# Organizational Responses to Public and Private Politics: An Analysis of Climate Change Activists and U.S. Oil and Gas Firms

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We explore how activists' public and private politics elicit different organizational responses. Using data on U.S. petroleum companies from 1982 to 2010, we investigate how climate change activists serving as witnesses at congressional hearings and engaging in firm protests influenced firms' internal and external responses. We find that public politics induced internally focused practice adoption, whereas private politics induced externally focused framing activities. We also find that private and public politics had an interaction effect: as firms faced more private political pressure, they were less likely to respond to public political pressures; similarly, as firms faced greater public political pressure, they were less likely to respond to private political pressures. The results suggest that activists can have a significant impact on firm behavior depending on the mix of private and public political tactics they engage in. We discuss the implications of our study for social movement research, organization theory, and nonmarket strategy.

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## Introduction

It is increasingly recognized that social movements can affect not only individual firms but also entire industries by identifying political opportunities, framing issues and problems, and mobilizing constituencies and resources (Davis et al. 2008, King and Pearce 2010). Our understanding of how social movements accomplish this has coalesced around two primary streams of research. The first suggests that movements can influence firms by leveraging the state to exert coercive and economic influence (Tarrow 1998, Amenta and Caren 2004, Olzak and Soule 2009). This approach has come to be known as "public politics" (Reid and Toffel 2009), because the outcomes of such political maneuvering are not under the social movement organizations' direct control; multiple stakeholders may have some influence. Public politics can be powerful because regulation shapes resource flows and allocation decisions within and between firms and exerts a normative influence on them (Wade et al. 1998). Despite the importance of movement-induced regulation, this critical pathway by which activists influence firms remains relatively unexplored (Clemens 2005). Although a wealth of research exists that identifies the conditions that make social movements influential in shaping public policy, only a few studies have investigated how social movements use

the state as a fulcrum to help them campaign against other targets (Amenta et al. 2010).

The second stream of research concerns how social movements influence firms by calling attention to and giving meaning to issues and problems through the use of tactics such as protests, rallies, sit-ins, strikes, and boycotts. These extra-institutional tactics have come to be known as "private politics" (Baron 2003) and are effective when they pose a credible threat to a firm's image and reputation (Bartley and Child 2011). Private political tactics[1] can have significant financial impacts on firms; for instance, protests influence a firm's stock price and media-covered boycotts have a material impact on firms' decisions (King and Soule 2007, King 2008). Other studies have shown how private political tactics result in firm responses that vary from symbolic responses to acquiescence (Briscoe and Safford 2008).

Although evidence has begun to accumulate about the direct impact of social movement tactics on organizations via tactics such as protests and boycotts (Luders 2006, Weber et al. 2009), as well as the indirect impact via stimulating changes in public policy (Schneiberg and Bartley 2001, Hiatt et al. 2009, Young and Schwartz 2014), few studies have considered both public and private political tactics simultaneously. As a consequence, little attention has been paid to the respective mechanisms that account for their impact on organizations;

therefore, questions regarding how the tactics may interact and what consequences or outcomes such interactions may generate have been neglected. Equally important is the way in which the targets of those tactics choose to respond. Just as different social movements have particular tactical repertoires (King and McDonnell 2014), firms have repertoires of strategic responses to stakeholder activism (McDonnell and King 2013). Yet extant literature has little to say about distinct firm responses to public and private politics.

We address these limitations by focusing on the public and private politics of social movements as well as the subsequent responses on the part of their targets. To explore the effects of public political tactics on firm outcomes, we examine an important but understudied form of political participation by activists: serving as expert witnesses in congressional hearings. To explore the effects of private political activities, we focus on the impact of firm-targeted protests. Specifically, we seek to determine (a) whether social movements can indeed influence firms through public politics even if their demands never become legally institutionalized, (b) whether public and private politics foster differential firm responses to movement demands, and (c) how responses to public and private politics interact. We argue that firms will respond to public political tactics with externally oriented framing activities and will respond to private political tactics with internally focused practice adoption. Furthermore, we argue that public and private political tactics will interact: as firms face more private political pressure, they will be more likely to respond to public political tactics; on the other hand, as firms face greater public political pressure, they will be less likely to respond to private political tactics.

To test our arguments, we observe a range of firm reactions and examine the two most common types of responses in our data set: the adoption of new practices and the framing of firm actions. We empirically examine the relationship between public and private political tactics (testimony at congressional hearings on climate change and firm protests, respectively) of climate change activists on the responses of U.S. oil and gas firms from 1982 to 2010. During this time period, climate change activists used various tactics to make climate change a national concern. They sponsored scientific studies, protested oil and gas companies, and advocated for laws to limit the amount of greenhouse gas that firms could emit—policies that could severely affect firm operating costs and profits. Although the climate change movement never achieved federal regulatory success during the period of our study, our findings suggest that protests and appearances as expert witnesses in congressional hearings orchestrated by the movement influenced firm management with regard to internally focused adoption of practices and externally focused linguistic framing of the movement's issues and the firm's own actions.

## Theory and Hypotheses

Social movement scholars have traditionally viewed movements as political phenomena (Giugni 1999), which, when coupled with the difficulty of studying other types of movement effects, has led to a natural focus on policy outcomes (see Amenta et al. 2010 for a review). However, despite a bulk of accumulated literature on policy outcomes, the findings are equivocal with regard to the efficacy of social movements in achieving policy change. Recent work suggests that regardless of whether movements achieve their political goals, their involvement in the political process may be beneficial (Amenta et al. 2010). These benefits become apparent in cases where social movements may use the state as a fulcrum to exert indirect influence over firms (Tarrow 1998). Yet despite this potential pathway of influence, research has largely been confined to the effects of private political tactics such as protests (King and Pearce 2010).

As a result, the literatures on public politics and private politics have developed independently from one another, despite calls to integrate these approaches and to empirically assess their impact on their respective targets (Baron 2003, Soule 2009). More recently, work has differentiated between public and private politics, demonstrating how tactical repertoires of activists are to some degree contingent upon the respective target. Using a 30-year data set of protests in the United States, Walker et al. (2008) found that the state is indeed the most common target for social movement activism, given its relative openness and routinized channels of access. They also showed that, given its coercive power, the state effectively channels social activism into more conventional forms of tactics such as lobbying and lawsuits. By contrast, corporate actors that are more closed and lack routinized channels of access are subject to more transgressive or disruptive tactics such as strikes, pickets, boycotts, and protests.

Despite growing theoretical and empirical attention to multiple targets of activism and a broader range of tactics employed by movements, it is still an open question as to whether and under what conditions anticorporate activists challenge the corporation solely through private political tactics or whether they also target some government or agency responsible for its regulation. Below, we outline the distinct mechanisms behind each type of tactic and then hypothesize both the main effects of each tactic and their interaction on firm responses.

### Firm Responses to Public Politics: Practice Adoption

The literature at the nexus of social movement theory and organization theory has explored the impact of social movements on organizations by means of *public politics*—the act of leveraging the state or its agencies to effect policy change (Reid and Toffel 2009,

Soule 2009). Specifically, activists may influence policy outcomes through actions such as lawsuits and by lobbying policy makers. In turn, changes in public policy constrain or enable different corporate practices and technologies (Pacheco et al. 2014, York and Lenox 2014).

We propose that activists can influence firms by using the policy-making process to foment regulatory uncertainty and risk. The credible risk of regulation is capable of inducing internal changes in firm behavior (Goodin 1986, Segerson and Miceli 1998, Lyon and Maxwell 2014). Uncertainty and risk are particularly salient early in the policy-making process when there is discussion of ways to address movement demands but not yet a decision on which, if any, to pursue. Public policy has real economic implications for firms. It makes particular actions subject to penalties (Wade et al. 1998), establishes the rules for economic exchange (Dobbin and Dowd 1997), and can increase the costs of business activity. Although evidence of the effect of policy outcomes on organizations abounds, few have explored the impact of regulatory uncertainty on firms' actions (Henisz et al. 2014). Some scholarship has theorized the impact of regulatory uncertainty on firms' strategies and decision processes (e.g., Marcus 1981), but precisely how firms should respond to policy makers' responsiveness to movement concerns is less clear. Difficulties in assessing risk and opportunity may motivate some firms to take a "wait-and-see" approach, engaging in more information seeking before deciding to respond, whereas other firms may preemptively innovate, make investments, or build capacity (Eisenhardt and Tabrizi 1995). Some studies indicate that action is more likely if the risk of future regulation is expected to persist and if potential outcomes would be costly (Aragon-Correa and Sharma 2003). Others suggest that, when a threat is salient, it captures the firm's attention and motivates it to respond (Hoffman and Ocasio 2001, Lyon and Maxwell 2014).

Building on these prior studies, we argue that if firms face persistent and high levels of movement-induced regulatory risk, they will be more likely to act in substantive ways to reduce the perceived risk. One reason is that firms recognize that through their internal actions they can shape rather than simply respond to regulatory risk by altering both the form and likelihood of regulation (Lyon and Maxwell 2014). By developing internal practices, processes, or technologies, firms can demonstrate to policy makers that movement demands and potential policy goals are being met credibly and voluntarily, making the need for regulation less urgent or even unnecessary. Policy makers may be less likely to expend political capital to legislate on a problem that has already been addressed by the industry (Maxwell et al. 2000, Lim and Prakash 2014). Additionally, if firms in an industry address (or appear to be addressing) movement demands, they may reduce the movement's

influence on the policy-making process, making it less likely that actual policy changes will occur (Khanna and Anton 2002). Finally, if the policy-making process were to continue, the firm's adoption of practices that address movement demands could still reduce regulatory risk. If policy makers take firms' own positive actions into account, the resulting policy might be more favorable to those firms than if they had only adopted a wait-and-see approach. Firms that anticipate regulation and strategically develop internal practices and technologies that meet the goals of potential policy can persuade policy makers to accept those practices as possible solutions (Lyon and Maxwell 2003). For example, seeing that German automakers had invested heavily in three-way catalytic converters to reduce $NO_x$ emissions, policy makers accepted catalytic converters, rather than other competing "clean engine" technologies, as the emission standard (Lutz et al. 2000).

In sum, we argue that social movements can influence a firm's adoption of new practices by creating regulatory uncertainty and risk through the policy-making process. Congressional discussion of movement demands makes the threat of regulation credible and salient, which can capture firms' attention. Thus, firms may be motivated to address movement demands with substantive, internally focused actions affecting their technical practices with the intent to reduce regulatory risk by discouraging the continuation of the policy-making process or, if it were to continue, by influencing policy formulation so that policy outcomes acknowledge firms' own actions. Hence, we argue the following.

HYPOTHESIS 1. *Public politics will be associated with greater firm adoption of internal practices that attempt to address movement concerns.*

## Firm Responses to Private Politics: Framing Activities

Activists can affect firms not only through public politics but also through private political tactics such as consumer boycotts, protests, and blockades. Whereas public politics attempt to influence a company's behavior indirectly through policy, private politics attempt to alter the public's view of the company by drawing public attention to controversies and by framing firms and their actions as unethical (Eesley and Lenox 2006, Vasi and King 2012). If a firm is a target of protests, blockades, or boycotts, it may suffer damage to its reputation and image (King and Soule 2007, King 2008), which may cause important stakeholders to doubt its claims to be addressing movement demands and potential policy goals (Barnett and King 2008). As legitimacy and image threats in the eyes of key stakeholders are made salient, firms' attention is drawn to private politics. Thus, these two approaches rely on different mechanisms of influence: public politics rely on using the state as a fulcrum

to exert coercive and economic influence (Tarrow 1998), whereas private politics rely on public shaming (King and Pearce 2010).

Having argued that public politics leads to changes in firms' technical practices, we suggest that private politics will, for a number of reasons, elicit different responses. Whereas public political tactics can lead to pressure through state support, private political tactics such as boycotts and protests are usually independent of state influence and are episodic in nature. Furthermore, once such tactics end, activist pressure generally subsides (McDonnell and King 2013). Unlike the state, which wields regulatory authority, social movements have little coercive power vis-à-vis firms. Instead, the power of private political tactics rests in their ability to tarnish the legitimacy and image of firms (Armstrong and Bernstein 2008). Additionally, a firm may find activists' demands unclear or unrealistic when communicated via protests or boycotts. Finally, even if the activists' position is clear, the proposed changes may seem unrelated to the firm's own goals (Bromley and Powell 2012). Thus, in the absence of any strong coercive power, the firm has more discretion in responding to activist demands and is likely to satisfice rather than optimize when it comes to compliance. We therefore argue, in contrast to the impact of inherently more persistent public politics on a firm's internally oriented technical responses, private politics, which are more episodic and ephemeral in nature, will elicit more externally directed responses that attempt to manage the firm's reputation and to convince important audiences of the value and legitimacy of the firm's actions. We explore two kinds of responses that frame firm actions positively vis-à-vis social movements: (a) seeking affiliation with movement-aligned associations and (b) issuing public statements via press releases that address social movement issues.

*Affiliating with Associations That Address Movement Concerns.* Activist attacks can tarnish a firm's image and reputation and instill doubt in the minds of key audiences that the firm will actually address activists' demands (King and Soule 2007). To deal with activist attacks, firms can affiliate with prominent associations that seek to address movement concerns, signaling that the firm has aligned itself with movement demands. Research on social ties suggests that the perception of a firm is influenced by its affiliations (Baum and Oliver 1991); audiences assume that the understandings, values, and norms held by one actor are shared by other parties to which it has ties (McPherson et al. 2001). Firms may therefore seek to buttress their reputations against activist attacks by affiliating with associations aligned with the activists' goals (Kim and Lyon 2015). Therefore, we argue that the more activists protest a firm, the more likely it will affiliate with associations that seek to address activists' concerns.

HYPOTHESIS 2. *Private politics via protests will be associated with firms seeking affiliation with associations that attempt to address movement concerns.*

*Issuing Press Releases.* Private political tactics may also induce firms to frame the movement's issues and their own actions in ways that protect their image and reputation. For example, firms use press releases and media interviews to present their views and reasons, casting issues in a particular light (Lounsbury and Glynn 2001). Scholars have found that such framing can shape how audiences assess a firm's reputation and practices (Bansal and Clelland 2004).

Press releases that frame a firm's actions and motives in a good light can be particularly important when facing protests, which can threaten its reputation and call into doubt its claims to address movement demands. If the firm's own narrative gains legitimacy in the eyes of key audiences, press releases that reinforce this narrative will buttress its image and reputation. Thus, we argue that, as reputational attacks increase from private politics, firms will increasingly seek to shape the public debate of movement issues and the public's opinion of their own actions through press releases.

HYPOTHESIS 3. *Private politics via protests will be associated with increased framing of movement concerns and firm actions via press releases.*

## Interaction of Firm Responses to Public and Private Politics

Although private and public politics may differentially affect firms and elicit distinct responses, it is possible that the two interact, given that both are intended to alter firm behavior. The social movement literature on radical flank theory provides a useful starting point to theorize the potential interactive effects of private and public tactics. Radical flank theory refers to the impact of radical social movement organizations on the efficacy of more moderate ones (Haines 1984, 1988). Radical groups with their associated ideology, organization, and tactics can have beneficial effects on the efforts of moderate social movement organizations by either providing a radical foil against which moderate claims are redefined as more reasonable or by generating crises that are subsequently resolved by making concessions to the more moderate rather than the more radical interests within a social movement (Haines 1984).

Although this theoretical approach was developed in the context of radical versus moderate groups within the civil rights movement, the theory can be reasonably adapted to the level of social movement tactics. We make this claim because tactics or action repertoires are often highly correlated with and used to categorize social movement organizations (SMOs) along a radical–moderate continuum (Haines 1988, Kriesi 1996).

For example, although the Congress of Racial Equality (CORE) social movement organization held the same goals as those of the National Association for the Advancement of Colored People (NAACP), because CORE engaged in direct, face-to-face confrontational tactics, they were classified as more radical and militant than the NAACP (Haines 1988, p. 27).

A second justification for adapting radical flank theory to the level of tactics is because organizations are dynamic. They can be perceived as more or less radical over time and as a result of the emergence of new groups that may make incumbent groups appear more moderate because of the tactics employed, the goals pursued, and the ideologies espoused (Haines 1988). More recent work underscores the fact that SMOs often blend radical/disruptive tactics with more moderate/persuasive tactics and recognizes the existence of "hybrid" SMOs (Clemens 1997). Thus, we find it more theoretically useful and tractable to determine the degree of "radicalness" of a range of tactics rather than to attempt to classify the shifting radical nature of SMOs.

In focusing on different tactics employed by a social movement, we recognize that activists can and do challenge multiple targets using a variety of tactics and repertoires (McAdam 1983, Morris 1993, Soule 2009). Although scholars have devoted theoretical and empirical effort to categorizing the nature of tactics (Tarrow 1998, Taylor and Van Dyke 2004), few studies have tied distinct types of tactics to specific targets of activism. Clearly, different tactics serve different purposes and carry varied legitimacy in the eyes of the targets and broader stakeholders. Drawing on radical flank theory (Haines 1988) and following more recent empirical work on social movement repertoires (Walker et al. 2008), we suggest that private politics, which utilize disruptive and confrontational tactics such as protests and boycotts, are more radical than public politics, which are more persuasive in nature and conventional in the sense that they tap institutionalized channels of access to policy makers. Given these differences, private and public politics are likely to interact when used concurrently as they relate to specific firm responses.

We argue that private politics will enhance the influence of public political tactics on firm practice. Radical flank theory suggests that the presence of activists engaging in radical tactics such as boycotts, disruptive protests, and obstructionism will motivate firms and other important stakeholders to deal with activists who engage in more moderate tactics, such as activists serving as witnesses in congressional hearings (Haines 1984, McAdam 1992). For example, American office supply chain Staples, facing protests over its ecological footprint from the Rainforest Action Network, sought to negotiate instead with the Environmental Defense Fund, a nongovernmental organization (NGO) that engaged in more moderate tactics and was seen as more legitimate in reaching a compromise (Barnett and Hoffman 2008). In another example, conservative national labor unions in Central America who argued for labor reform in the global apparel industry were aided by radical transnational activist pressure that raised the specter of even more left-oriented unionization, prompting firms to become more amenable to conservative union demands (Anner 2009). Following this same logic, we posit that because private political tactics are more radical in nature than public politics, they will enhance the effect of public politics on firms adopting internal practices to address movement concerns.

HYPOTHESIS 4. *The impact of public politics on the adoption of internal practices will be positively moderated by the number of activist protests.*

We argue that a similar logic operates in the context of how public politics might moderate the effect of private politics on firm-framing activities. Radical flank theory argues that the presence of radicals causes moderates to appear more legitimate and amenable to negotiation in the eyes of important audiences, such as the public, policy makers, and corporations. Likewise, the presence of moderates makes radical groups appear illegitimate and less attractive (Barnett and Hoffman 2008). Thus, given the choice between moderate and radical groups, firms will likely choose to engage with those that use moderate tactics over those that use radical tactics because it may provide a more favorable compromise. Additionally, because activists who use radical tactics lose support relative to those who use moderate tactics, firms will feel less public pressure to engage with more radical activists, reducing firms' incentive to respond with framing activities. Applying this perspective here, we argue that in the presence of more moderate or conventional tactics, firm responses to radical tactics will be mitigated because firms will generally prefer to engage with activists who utilize conventional channels such as public politics than more disruptive tactics such as private politics. Thus we hypothesize as follows.

HYPOTHESIS 5. *The impact of private politics on firms' affiliation seeking will be negatively moderated by the number of activist witnesses at congressional hearings.*

HYPOTHESIS 6. *The impact of private politics on firm press releases will be negatively moderated by the number of activist witnesses at congressional hearings.*

## Empirical Context: U.S. Oil and Gas Industry

We consider the oil and gas industry an ideal setting to study the differential impacts of private and public politics on firms' responses for two reasons. First,

it is a long-standing and major target of social movement activity, giving us ample opportunity to assess the impact of protest on firms' responses. Second, because of its inherent safety and environmental issues, the industry is highly regulated and therefore constantly concerned with governmental monitoring and regulation (Hoffman 1999).

Petroleum production takes place in stages. The most well-known stages of petroleum production are primary and secondary stage production: pumping oil from the reservoir and maintaining well pressure. However, it eventually becomes difficult to extract the remaining oil using conventional techniques. In this case, oil and gas companies can abandon the well and move on to more economically viable projects or can engage in the tertiary stage of production, known in the industry as enhanced oil recovery (EOR). This includes steam injection, in situ combustion, electrical heating, chemical flooding, and gas injection (Moritis 2010). The principle behind all these methods is to displace the oil with the injected material by increasing rock permeability and well pressure while reducing petroleum viscosity. Since the primary and secondary production stages recover, on average, less than 30% of a reservoir's oil, the use of EOR technologies can be extremely valuable, increasing the amount of oil extracted by 30%–60% (Ali and Thomas 1994). The U.S. Department of Energy (2007) estimated that an additional 146 billion barrels of oil could be recovered from existing wells in the United States using EOR techniques. Interest in EOR began in the 1970s in response to the world oil crisis and the widespread nationalization of private oil and gas companies. As of 2011, EOR accounted for 281,000 barrels per day, or 6% of daily U.S. oil production (NEORI 2012).

In this study, we are primarily interested in firm adoption of carbon dioxide injection. Although unprofitable compared with other EOR technologies, it became a popular firm response to public political tactics.[2] The technology entails injecting carbon dioxide ($CO_2$) into wells to displace oil from a reservoir. Atmospheric carbon dioxide has been declared to be a major culprit of climate change. Because the $CO_2$ used in EOR becomes permanently sequestered into the ground, $CO_2$ EOR could be characterized as a potential solution to climate change.

While EOR methods were being developed, climatologists tracked changes in the planet's temperatures by studying Antarctic ice cores and created models based on increases in atmospheric greenhouse gases such as carbon dioxide and methane. Results showed that the release of carbon dioxide and methane into the atmosphere correlated with higher global temperatures. Environmental activists seized on these scientific reports and, using public and private politics, sought to convince companies, governmental officials, and the public of the impending catastrophe of greenhouse gas emissions (Ansari et al. 2013).

## Methods

The sample for our analysis consists of all EOR well data and information on all publicly traded U.S. oil and gas corporations from 1982 through 2010, encompassing 748 companies and more than 110 EOR projects. Of those companies, 82 (11%) engaged in enhanced oil recovery and 43 (6%) had at some point developed and adopted $CO_2$ injection as their choice of EOR technology.

### Dependent Variables

Our dependent variables are the adoption of firm practices that attempt to address movement demands (*$CO_2$ EOR injection*) and the framing activities that seek to protect and improve the firm's image (*affiliation seeking* and *press releases*). We measure internally focused firm practices as the number of $CO_2$-injection projects a company pursued in given year. Data on EOR projects and oil and gas companies came from biennial surveys[3] from the *Oil and Gas Journal*.

With regard to framing activities, we measured affiliation seeking with movement-aligned organizations as the number of climate change associations a firm joined in a given year. Most of these associations were staffed by recognized scientific experts on climate change and had prominent environmental nongovernmental organizations as members. Seventeen climate change associations had accepted petroleum companies as members. Our data on membership came from oil and gas companies and from the associations' membership lists. It is important to note that although affiliation with such associations is often designed to foster collective action toward substantive self-regulatory efforts (Lenox and Nash 2003), in many contexts these affiliations are largely symbolic (Delmas and Montes-Sancho 2010). Most affiliations with climate associations in our study were of the latter type in which the association was not working with firms to establish self-regulation standards.

Regarding press releases, we followed prior research (McDonnell and King 2013) and counted the annual number of press releases in which oil and gas firms addressed climate change and sought to protect their image. We extracted the relevant press releases from PR Newswire and Business Wire in LexisNexis using search terms such as "climate change," "greenhouse gas," "global warming," and "carbon capture" by firm-year. Our three dependent variables were not interdependent; firms could and (empirically) did engage in some or all of the three actions.

### Predictor Variables

Our predictor variables are public and private political tactics used by climate change activists. To capture public political tactics, we counted how many times climate change activists served as witnesses in U.S. Senate or House of Representatives hearings on climate change

in a given year (*activist witnesses*). Congressional witnesses are invited to testify by committee chairs or by the ranking minority chair. In many cases, witnesses also request to testify, which must be approved by committee chairs (LaForge 2010, Heitshusen 2012). We collected data on hearings on general climate change issues and on specific greenhouse gases such as carbon dioxide and methane. None of these hearings ever led to a bill that became law.[4] We identified whether a witness was a climate change activist based on his or her affiliation with climate change advocacy organizations and summed the number of these witnesses per hearing. This measurement captures the movement's influence on policy makers because only those witnesses who have successfully communicated the importance of their position to members of Congress are invited to testify (Leyden 1995). These data come from the U.S. Library of Congress's THOMAS database.

Following previous research (King 2008) and using the LexisNexis newspaper database, we captured private political tactics as the sum of protests related to climate change against oil and gas companies reported in local and national U.S. newspapers (*firm protests*). All predictor variables were lagged by one year to deal with potential endogeneity. As a robustness check, we also ran analyses with predictor variables lagged by two years in the Heckman model and found no difference in effects. Results also remained the same in multivariate analyses without a lag.

### Control Variables

We controlled for a number of factors that could affect practice adoption and framing activities. Since EOR is resource intensive, it is likely to be affected by firm revenues and the relative price of petroleum to natural gas, as a higher oil price in relation to natural gas could cause firms to invest more in oil extraction processes. We therefore included *firm revenues* and the *liquid-oil-to-natural-gas price ratio*, using the West Texas Intermediate (WTI) annually averaged spot price and the annually averaged price of wellhead natural gas. We also included a firm's *return on assets* and *research and development to sales* that could affect EOR activity, as reported in the *Oil and Gas Journal* surveys.

We controlled for the percentage of a firm's crude oil reserves that originates from the United States (*U.S. liquid oil reserves percentage*) because firms with a greater proportion of oil from the United States would likely be more affected by the potential enactment of climate change policy in the United States than those with less. Similarly, because crude oil is more carbon dense than methane, firms that depend more on oil than on natural gas for their revenues would also likely be more affected by climate change policy, which could affect their EOR technology decision. We therefore controlled

for the ratio of U.S. crude oil to natural gas production by company (*U.S. liquid-oil-to-gas-production ratio*).

We also controlled for the number of EOR projects (*EOR projects*) a firm engaged in as well as how many of those projects were joint ventures with other companies (*joint venture EOR projects*) in a given year. To capture industry learning trends, we included a measure of *EOR technology efficiency*, which is the annual total number of barrels of oil extracted per EOR project, as reported in the *Oil and Gas Journal* surveys. We also controlled for the number of *general EOR incentives* at the state and federal levels as well as EOR incentives specifically directed toward $CO_2$ technologies (*$CO_2$-specific EOR incentives*). Data on state regulations and incentives came from state regulation codebooks.

Because hearings on climate change may depend on which political party is in control, we controlled for the percentage of Democratic seats held in the House of Representatives and Senate (*Democrat control*), following prior research (Soule and Olzak 2004). To capture public sentiment of climate change, we included a dummy variable to control for the years after which the United Nations (UN) Framework Convention on Climate Change occurred. We also included a count of *total congressional witnesses* testifying about climate change by year in order to account for any effects related to climate change testimony in general.

We also controlled for a firm's past environmental and safety record with variables that measured reported U.S. Environmental Protection Agency (EPA) complaints and major industrial accidents. The variable *EPA complaints* captures the number of formal public complaints about a firm submitted to the EPA by year. The variable *major industrial accidents* seeks to capture industrial disasters that caused major environmental damage and human death. It is a yearly sum of the number of oil spills that exceeded 100,000 barrels internationally and 10,000 barrels in U.S. waters as well as the number incidents where five or more fatalities occurred. We obtained these data from the U.S. Environmental Protection Agency, the U.S. National Oceanic and Atmospheric Administration, the U.S. Coast Guard National Response Center, and the U.S. Occupational Safety and Health Administration. Finally, we included firm-fixed effects to control for any unobserved, time-invariant firm-specific characteristics.

### Analysis

A firm's decision to adopt a particular EOR technology is likely conditional on unobserved factors that influence the firm's decision to engage in any type of EOR in the first place. To correct for this potential bias, we employed a two-stage Heckman (1979) selection model to calculate the extent to which firms adopted climate change technologies. It can be modeled as $y_{it} = x_{i(t-1)}\beta + z_{it}\gamma + \lambda + u + \varepsilon_{it}$, where $y_{it}$ is the number of

EOR projects for each firm $i$ in year $t$, $x_{it}$ is our predictor variable of congressional hearings, $z_{it}$ is a vector of time-varying controls, $\lambda$ is the inverse Mills ratio, $u$ is the firm-fixed effect, and $\varepsilon_{it}$ is the random error. Given that enhanced oil recovery is a technology-intensive process requiring technical expertise and financial capital, the instrument selector variables we included are firm size as measured by annual firm revenues and the ratio of oil price to gas price.[5]

To analyze the effect of public and private political tactics on firm membership in climate change organizations and on firm press releases, we conducted a multivariate regression, a technique commonly used to measure endogenous dependent variables (Zellner 1962). It entails jointly regressing several dependent variables on the same independent variables, thereby producing a model with adjusted coefficients and standard errors for the two equations. The parameter estimates are given by a $p \times q$ matrix of $B = (X'X)^{-1}X'Y$, where $Y$ is an $n \times q$ matrix of dependent variables and $X$ is an $n \times p$ matrix of independent variables.[6]

## Results

Descriptive statistics and bivariate correlations appear in Table A1 of the online appendix (available as supplemental material at http://dx.doi.org/10.1287/orsc.2015.1008). The results of the two-stage Heckman selection regression predicting the adoption of $CO_2$-injection technologies to reduce climate change at the firm level appear in Table 1. The first stage of the Heckman selection model is found in Table A2 of the online appendix . The results of the multivariate regression predicting firm membership in movement-aligned associations and firm press releases are found in Table 2. In the online appendix, we present robustness checks that include analyses of $CO_2$-injection technology adoption at the EOR-project level (Table A3), the profitability of $CO_2$-injection techniques (Table A4), and firm lobbying (Tables A5 and A6).

*Practices: Adoption of $CO_2$ Injection.* In the first-stage analysis found in Table A2, the results indicate that firm revenues increased the probability that a firm would engage in enhanced oil recovery, in accordance with our instrument expectations, whereas the ratio of oil price to natural gas price did not have a significant effect. In addition, greater EOR incentives had a positive impact on the decision to engage in EOR, whereas a firm's EOR technology efficiency and the number of climate change witnesses at congressional hearings had the opposite effect.

In the second-stage analysis, found in Table 1, the first model shows the effects of the control variables only, the second adds activist witnesses at congressional hearings, the third adds firm protests, and the

fourth includes the firm's response to private politics (total sum of press releases and association affiliations). A few of the control variables significantly affected adoption of $CO_2$-injection technologies. Companies with greater experience with EOR projects, with greater industrial accidents, and with a larger percentage of their liquid reserves held in the United States were more likely to adopt $CO_2$-injection technologies. For every EOR project in operation, a firm would be 11% more likely to adopt $CO_2$ injection. Additionally, for every percentage of oil reserves in the United States versus in other countries, a firm would be 10 times more likely to adopt $CO_2$ injection.

The results in Table 1 support Hypothesis 1. Model 2 indicates that a higher number of activist testimonies at congressional hearings had a positive impact on the adoption of technologies that mitigate climate change. A one-standard-deviation increase in activist testimonies from the year before increased the propensity of a firm to use $CO_2$-injection technology over other EOR technologies by 75% (see Figure A1 in the online appendix). Firms chose carbon dioxide well injection technology because it allowed them to address activists' demands while maintaining ongoing petroleum extraction—their core business function. Oil and gas companies viewed $CO_2$ injection as a solution to social movement demands and potential policy goals and chose this less profitable technique over several alternatives in response to activist-generated regulatory risk. For example, in 2009, ExxonMobil touted its accomplishments in sequestering $CO_2$ through EOR. It stated that

> ExxonMobil is active in the evaluation and adoption of Carbon Capture and Storage (CCS) around the world. ExxonMobil is taking action to mitigate greenhouse gas emissions today and to support the development of advanced energy technologies with the potential to reduce future emissions significantly.... We have a history of proven results in a production process called Enhanced Oil Recovery (EOR), which involves injecting $CO_2$ into a reservoir to extract "trapped" oil and gas that could not otherwise be produced. (ExxonMobil 2009)

*Framing Activity: Affiliation with Movement-Aligned Associations.* The first model in Table 2 includes the control variables only, the second model adds activist witnesses at congressional hearings, the third includes firm protests, and the fourth includes the firm's response to public politics ($CO_2$ adoption). Several control variables had a significant impact on affiliation with movement-aligned associations. Larger firm size, in terms of firm revenues and a greater number of joint ventures in other EOR projects, was associated with greater affiliation. On the other hand, greater $CO_2$-specific EOR incentives, EOR technology efficiency, and more dependence on U.S. oil reserves were negatively associated with affiliation. This latter effect may be because firms with more oil reserves abroad are responding to activist

**Table 1    Second Stage of Heckman Two-Stage Regression of $CO_2$ EOR Injection**

| Variable | Model 1 | Model 2 | Model 3 | Model 4 |
|---|---|---|---|---|
| *Activist witnesses* | | 0.036* | 0.047** | 0.050** |
| | | (0.016) | (0.016) | (0.016) |
| *Firm protests* | | | −0.141*** | −0.104 |
| | | | (0.043) | (0.075) |
| *Activist witnesses × Firm protests* | | | | −0.003*** |
| | | | | (0.001) |
| *General EOR incentives* | −0.186 | 0.320 | 0.292 | 0.340 |
| | (0.696) | (0.731) | (0.718) | (0.719) |
| *$CO_2$-specific EOR incentives* | 1.424* | 0.783 | 1.028 | 1.040 |
| | (0.648) | (0.688) | (0.680) | (0.679) |
| *Democrat control* | −0.051 | −6.850 | −7.238 | −7.056 |
| | (5.239) | (5.975) | (5.869) | (5.866) |
| *UN Framework Convention on Climate Change* | 0.955 | 0.839 | 0.985 | 1.020 |
| | (0.877) | (0.863) | (0.849) | (0.849) |
| *EOR technology efficiency* | 0.000 | 0.000 | 0.000 | 0.000 |
| | (0.001) | (0.001) | (0.001) | (0.001) |
| *EPA complaints* | 0.091 | −0.214 | 0.082 | −0.022 |
| | (2.368) | (2.305) | (2.265) | (2.265) |
| *Major industrial accidents* | 2.520+ | 2.795* | 2.682* | 2.868* |
| | (1.401) | (1.347) | (1.322) | (1.337) |
| *Total congressional witnesses* | 0.007 | 0.003 | 0.005 | 0.005 |
| | (0.004) | (0.004) | (0.004) | (0.004) |
| *EOR projects* | 0.115*** | 0.118*** | 0.130*** | 0.129*** |
| | (0.032) | (0.032) | (0.032) | (0.032) |
| *Joint venture EOR projects* | −0.002 | −0.008 | 0.006 | 0.004 |
| | (0.053) | (0.052) | (0.051) | (0.051) |
| *Return on assets* | −0.013 | −0.085 | −0.146 | −0.152 |
| | (0.678) | (0.684) | (0.673) | (0.672) |
| *Research and development to sales* | 0.144 | 0.138 | 0.025 | 0.018 |
| | (0.729) | (0.732) | (0.721) | (0.720) |
| *U.S. liquid oil reserves percentage* | 10.139*** | 10.195*** | 9.936*** | 9.935*** |
| | (1.331) | (1.304) | (1.283) | (1.282) |
| *U.S. liquid-oil-to-gas-production ratio* | 0.411 | 0.432 | 0.477 | 0.494 |
| | (0.601) | (0.603) | (0.593) | (0.592) |
| Firm-fixed effects | Yes | Yes | Yes | Yes |
| Constant | −3.981 | −0.433 | 0.802 | 0.571 |
| | (3.626) | (3.814) | (3.764) | (3.767) |
| Wald $\chi^2$ | 275.35*** | 289.11*** | 310.60*** | 312.19*** |
| No. of uncensored observations | 306 | 306 | 306 | 306 |

*Note.* Standard errors appear in parentheses.
    $^+p < 0.10$; $^*p < 0.05$; $^{**}p < 0.01$; $^{***}p < 0.001$.

pressure in other regulatory regimes (such as the European Union) in which climate change activists are more influential.

The results in Model 3 of Table 2 support Hypothesis 2. A one-standard-deviation increase in protests against a firm increased a firm's propensity to seek membership with an additional climate change association by 3%. Climate change associations generally operated as nonprofit groups for the promotion of carbon-sequestration technologies as a possible solution to climate change. Petroleum companies joined climate change associations such as the Global Methane Initiative and the Pew Center for Global Climate Change (now the Center for Climate and Energy Solutions). Companies also formed and joined associations centered more specifically on carbon capture and storage. For instance, in 2000, BP, Chevron, and Shell joined the $CO_2$ Capture Project to advance EOR technologies that would "underpin the deployment of industrial-scale $CO_2$ capture and storage" ($CO_2$ Capture Project 2012). In 2008, Occidental Petroleum, ConocoPhillips, BP, Shell, Denbury Resources, and other companies joined the U.S. Carbon Sequestration Council to discuss and "reach consensus or at least narrow differences" on interests and issues regarding geological sequestration rule making (Carbon Sequestration Council 2009).

**Table 2  Multivariate Regression of Association Membership and Press Releases**

| Variable | Model 1 | | Model 2 | | Model 3 | | Model 4 | |
|---|---|---|---|---|---|---|---|---|
| | Association affiliation | Press releases | Association affiliation | Press releases | Association affiliation | Press releases | Association affiliation | Press releases |
| *Activist witnesses* | | | 0.000 (0.000) | 0.000 (0.000) | 0.000 (0.000) | −0.000 (0.000) | 0.000 (0.000) | 0.000 (0.000) |
| *Firm protests* | | | | | 0.016*** (0.002) | 0.027*** (0.002) | 0.026*** (0.002) | 0.071*** (0.003) |
| *Activist witnesses × Firm protests* | | | | | | | −0.000*** (0.000) | −0.001*** (0.000) |
| *General EOR incentives* | 0.029*** (0.008) | 0.027* (0.013) | 0.031*** (0.008) | 0.028* (0.013) | 0.029*** (0.008) | 0.025* (0.013) | 0.027*** (0.008) | 0.014 (0.012) |
| *$CO_2$-specific EOR incentives* | −0.026+ (0.016) | 0.010 (0.024) | −0.031+ (0.016) | 0.008 (0.025) | −0.051** (0.016) | −0.026 (0.024) | −0.043** (0.016) | 0.012 (0.023) |
| *Democrat control* | −0.079 (0.068) | −0.120 (0.105) | −0.134+ (0.076) | −0.146 (0.118) | −0.132+ (0.075) | −0.143 (0.115) | −0.120 (0.074) | −0.088 (0.108) |
| *UN Framework Convention on Climate Change* | −0.007 (0.011) | −0.024 (0.017) | −0.008 (0.011) | −0.024 (0.017) | −0.007 (0.011) | −0.023 (0.017) | −0.004 (0.011) | −0.007 (0.016) |
| *EOR technology efficiency* | −0.000+ (0.000) | 0.000 (0.000) | −0.000* (0.000) | 0.000 (0.000) | −0.000* (0.000) | 0.000 (0.000) | −0.000* (0.000) | −0.000 (0.000) |
| *EPA complaints* | −0.035 (0.065) | −0.032 (0.100) | −0.036 (0.065) | −0.032 (0.100) | −0.039 (0.063) | −0.037 (0.098) | −0.042 (0.063) | −0.052 (0.092) |
| *Major industrial accidents* | 0.074 (0.046) | 0.067 (0.071) | 0.074 (0.046) | 0.067 (0.071) | 0.055 (0.045) | 0.036 (0.070) | 0.081+ (0.045) | 0.158* (0.066) |
| *Total congressional witnesses* | 0.000+ (0.000) | −0.000 (0.000) | 0.000 (0.000) | −0.000 (0.000) | 0.000 (0.000) | −0.000 (0.000) | 0.000+ (0.000) | 0.000 (0.000) |
| *Firm revenues* (logged) | 0.007** (0.002) | 0.006 (0.003) | 0.006** (0.002) | 0.005 (0.004) | 0.006* (0.002) | 0.004 (0.004) | 0.005* (0.002) | 0.002 (0.003) |
| *Joint venture EOR projects* | 0.017*** (0.002) | 0.015*** (0.003) | 0.017*** (0.002) | 0.015*** (0.003) | 0.013*** (0.002) | 0.009** (0.003) | 0.012*** (0.002) | 0.004 (0.003) |
| *Return on assets* | 0.001 (0.003) | 0.001 (0.005) | 0.001 (0.003) | 0.001 (0.005) | 0.001 (0.003) | 0.001 (0.005) | 0.001 (0.003) | 0.001 (0.005) |
| *Research and development to sales* | 0.007 (0.009) | 0.006 (0.014) | 0.007 (0.009) | 0.006 (0.014) | 0.006 (0.009) | 0.004 (0.014) | 0.006 (0.009) | 0.003 (0.013) |
| *U.S. liquid oil reserves percentage* | −0.090*** (0.020) | −0.080* (0.031) | −0.090*** (0.020) | −0.080* (0.032) | −0.082*** (0.020) | −0.067* (0.031) | −0.082*** (0.020) | −0.069* (0.029) |
| *U.S. liquid-oil-to-gas-production ratio* | −0.001 (0.002) | −0.006* (0.002) | −0.001 (0.002) | −0.006* (0.002) | −0.001 (0.001) | −0.006* (0.002) | −0.001 (0.001) | −0.005* (0.002) |
| Firm-fixed effects | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Constant | 0.012 (0.069) | 0.293** (0.107) | 0.060 (0.076) | 0.316** (0.117) | −0.097 (0.076) | 0.059 (0.116) | −0.129+ (0.075) | −0.093 (0.110) |
| *F* statistic | 2.02*** | 1.04*** | 2.02*** | 1.03*** | 2.25*** | 1.25*** | 2.32*** | 1.85*** |
| No. of observations | 3,449 | 3,449 | 3,449 | 3,449 | 3,449 | 3,449 | 3,449 | 3,449 |

*Note.* Standard errors appear in parentheses.
$^{+}p < 0.10$; $^{*}p < 0.05$; $^{**}p < 0.01$; $^{***}p < 0.001$.

*Framing Activity*: *Press Releases.* A couple of the control variables had statistically significant impacts on the framing of firm actions and movement issues via press releases: dependence on U.S. oil reserves and a high U.S. liquid-oil-to-gas-production ratio were negatively associated with the number of press releases. The results in Model 3 of Table 2 support Hypothesis 3. A one-standard-deviation increase in protests against a firm increased its propensity to issue a press release that sought to frame the firm in a good light with respect to actions it was or was not taking with regard to climate change by 5%.

Some examples of press releases that sought to frame the company in a good light regarding climate change include the following: Exxon's chairman and chief executive officer stated in a press release that "the most pressing environmental problems of the developing nations are related to poverty, not global climate change" and that addressing these problems "will require economic growth, and that will necessitate increasing, not curtailing, the use of fossil fuels" (Exxon 1997). A ChevronTexaco press release stated that the firm "initiated a third-party verification of greenhouse gas emissions, which enabled the company to set an emissions

goal for 2004.... ChevronTexaco's goal is to find ways to meet growing energy demand while reducing long-term growth in greenhouse gas emissions" (Chevron-Texaco 2004). In a final example, a Conoco press release stated that it "recognizes that human activity, including the burning of fossil fuels, is contributing to increased concentrations of greenhouse gases (GHG) in the atmosphere that can lead to adverse changes in global climate," and that it had shown "continued commitment to achieving sustainable growth through financial excellence, environmental responsibility, and social progress" (Conoco 2002).

*Interaction of Public and Private Politics.* To test the interaction between firm responses to private and public politics, we included private political tactics in the analyses predicting the adoption of new practices (Models 3 and 4 of Table 1) and public political tactics in the analyses predicting framing strategies (Models 3 and 4 of Table 2). In Hypothesis 4, we argued that the response to public politics (adoption of $CO_2$ technologies) would increase in the presence of private politics. The results in Model 4 of Table 2 do not support this argument. Surprisingly, the interaction of protests and activist witnesses is actually negative, suggesting that in the presence of private politics, firms are less likely to respond to public politics by adopting new practices. We also find that the main effects of private politics are negative and significant in Model 3 of Table 2 (but not in Model 4, which includes the interaction of public and private politics), indicating that firms are less likely to adopt new practices in response to private political tactics alone. We discuss these unexpected findings in the Discussion section.

The results in Model 4 of Table 2 offer support for both Hypotheses 5 and 6. The interaction of protests and activist witnesses is significant and negative, suggesting that in the presence of public politics, firms are less likely to respond to private politics by joining associations that address movement concerns and by framing the issues through press releases. We also find that public politics have no effect on the likelihood of firms' joining associations or issuing press releases.

## Robustness Tests

We conducted a number of robustness tests to address alternative explanations and firm responses. Our main analysis is at the firm-year level. Although we controlled for firm-fixed effects, there remains a possibility of endogeneity because of firms' selection of particular EOR projects. To deal with this, we also ran a logistic regression at the EOR-project level of whether a firm would select $CO_2$ injection versus all other types. Because the EOR-project level allows us to more accurately capture local geographical factors, we also included a binary variable (*climate change regulation*)

that controlled for individual states that had signaled their intent to regulate carbon-dioxide emissions (for a description, see Reid and Toffel 2009). The results of our robustness test at the EOR-project level, shown in Table A3, provide additional support for Hypothesis 1. They show that, when we controlled for the nature of the EOR projects, greater activist participation as witnesses at hearings led to more adoption of $CO_2$-injection technologies.

We also ran a first-difference estimator to address potential endogeneity using activist witnesses and firm protests as predictors of $CO_2$ EOR adoption, climate change affiliation, and press releases. The results of the first-difference estimator, which regresses the change of the dependent variables $y_{it}$ on the change of independent variables $x_{it}(\Delta y_{it} = y_{it} - y_{it-n} = \Delta x_{it}\beta + \Delta u_{it}, t)$, supported our main arguments.

A possible counterargument to why oil and gas companies adopted $CO_2$-injection techniques is that this technology was more profitable than other techniques. $CO_2$ injection is frequently asserted to be unprofitable relative to other EOR techniques; we test this empirically in a logistic analysis on EOR-project profitability ($1 =$ yes, $0 =$ no) of using $CO_2$ injection, as reported by the companies in the *Oil and Gas Journal* surveys. The analysis, presented in Table A4 of the online appendix, revealed that after controlling for project features, $CO_2$ injection was far less profitable than other EOR techniques in use during our study period. We believe that this finding provides further evidence of our claim that movement-induced regulatory risk leads firms to expend resources to develop and adopt internal practices to reduce that risk by meeting both movement demands and implicit policy goals.

It might be that firms' internal and external responses are due less to activists' tactics than to general public opinion regarding climate change (Manza and Cook 2002). With the limited data we had on public opinion (for 1997–2010), we ran analyses with two variables based on Gallup Poll questions that measured the percentage of people who believed that (a) scientists believed global warming to be occurring and (b) global warming would affect their way of life. For those limited years, we found that public opinion data did not alter the main results.

Another possible criticism is that we only investigate three of the innumerable possible responses firms might make to activist pressures. To address this concern, we examined annual reports and press releases to identify all possible actions firms could take to deal with private and public politics. In addition to the three we studied, the other visible responses we identified were lobbying (which we discuss below) and investment in technologies outside the firm's core competency, such as in renewable energy. Only six made investments in

renewables, so these alternatives were not included in the analyses.

Lobbying (specifically, money spent on lobbyists and political contributions), similar to affiliation, is another activity that may be affected by public politics. As activists increasingly pressure Congress for regulatory change, firms may respond in kind by increasing their own lobbying. However, the data on firm lobbying are limited to less than one-third of the years in our observation window (namely, 1999–2010) because firms were not legally required to reveal political donations until 1999. Using that limited panel, we included a supplemental analysis that examines the effect of protests and of activist witnesses at congressional hearings on firm lobbying. (The variable *EPA complaints* was dropped because of limited data within this time window). The results (see Table A5) show that although public political tactics do not have a direct impact on how much firms lobby via financial contributions, private political tactics do. A possible explanation for this is that protests—driven to some extent by the firm's poor environmental track record—may signal the public's skepticism about the firm's commitment to environmentally sustainable operations, such as mitigating carbon emissions. In results not reported here, we regressed *EPA complaints* and *major industrial accidents* on *firm protests* and found that both variables significantly predicted protests against firms. Given that prior research suggests that protests are an important determinant of congressional hearings (King et al. 2007) and that firms may try to preempt hearings through lobbying tactics (Victor 2007, McKay 2012), we speculate that the observed lobbying via financial contributions is aimed at preventing hearings on the industrial accidents and environmental violations that spawned the protests.

In addition to political expenditures, firms lobby Congress through an informational strategy that seeks to influence policy by providing policy makers with information, often through firm and trade association congressional testimony (Hillman and Hitt 1999). To test this, we ran analyses on activist and protest influence on the number of firm and trade association witnesses at congressional hearings. The results (see Table A6) show that as activists' public and private political tactics increase, firms increasingly respond individually and collectively (via trade associations) by providing their own testimony.[7]

## Discussion

This study contributes to the literature at the intersection of social movements and organizations in a number of ways. Primarily, the results enlarge our understanding of firms' differential responses to simultaneous pressures of public and private politics. In the context of U.S. oil and gas firms, we found that through providing testimony at congressional hearings (a public political tactic), social movement activists increased the likelihood that firms

adopted $CO_2$ injection as an EOR technology, marking a significant change in an internal practice of their business. By contrast, the private political tactic of protest did not increase the likelihood of practice changes. Instead, the episodic nature of protest, coupled with the activists' limited bargaining power as a secondary stakeholder of the firm, drew more symbolic framing responses from firms such as affiliating with industry associations and issuing press releases that framed their actions as solutions to activists' demands (Den Hond and De Bakker 2007; Marquis and Qian 2013).

What explains firms' differential responses to these distinct tactics? We conclude that social movement involvement in the regulatory process raised the stakes for oil and gas firms by increasing regulatory risk. Given the coercive nature of the state and the long-term consequences of regulation, oil and gas companies responded preemptively with a technical solution in the form of $CO_2$-injection technology that ostensibly sought to address movement demands while allowing them to carry on with enhanced oil recovery. Thus, by being involved in the regulatory process early on, activists influenced firm practices that sought to address movement concerns (Porter and Reinhardt 2007). By contrast, because social movement involvement in private political tactics threatened firms' image and reputation, firms responded with actions that sought to bolster their reputation. Affiliating with associations aligned with activists' goals can be beneficial because audiences equate the values and norms held by one actor with those shared by other parties to which it has ties (McPherson et al. 2001). Additionally, issuing public statements such as press releases are beneficial because they shape the public debate in terms of firms' own narratives.

Our study also contributes to our understanding of the interactions of public and private politics. We find that how firms respond to one affects how they respond to the other. Contrary to our expectations, our results show that in the presence of private political tactics, firms are less likely to respond to public politics via internal practice adoption. This is surprising because a significant body of research on social movements' radical flanks suggests that the presence of more radical public politics such as disruptive protests, boycotts, and obstructionism increase the likelihood of policy change. If this were true, we would expect the combined pressures of public and private politics to increase the likelihood that firms would respond with internal practices adoption in order to preempt policy change. A possible explanation is that firms may face trade-offs in their strategic focus. Research suggests that firms generally have either a long-term or short-term strategic focus in their response to stakeholders (Slawinsky and Bansal 2012). A long-term strategic focus anticipates future needs and plans for them despite the uncertainty associated with more distant time horizons; by contrast, a short-term strategic focus is less tolerant of uncertainty and emphasizes urgent needs over

planning for the future. A trade-off between these two foci exists because the most suitable course of action in the short term is generally not the same course of action that would be most suitable in the long term (Laverty 1996). For example, a study on the Federal Aviation Administration (FAA) found that as problems in a particular domain became more salient than others in the short term, the FAA focused its attention on finalizing rules in that domain at the expense of other domains that required longer-term investments; however, this short-term focus may not solve the real underlying problems (Sullivan 2010). Applying this logic to our context, we suggest that the threats posed by the episodic nature of private political tactics may lead firms to take a more short-term strategic focus and implement response strategies designed to deflect rather than to directly address stakeholder scrutiny. On the other hand, the persistent nature of public political tactics may lead firms to take a more long-term strategic focus to directly address stakeholder demands and engage in longer-term investments in new processes, products, or practices. When firms are confronted with both public and private political tactics, their strategic focus may become split between the long and short terms. As a consequence, organizations may be less likely to adopt new practices that address movement concerns or engage in framing activities, as attention and focus are divided to address multiple foci (Hoffman and Ocasio 2001). Our data limitations prevent us from testing these and other possible explanations for our results, but we suggest this as an area of future research. Scholars might go beyond looking at the interactions between tactics and explore the interactions between firm responses to public and private politics. For example, one approach could examine more directly how firms make trade-offs in the deployment of resources to address simultaneous regulatory and reputational threats. Another might be to explore directly how differences in strategic focus can lead firms to react with individual or multiple response types.

Consistent with our expectations, however, we find that the presence of public politics reduces the likelihood that firms will respond to private political tactics. Firms were less likely to join associations that address movement concerns and issue press releases when activists testified at congressional hearings. We also find that public political tactics have no effect on the likelihood of firms' joining associations or issuing press releases. This is likely because these affiliations were with associations that were not designed as mechanisms of collective action to advance substantive change but instead were designed to promote education and awareness of firms' proenvironmental efforts. Thus, we believe that these affiliations were largely symbolic responses to private political pressures.

Our findings also contribute to a growing body of literature addressing an important empirical question concerning firms' responses to social movements (Ingram

et al. 2010, Hiatt and Park 2013). First, this study demonstrates how activists can use the state as a fulcrum to campaign against firm targets (Amenta et al. 2010). Most social movement studies have focused on the impact of activists on policy change (King and Pearce 2010), and none that we know of have investigated how activists can leverage the coercive influence of the state to effect change without their demands ever becoming law. This study finds that even in the absence of policy change, public political tactics can still have a substantive effect by increasing the risk and uncertainty surrounding potential policy change.

Second, few studies have examined the effect of private and public political tactics together, notwithstanding calls from scholars to take a multi-institutional approach that incorporates political power with direct firm pressures (Baron 2003, Soule 2009). Most studies have examined public and private politics separately, and the handful that have considered both have failed to distinguish the mechanisms between the two (Reid and Toffel 2009). Consequently, we know very little about how the varying tactics may affect organizations, particularly when used together.

A general concern among social movement scholars is that although it is easy to evaluate external firm responses to activist demands in terms of press releases and other official statements, these responses may only be symbolic; firms may "decouple" external and internal responses, leaving internal process unchanged (Bromley and Powell 2012, Kennedy et al. 2012). By examining both internally focused responses and externally focused responses, we observe the impact of public and private politics on distinct firm actions. Because our study is among the first to examine the differential impacts of public and private politics, future research should examine more broadly the conditions under which public and private political tactics lead to similar or different outcomes. For example, some tactics may have a contradictory effect and elicit responses in opposite directions, resulting in little change, whereas others may have a synergistic effect and accelerate change.

This study also highlights an alternative public political mechanism by which activists influence firms. Prior research has largely focused on the effect of policy outcomes using the mechanisms of state regulation and economic incentives to explain how social movements can spur firms to address their grievances. Yet inconsistent studies have led to disagreement on just how much impact social movements really have on policy outcomes (Burstein and Linton 2002, Soule and King 2006). By examining the influence that social movement involvement in the early stages of the policy making process has on firms, we extend work on the impact of movements on the policy process (Olzak and Soule 2009). Future research might expand our findings to determine to what extent movement tactics and repertoires impact

the policy process at different stages of policy making.

Third, this study contributes to the emerging literature at the intersection of social movements and the creation of new markets and technologies (Hiatt et al. 2009, Sine and Lee 2009, Hiatt and Carlos 2015). Whereas studies in this have area have generally focused on how movements foment new market growth by promoting new organizational forms and practices (Pacheco et al. 2014, York et al. 2015), few have examined how activists targeting industries can unintentionally foster the development of technological innovations and practices (Tushman and Anderson 1986). By illustrating the influence of opposition activists on the adoption of new technologies, our study adds to the social movement and entrepreneurship literature and answers the call of scholars to understand the unintended consequences of movements on markets and organizations (Giugni 1999).

This study also contributes to the strategy literature by answering calls to explore firms' responses to uncertainty in the regulatory environment, a generally underexamined area in management research (Henisz et al. 2014). Existing studies identify firms' external strategies to establish social ties to resource-rich actors (Hallen and Eisenhardt 2012), gather information (Henisz and Delios 2004), manage the policy-making process in environments with weak institutional constraints (Holburn and Zelner 2010), and build stakeholder support to sway regulatory actions (Hiatt and Park 2013, Walker and Rea 2014). However, the impact of movement-induced regulatory risk on internal strategies such as adopting new technology is largely neglected. Subsequent research might therefore examine how the source of regulatory risk affects a firm's response. We have examined how social movement demands create regulatory risk through the policy process, but regulatory risk can also arise from corporate scandals, industrial accidents, or natural disasters.

Additionally, the results from this study may also extend to strategy research on industry self-regulation (Barnett and King 2008). Pressures from activists can transform firms' symbolic responses into new forms of self-regulation such as certification and rating systems (Schneiberg and Bartley 2008). For example, in 2011, the Oklahoma Conservation Commission adopted a carbon sequestration certification program for enhanced oil recovery in response to local firm actions to develop such a program. These industry-designed certifications can help companies to credibly claim social and environmental responsibility (Bartley 2011) by increasing public acceptance of their claims (Lee 2009, Lee et al. 2015). However, research on the effectiveness of this and other forms of self-regulation in interaction with more conventional forms of regulation is inconclusive. In some cases multiple forms of regulation may coexist with conflicting goals or competing mechanisms, whereas in other cases multiple forms of regulation may be complementary

or become hybridized. Consequently, future researchers may want to explore whether and how such certifications and rating systems may reinforce or undermine the effectiveness of activists' public political tactics.

This study is not without limitations. Although we have made efforts to econometrically control for selection bias and the impact of unobserved variables, endogeneity problems may still exist. We conducted a number of robustness checks in an attempt to rule out alternative explanations of our results, but we cannot entirely rule out reverse causality. For instance, although we contend that congressional testimonies by activists cause regulatory uncertainty, one possible explanation for our results may be that uncertainty about how to regulate leads congressional leaders to solicit more input from activists at hearings. We believe this to be unlikely, however, because studies show that members of Congress (or their staff) usually meet with the potential witnesses prior to hearings (Oleszek 1989), and thus they already have an idea of what the witnesses will say (Leyden 1995, Talbert et al. 1995). Additionally, private political tactics and firms' framing actions both may be caused by a third, unobserved variable. For example, in the event of environmental accident, firms may join associations and promote their reformed behavior through press releases. Activists also might respond to the environmental accident by protesting the firm; however, this was not the underlying reason the firm decided to join associations and issue press releases. Although we addressed this particular scenario with robustness checks and additional variables, there may be other factors that cause both firm and movement responses. A lack of an appropriate exogenous shock in our context makes it difficult to fully assert causality. Future research might delve into this issue with rich qualitative analysis to shed more light on the causal relationships involved.

Finally, the results of this study have important practical implications for how social movement leaders and activists seek to influence firms. Although the focus of this study was on firms' strategic responses to social movement pressures, perhaps equally important are social movements' strategic choices. Given the multiple pathways by which social movements may influence firm behavior, activists must strategically decide which tactics and pathways of influence to pursue. For instance, by targeting firms with better, rather than worse, social and environmental performance, activists can use the visibility and salience of firms' positive reputations against them (King and McDonnell 2014). Building on this research, our results suggest that movements must be careful in selecting which and how many tactics to pursue. Engaging in private political tactics alone may elicit largely symbolic responses, and pursuing both public and private political tactics simultaneously may create an adverse effect that reduces movement effectiveness. Additionally, prior studies have demonstrated how activists expend large amounts of resources to lobby for

policy passage, although some studies indicate that the direct impact of activists on policy is small. Our results suggest that for every three activists testifying in a congressional hearing on climate change, oil and gas producers invested about 12% more in a largely unprofitable EOR technology to address movement demands. Thus, this study suggests that influencing the policy-making process can be a significant and much less costly method for activists than the traditional emphasis on policy outcomes when seeking to change the ways of powerful firms.

## Supplemental Material
Supplemental material to this paper is available at http://dx.doi.org/10.1287/orsc.2015.1008

## Endnotes
[1]By private politics, we refer to the "collective interactions between parties attempting to advance their interests that do *not* rely on the law, public order, or the state" (Soule 2009, p. 30).

[2]Delivery of $CO_2$ to the well constitutes the most unprofitable component of $CO_2$ EOR. Recent studies estimate that the total cost for $CO_2$ delivery is $150–$200 per ton. To be profitable at crude oil priced at $70 per barrel, energy experts state that $CO_2$ cannot exceed $45 per ton (U.S. Department of Energy 2008). See Table A5 in the online appendix for empirical support.

[3]http://www.ogj.com/ogj-survey-downloads.html (accessed September 24, 2015).

[4]Some state-level regulations were adopted but not implemented. For example, California adopted the Global Warming Solutions Act in September 2006, but rule making was delayed until 2011 and implementation until 2012. Likewise, several northeastern states adopted emissions trading programs under the Regional Greenhouse Gas Initiative in 2005 but did not implement them until 2009, and emissions restrictions were delayed until 2015. Both regulatory initiatives focused on reducing emissions from automakers and utilities; none directly affected the oil and gas industry.

[5]We also estimated the models using a negative binomial regression and found similar results.

[6]Multivariate test statistics (Wilks's lambda, Pillai's trace test, Lawley–Hotelling trace, and Roy's largest root) indicated that the equations in each model were statistically significant. Tests for multicollinearity in the Heckman and multivariate regression analyses found that all variance-inflation factors were less than 2.85 and that most were less than 1.33, indicating an acceptable level of multicollinearity (Afifi et al. 2004).

[7]The difference between financial and informational lobbying could also be due to data limitations related to political expenditures.

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## Table A1. Descriptive Statistics and Bivariate Correlations

| | Variables | Mean | Std. Dev. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Carbon dioxide injection projects | 0.226 | 1.486 | 1 | | | | | | |
| 2 | Association affiliation | 0.010 | 0.122 | 0.159 | 1 | | | | | |
| 3 | Press releases | 0.010 | 0.148 | 0.116 | 0.493 | 1 | | | | |
| 4 | Activist witnesses at hearings | 7.185 | 11.460 | 0.059 | 0.049 | 0.021 | 1 | | | |
| 5 | Firm protests | 0.117 | 1.776 | 0.125 | 0.362 | 0.387 | 0.079 | 1 | | |
| 6 | Democrat control | 0.547 | 0.048 | -0.036 | -0.055 | -0.063 | 0.191 | -0.037 | 1 | |
| 7 | UN Framework Convention on Climate Change | 0.427 | 0.495 | 0.063 | 0.070 | 0.066 | 0.187 | 0.074 | -0.669 | 1 |
| 8 | EOR technology efficiency | 2574 | 1191 | 0.059 | 0.074 | 0.074 | 0.209 | 0.071 | -0.645 | 0.870 |
| 9 | EPA complaints | 0.001 | 0.033 | 0.022 | -0.004 | -0.002 | -0.002 | -0.002 | 0.023 | -0.030 |
| 10 | Major industrial accidents | 0.002 | 0.042 | 0.173 | 0.085 | 0.061 | 0.012 | 0.079 | 0.020 | -0.018 |
| 11 | Total congressional witnesses | 63.072 | 82.502 | 0.044 | 0.083 | 0.044 | 0.328 | 0.051 | -0.041 | 0.320 |
| 12 | General EOR incentives | 0.628 | 0.751 | 0.319 | 0.242 | 0.189 | 0.176 | 0.201 | -0.421 | 0.704 |
| 13 | CO2-specific EOR incentives | 0.027 | 0.175 | 0.374 | 0.217 | 0.187 | 0.108 | 0.273 | -0.117 | 0.193 |
| 14 | Total EOR projects | 0.682 | 3.977 | 0.462 | 0.251 | 0.133 | -0.001 | 0.230 | 0.011 | -0.021 |
| 15 | Joint venture EOR projects | 0.099 | 1.512 | 0.226 | 0.328 | 0.244 | 0.016 | 0.407 | -0.063 | 0.062 |
| 16 | Return on assets | 3.269 | 71.916 | -0.006 | -0.004 | -0.003 | -0.017 | -0.003 | 0.018 | -0.019 |
| 17 | Research and Development to sales | 2.425 | 62.109 | -0.011 | -0.007 | -0.005 | -0.029 | -0.005 | 0.028 | -0.041 |
| 18 | U.S. liquid oil reserves percentage | 0.909 | 0.224 | -0.206 | -0.204 | -0.150 | 0.010 | -0.175 | 0.077 | -0.066 |
| 19 | U.S. liquid oil to gas production ratio | 0.119 | 1.717 | -0.002 | -0.004 | -0.003 | -0.008 | -0.003 | -0.029 | 0.019 |
| 20 | Firm revenues | 3344695 | 23200000 | 0.318 | 0.240 | 0.173 | 0.130 | 0.192 | -0.158 | 0.202 |
| 21 | Crude oil to natural gas price ratio | 2.076 | 0.544 | 0.017 | 0.002 | -0.009 | 0.701 | 0.039 | 0.386 | -0.228 |

| | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **8** | 1 | | | | | | | | | | | | |
| **9** | -0.033 | 1 | | | | | | | | | | | |
| **10** | -0.023 | 0.175 | 1 | | | | | | | | | | |
| **11** | 0.434 | -0.026 | -0.013 | 1 | | | | | | | | | |
| **12** | 0.759 | -0.018 | 0.014 | 0.465 | 1 | | | | | | | | |
| **13** | 0.173 | -0.006 | 0.051 | 0.043 | 0.551 | 1 | | | | | | | |
| **14** | -0.025 | 0.028 | 0.246 | -0.010 | 0.203 | 0.254 | 1 | | | | | | |
| **15** | 0.063 | 0.014 | 0.028 | 0.029 | 0.225 | 0.285 | 0.430 | 1 | | | | | |
| **16** | -0.028 | -0.001 | -0.002 | -0.020 | -0.022 | -0.005 | -0.007 | -0.003 | 1 | | | | |
| **17** | -0.054 | -0.002 | -0.003 | -0.033 | -0.041 | -0.011 | -0.012 | -0.005 | 0.280 | 1 | | | |
| **18** | -0.073 | -0.052 | -0.100 | -0.004 | -0.277 | -0.316 | -0.238 | -0.149 | 0.013 | 0.012 | 1 | | |
| **19** | 0.020 | -0.002 | -0.002 | 0.005 | 0.008 | -0.003 | -0.005 | -0.003 | -0.001 | -0.002 | 0.012 | 1 | |
| **20** | 0.185 | 0.061 | 0.110 | 0.091 | 0.401 | 0.337 | 0.363 | 0.178 | -0.065 | -0.111 | -0.446 | 0.002 | 1 |
| **21** | -0.175 | 0.006 | 0.008 | 0.038 | -0.118 | 0.025 | -0.008 | -0.021 | -0.008 | -0.001 | 0.026 | -0.007 | 0.072 |

**Table A2. First Stage of Heckman Two-stage Regression of $CO_2$-EOR Injection**

| Variables | Model 1 |
|---|---|
| Firm revenues (logged) | 0.301*** |
| | (0.021) |
| Crude oil to natural gas price ratio | -0.265+ |
| | (0.142) |
| Activist witnesses at hearings | 0.012* |
| | (0.005) |
| Firm protests | 0.003 |
| | (0.033) |
| General EOR incentives | 1.057*** |
| | (0.116) |
| CO2-specific EOR incentives | -0.281 |
| | (0.233) |
| Democrat control | -2.233 |
| | (1.457) |
| UN Framework Convention on Climate Change | -0.545** |
| | (0.211) |
| EOR technology efficiency | -0.000*** |
| | (0.000) |
| EPA complaints | -0.219 |
| | (0.782) |
| Major industrial accidents | 1.001 |
| | (0.725) |
| Total congressional witnesses | -0.003*** |
| | (0.001) |
| Return on assets | -0.005 |
| | (0.025) |
| Research and development to sales | -0.065 |
| | (0.060) |
| U.S. liquid oil reserves percentage | 0.290 |
| | (0.187) |
| U.S. oil to gas production ratio | 0.012 |
| | (0.016) |
| Firm fixed effects | Yes |
| Constant | -2.839** |
| | (1.011) |
| LR Chi squared | 1010.25*** |
| No. of Observations | 3310 |

Standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05, + p<0.10

**Table A3. Logit Analysis of CO$_2$-EOR Injection at the EOR-project Level**

| Variables | Model 1 | Model 2 | Model 3 |
|---|---|---|---|
| Activist witnesses at hearings | | 0.026** | 0.026** |
| | | (0.009) | (0.009) |
| General EOR incentives | 0.539* | 0.775** | 0.775* |
| | (0.251) | (0.263) | (0.372) |
| CO2-specific EOR incentives | 0.164 | -0.209 | -0.209 |
| | (0.570) | (0.577) | (0.640) |
| EOR project age | -0.113*** | -0.124*** | -0.124*** |
| | (0.018) | (0.018) | (0.025) |
| Reservoir Porosity | -0.060** | -0.059** | -0.059 |
| | (0.021) | (0.021) | (0.054) |
| Reservoir Permeability | -0.000 | -0.000 | -0.000 |
| | (0.000) | (0.000) | (0.000) |
| Reservoir Depth (feet, logged) | 1.708*** | 1.795*** | 1.795** |
| | (0.320) | (0.324) | (0.622) |
| Oil Gravity °API | -0.018 | -0.019 | -0.019 |
| | (0.018) | (0.018) | (0.029) |
| Oil viscosity (in centipoise) | -0.002* | -0.002* | -0.002 |
| | (0.001) | (0.001) | (0.002) |
| Oil temperature | -0.008* | -0.009* | -0.009 |
| | (0.004) | (0.004) | (0.007) |
| EOR project size (acres, logged) | 0.067 | 0.071 | 0.071 |
| | (0.061) | (0.062) | (0.124) |
| Number of producing wells | 0.001*** | 0.001*** | 0.001 |
| | (0.000) | (0.000) | (0.001) |
| Percent of wells injected | 0.202 | 0.205 | 0.205 |
| | (0.134) | (0.139) | (0.197) |
| Previous production was primary | 1.068*** | 1.048*** | 1.048 |
| | (0.257) | (0.259) | (0.664) |
| Project joint venture (binary) | 0.179 | 0.288 | 0.288 |
| | (0.919) | (0.932) | (1.601) |
| State natural gas processing capacity | 0.131*** | 0.132*** | 0.132* |
| | (0.024) | (0.025) | (0.063) |
| State population (logged) | -0.043 | -0.053 | -0.053 |
| | (0.162) | (0.165) | (0.482) |
| State gross product per capita | -93.406*** | -105.268*** | -105.268* |
| | (21.909) | (22.463) | (41.947) |
| Democrat control | -1.665 | -6.273+ | -6.273* |
| | (3.162) | (3.506) | (2.876) |
| UN Framework Convention on Climate Change | -0.257 | -0.232 | -0.232 |
| | (0.488) | (0.485) | (0.474) |
| EOR technology efficiency | 0.001*** | 0.001*** | 0.001*** |
| | (0.000) | (0.000) | (0.000) |
| Total congressional witnesses | -0.003 | -0.004+ | -0.004 |
| | (0.002) | (0.002) | (0.002) |
| Constant | -14.121** | -11.520* | -11.520 |
| | (4.411) | (4.524) | (9.996) |
| Geological formation controls | Yes | Yes | Yes |
| Firm fixed effects | Yes | Yes | Yes |
| Firm cluster | No | No | Yes |
| LR chi squared (Wald chi 2 for cluster analysis) | 1863.13*** | 1872.81*** | 434.73*** |

| | | |
|---|---|---|
| No. of Observations | 2311 | 2311 | 2311 |

Standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05, + p<0.10

## Table A4. Logit Analysis of EOR Project Profitability (1=yes, 0=no)

| Variable | Model 1 | Model 2 |
|---|---|---|
| $CO_2$ injection | | -1.353*** |
| | | (0.204) |
| EOR project age | 0.140*** | 0.135*** |
| | (0.015) | (0.015) |
| General EOR incentives | -0.234 | 0.021 |
| | (0.229) | (0.240) |
| $CO_2$-specific EOR incentives | 0.474 | 0.559 |
| | (0.520) | (0.512) |
| Reservoir porosity | 0.038** | 0.038** |
| | (0.013) | (0.013) |
| Reservoir permeability | -0.000 | -0.000 |
| | (0.000) | (0.000) |
| Reservoir depth (feet, logged) | -0.016 | 0.180 |
| | (0.110) | (0.116) |
| Oil gravity °API | -0.026** | -0.020* |
| | (0.008) | (0.009) |
| Oil viscosity (in centipoise) | -0.000 | -0.000 |
| | (0.000) | (0.000) |
| Oil temperature | -0.000 | -0.000 |
| | (0.001) | (0.001) |
| EOR project size (acres, logged) | 0.290*** | 0.267*** |
| | (0.048) | (0.050) |
| Number of producing wells | 0.000 | 0.001 |
| | (0.001) | (0.001) |
| Percent of wells injected | 0.019 | 0.094 |
| | (0.112) | (0.161) |
| Previous production was primary | -0.320* | -0.355* |
| | (0.136) | (0.140) |
| Geological formation controls | Yes | Yes |
| Year fixed effects | Yes | Yes |
| Constant | -1.129 | -2.702** |
| | (0.913) | (0.975) |
| LR chi-squared | 543.72*** | 589.72*** |
| No. of observations | 2424 | 2424 |

Standard errors in parentheses
*** p<0.001, ** p<0.01, * p<0.05, + p<0.10

**Table A5. Linear Regression of Activists' Influence on Firm Lobbying (via political contributions)**

| Variables | Model 1 | Model 2 | Model 3 |
|---|---|---|---|
| Activist witnesses at hearings | | 0.008 | 0.001 |
| | | (0.008) | (0.006) |
| Firm protests | | | 0.353*** |
| | | | (0.019) |
| General EOR incentives | -0.086 | -0.120 | -0.039 |
| | (0.165) | (0.168) | (0.140) |
| CO2-specific EOR incentives | -0.330 | -0.349 | -0.477** |
| | (0.218) | (0.218) | (0.182) |
| Democrat control | 4.646** | 1.063 | 2.435 |
| | (1.452) | (3.597) | (2.995) |
| UN Framework Convention on Climate Change | Dropped | Dropped | Dropped |
| EOR technology efficiency | 0.000 | 0.000 | -0.000 |
| | (0.000) | (0.000) | (0.000) |
| EPA complaints | Dropped | Dropped | Dropped |
| Major industrial accidents | 2.325+ | 2.301+ | 0.611 |
| | (1.240) | (1.240) | (1.036) |
| Total congressional witnesses | 0.001 | 0.001 | 0.001 |
| | (0.001) | (0.001) | (0.001) |
| Firm revenues (logged) | 0.036 | 0.018 | 0.038 |
| | (0.049) | (0.051) | (0.043) |
| Joint venture EOR projects | -0.139*** | -0.140*** | 0.080** |
| | (0.031) | (0.031) | (0.028) |
| Return on assets | 0.023 | 0.017 | 0.021 |
| | (0.400) | (0.400) | (0.333) |
| Research and development to sales | 1.450 | 1.595 | 1.016 |
| | (3.374) | (3.376) | (2.810) |
| U.S. liquid oil reserves percentage | 0.439 | 0.425 | 0.042 |
| | (0.359) | (0.359) | (0.300) |
| U.S. liquid oil to gas production ratio | 0.002 | 0.002 | 0.001 |
| | (0.015) | (0.015) | (0.013) |
| Firm fixed effects | Yes | Yes | Yes |
| Constant | -2.916** | -1.251 | -1.427 |
| | (1.095) | (1.880) | (1.565) |
| F statistic | 4.82*** | 4.55*** | 30.49*** |
| No. of Observations | 1055 | 1055 | 1055 |

Standard errors in parentheses

*** $p<0.001$, ** $p<0.01$, * $p<0.05$, + $p<0.10$

**Table A6. Linear Regression of Activists' Influence on Firm Lobbying (via congressional witnesses)**

| Variables | Model 1 | Model 2 | Model 3 |
|---|---|---|---|
| Activist witnesses at hearings | | 0.001*** | 0.001*** |
| | | (0.000) | (0.000) |
| Firm protests | | | 0.014*** |
| | | | (0.001) |
| General EOR incentives | 0.028*** | 0.036*** | 0.034*** |
| | (0.007) | (0.007) | (0.007) |
| CO2-specific EOR incentives | 0.093*** | 0.079*** | 0.062*** |
| | (0.014) | (0.014) | (0.014) |
| Democrat control | -0.323*** | -0.486*** | -0.484*** |
| | (0.061) | (0.068) | (0.066) |
| UN Framework Convention on Climate Change | 0.046*** | 0.042*** | 0.043*** |
| | (0.010) | (0.010) | (0.010) |
| EOR technology efficiency | -0.000*** | -0.000*** | -0.000*** |
| | (0.000) | (0.000) | (0.000) |
| EPA complaints | -0.031 | -0.033 | -0.035 |
| | (0.058) | (0.057) | (0.056) |
| Major industrial accidents | 0.194*** | 0.195*** | 0.179*** |
| | (0.041) | (0.041) | (0.040) |
| Total congressional witnesses | 0.000*** | 0.000*** | 0.000*** |
| | (0.000) | (0.000) | (0.000) |
| Firm revenues (logged) | 0.003+ | 0.000 | -0.000 |
| | (0.002) | (0.002) | (0.002) |
| Joint venture EOR projects | 0.012*** | 0.012*** | 0.008*** |
| | (0.002) | (0.002) | (0.002) |
| Return on assets | 0.001 | 0.001 | 0.001 |
| | (0.003) | (0.003) | (0.003) |
| Research and development to sales | 0.004 | 0.002 | 0.002 |
| | (0.008) | (0.008) | (0.008) |
| U.S. liquid oil reserves percentage | -0.018 | -0.020 | -0.013 |
| | (0.018) | (0.018) | (0.018) |
| U.S. liquid oil to gas production ratio | 0.001 | 0.001 | 0.001 |
| | (0.001) | (0.001) | (0.001) |
| Firm fixed effects | Yes | Yes | Yes |
| Constant | 0.215*** | 0.340*** | 0.342*** |
| | (0.046) | (0.052) | (0.051) |
| F statistic | 32.55*** | 32.64*** | 38.29*** |
| No. of Observations | 3449 | 3449 | 3449 |

Standard errors in parentheses

*** p<0.001, ** p<0.01, * p<0.05, + p<0.10

**Figure A1: Activist Witnesses and Wells Injected with CO₂-EOR**