# Call It Like It Is: Using Quarterly Earnings Calls to Understand Firms' Climate Lobbying*†

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**Abstract**

The private sector drives much of climate politics, yet companies selectively choose specific issues and tactics for influence. When do firms engage in climate-related politics and what determines the policies they support? In the face of multifaceted potential impacts from climate change, some firms expect increased costs from new regulation and should lobby against such proclimate policies. Another matter is relative risk. Firms with physical asset vulnerability and those with greater green business opportunity relative to their competitors should lobby in favor of pro-climate regulation. We proxy for exposure to these threats and opportunities by analyzing the amount of discussion paid to physical, regulatory, and technological opportunity aspects of climate change on quarterly earnings call transcripts for more than 2000 public firms between 2002 and 2020. We estimate the effect of variation in climate exposure on the type and level of political behavior used to influence climate policy through lobbying. We find that increased overall exposure to climate change increases the likelihood that firms engage in any climate-related lobbying, and that differences in exposure to physical risks, regulatory costs, and market opportunities explain across- and within-industry variation of political activity.

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†Go to https://www.dropbox.com/s/z17ahhtjnxc5wg3/online_appendix_BBH1.pdf?dl=1 to view the online appendix.

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# 1 Introduction

The economics of the energy transition and other measures to combat climate change are starting to shift, with credit to policies such as the Inflation Reduction Act (IRA) in the United States which mobilizes billions of dollars in incentives to support clean energy investments. Through extensive lobbying, the utilities industry influenced legislation measures to maximize potential rewards for reducing emissions such that the IRA presents a "major long-term growth opportunity."[1] However, not all see room to profit from climate regulations, with significance divergence even within industries. This fact has long been clear when comparing major oil companies. BP has led the industry in climate pledges, aiming to rebrand themselves as an "energy business" rather than focusing exclusively on oil. Investments in new infrastructure and R&D may lag behind the discourse, but there are still notable differences about how BP approaches climate change in comparison to competitors like ExxonMobil. Other firms have taken public action against peers in the industry due to misalignment in climate policy preferences; for example, Shell quit the American Fuel and Petrochemical Manufacturers in 2019 and Total canceled its membership with the Canadian Association of Petroleum Producers in 2020.[2] Such cleavages, both between and within industries, are a symptom of how climate change (and related policies) triggers both real and perceived asset revaluation (Colgan et al., 2021). Yet, there is an open question as to how systematic these shifts in asset valuation are and whether they explain the political behavior of firms over time.

In this paper, we argue that the balance of climate risks in the form of regulatory costs and physical threats with "green" business opportunities explains firm lobbying behavior. Crucially, we observe that exposure to climate change may be a positive or negative state, reflecting potential growth opportunities for some and threats to the business of others. Companies with greater exposure, including both upside and downside, to the impacts of climate change are more likely to engage on climate issues. In particular, those facing high regulatory costs (e.g., requirements to cut emissions) will push against pro-climate regulation. Firms that expect more physical risks (e.g., damage to infrastructure) will support policies aiming to limit the impacts of climate change. On the contrary, those who see greater technological opportunity related to climate change mitigation and adaptation should lobby in favor of pro-climate policies. Heterogeneity within industries is also an important factor for political activity on climate change (Kennard, 2020). As such, we expect that if firms have relatively high exposure to climate change, as compared to industry competition, they will be more likely to lobby in favor of climate policies, even if this means going against industry-wide interests. We also argue that firms' political activity is more sensitive to the near-term risks and opportunities of climate change, such that exposure to regulatory change and opportunity should be associated with more lobbying than exposure to costly physical shocks.

To test our hypotheses, we examine the relationship between positive and negative exposure to

[1] Lipton, Eric. "With Federal Aid on the Table, Utilities Shift to Embrace Climate Goals." The New York Times, November 29, 2022.

[2] Beattie, Samantha. "Shell Promotes 'Ambitious' Climate Agenda While Backing Canadian Oil Lobby." HuffPost, October 4, 2020.

climate-related regulatory costs, physical impacts, and business opportunity with lobbying activities. To measure firm-level exposure as our main independent variable, we use a recently developed dataset that analyzes earnings call transcripts of publicly traded companies to identify the amount of attention paid by participants to firms' climate change exposures (Sautner et al., 2023). This time-varying measure is constructed using a machine learning keyword discovery algorithm for more than 2,000 firms from 34 countries between 2002 and 2020. It is a useful proxy for understanding the extent to which climate change is an important issue for a given company, and how they think about risks relative to opportunities. Estimating the impact of climate change on individual firms is difficult, and this measure has an advantage over others such as carbon emissions or ESG scores, which suffer from selection bias and primarily reflect historical business models. The transcripts reflect market participants' assessment of the effects of climate change on a given firm, including positive and negative aspects in light of prior firm performance and forward-looking strategy. Our dependent variable is political activity, focusing on direct lobbying of government agencies. To measure lobbying activity, we use data from LobbyView, a comprehensive database on lobbying in the US that includes all lobbying reports filed under the Lobbying Disclosure Act (LDA) of 1995 (Kim, 2018). We examine the entrance into lobbying, the persistence of lobbying activity, and total expenditures. We also use information about climate-related business "coalition" membership to infer whether a firm lobbies in favor or against climate protecting policies.

We find that greater overall exposure to climate change increases the likelihood that firms engage in climate-related lobbying, and that finer differences in exposure to physical risks, regulatory interventions, and market opportunities explain across- and within-industry variation of political activity. In particular, firms that discuss more technological growth opportunities are more likely to lobby on climate issues than those focused on costly physical and regulatory exposure. This reinforces the theoretical expectation that firm-level risks and opportunities have distinct impacts on political activity, with firms seeking government intervention to obtain gains, especially when they may be concentrated and provide leverage over competitors. Firms are apparently less likely to push government for policies that will protect physical assets and instead focus lobbying efforts on clean energy opportunities.

This paper contributes to the literature on the climate preferences of firms and the drivers of lobbying activity. We build on recent work focusing on variation in political activity across firms, responding to calls for the need to explain patterns in both climate resistance and support (Lerner and Osgood, 2022; Liu et al., 2023; Genovese, 2021). However, rather than classifying industries, or even firms, into "winners" and "losers", we take a unique approach by considering that a single company might gain from some aspects of climate change and suffer from others. We bring insights from the literature on firm heterogeneity (Kennard, 2020; Kim, 2017) to consider how the specific factors that determine whether a firm is a relative climate change winner or loser translate to political activity, providing an empirical exploration of the implications of asset revaluation (Colgan et al., 2021). In addition, this paper speaks to recent work emphasizing the importance of earnings calls for understanding firm political activity (Hassan et al., 2019; Mahdavi et al., 2022) by leveraging new

data that improve our ability to examine the role of firms in climate policymaking over other empirical approaches.

# 2 Firm Behavior in Response to Climate Change

## 2.1 Effects of Climate Change

Firms are subject to a broad set of threats and opportunities related to climate change, including threats to physical assets, climate-preserving regulatory actions that affect the costs of doing business, and technological opportunities arising from such regulation and shifts in demand. These dynamics create both winners and losers from climate change, dividing lines which can run across and within industries that help explain whether firms engage with climate policymaking.

Climate change is related to increasingly frequent and severe events, such as heatwaves and floods, that threaten the physical assets of actors in the private sector. S&P Global estimates that over 90% of the world's largest companies will have at least one asset highly exposed to the physical impacts of climate change by 2050.[3] Simple extremes such as intense rainfall or higher temperature variation can cause crop damage, increase flood risk, or change tourist destinations (Winn et al., 2011) while complex events such as tropical cyclones or ice storms can increase property and infrastructure damage, decrease land productivity, and increase the possibility of new epidemics. As an example, Pankratz and Schiller (2022) show that weather shocks at supplier locations reduce the operating performance of both suppliers and their customers, such that firms choose replacement suppliers with lower expected climate-risk exposure. Industries such as insurance, agriculture, fisheries, real estate, and tourism can be particularly impacted by physical changes, but these are not exclusive. While physical threats primarily pose a risk to business interests, they may also create pockets of opportunity for certain sectors, such as insurance, or create demand for adaptation technologies.

Climate-preserving regulatory actions can raise costs for firms and reduce the value of key assets. For example, holders of so-called "climate-forcing" assets such as oil fields or beef farms face high exit or transformation costs towards more climate-friendly assets (Colgan et al., 2021). Regulation aimed at phasing out fossil fuels or creating other meaningful shifts in energy use threatens the foundation of such firms. Not all companies face existential threat from regulation - others may simply worry about increased costs associated with compliance. For example, a review of the Clean Air Act shows how environmental regulation can impact firms by causing employment reductions, relocation requirements, and loss of capital stock (Currie and Walker, 2019).

Climate-related opportunities are created by government policies such as clean technology subsidies or R&D incentive schemes, shifts in public demand, and changes in the way industries conduct business. Companies that already have the ability to produce technological innovations that help solve environmental problems have a form of "technological power" per Falkner (2007). Even those that do

[3] Portala, Juliette. "Large Companies' Assets at Growing Risk of Climate Impact - S&P Global." Reuters, September 15, 2022.

not focus on technological innovation may evolve their production or R&D investment in response to new opportunities. For example, most major oil firms also have strategies to shift towards renewables (Pickl, 2019). Those companies that are changing faster may see more opportunity related to climate change than their competitors. Firms may also implement internal reforms to maximize expected profit (or minimize loss) from changes in risks or opportunities from climate change, such as shifting production or supply chains of expanding certain workforce segments. For example, Caterpillar was an early mover in building a new business unit that makes particulate filter systems for retrofitting diesel engines in response to US regulations (Lash and Wellington, 2007). Consumer behavior in light of the physical impacts, regulatory change, and technological development may also impact firms either in the form of boycotts or increased demand for "green" products.

## 2.2 When Firms Take Political Action

In response to the various impacts of climate change described above, some firms engage in political activities such as lobbying in favor, or against, climate-related legislation. The literature finds that firms are more likely to lobby against climate policy when they face high compliance costs, that is, if they are the main emitters of greenhouse gases (Brulle, 2021; Cheon and Urpelainen, 2013; Cory et al., 2021; Kelsey, 2018; Meckling, 2011, 2015). Such lobbying to avoid, or minimize, costs of regulation take multiple forms. When compliance with environmental trade regulations is costly, industries will oppose the inclusion of environmental provisions and seek to lobby their negotiating government to avoid such measures (Milewicz et al., 2018; Morin et al., 2018), while those facing domestic regulation seek to "level the playing field" (Lechner, 2016). Yet, firms also lobby when they expect gains from policy, creating a U-shaped relationship between greenhouse gas emissions and climate lobbying expenditures (Delmas et al., 2016). For example, companies with more at stake in the American Clean Energy and Security Act (ACES, also referred to as the Waxman-Markey bill) lobbied more, regardless of whether it was for potential gain or loss (Meng and Rode, 2019).

However, firms within the same industry often face the same absolute costs-benefits from climate policy which does not explain observed variation in lobbying patterns. Turning to the importance of comparative advantage, Vogel (1995) argues that early adopters of environmental standards have an incentive to export standards, benefiting leaders and harming laggards. This relates to the broader literature on the importance of firm heterogeneity for explaining political behavior (Kim, 2017), as emphasized in Kennard (2020)'s argument that variation in emissions abatement costs creates opportunity for some. Those that are relatively well-positioned to cope with more stringent climate policies have an incentive to lobby in favor of these policies, particularly if the gains from their newfound advantage among domestic competitors outweigh any consequent disadvantages relative to foreign firms. This idea of relative winners and losers has been explored elsewhere, such as for electric utilities (Kim et al., 2016) and transport (Akhundjanov and Muñoz-García, 2016), and in the European context around the EU Emissions Trading Scheme (Genovese, 2019; Genovese and Tvinnereim, 2019).

Yet, this existing literature on relative winners and losers does not tell us whether the type of

expected benefits or costs matter, nor does it explain how firms decide to start lobbying on climate policies and what it might take to change their position from an anti- to pro-climate stance. These questions are important, as competition between interest groups influences the content of policy (Cheon and Urpelainen, 2013), and even though estimates of the impact of lobbying on policy enactment is small, the potential payoffs for a given firm may be significant (Kang, 2016). With increasing attention to the distributive implications of climate change, there is an opportunity to better understand the realignment of interest groups and how actors compete for resources to address climate change (Colgan et al., 2021).

### 2.3 Importance of Relative Risks and Opportunities

We argue that the multifaceted impacts of climate change on firms are critical to explaining political action. Physical changes such as increased storm severity or rising sea-levels directly threaten assets. Actors who hold such assets should seek to divest and, when this is not possible, aim to prevent losses by influencing relevant policies. Physical risks may present an existential challenge for some sectors or specific firms, but the impacts are likely less widespread than those from regulatory risks. Proclimate regulation creates costs of compliance for many industries and the firms within those industries, but it may also create opportunities. The expected impacts of physical changes, new regulation, and business opportunities each contribute to expected loss or gains from climate change, and these can shift over time due to factors like market forces or prior policies.

Differential exposure to each of these factors should also be connected with variation in lobbying activity. We argue that firms are more sensitive to potential risks than to future opportunities and are likely to view lobbying as a useful tool to address these downside aspects of climate change. This is a form of loss aversion, whereby companies focus more heavily on using political activity to avoid potential regulatory risks rather than secure pathways for opportunity (Hassan et al., 2019). Regulation also relates more directly to the state - companies know the role that government agencies play in passing and enforcing legislation, making the potential payoffs of lobbying clearer. This is especially true when firms have an interest in preventing new regulation to maintain the status quo, as research shows that status quo supporters tend to be more active (and successful) in lobbying than those seeking significant change (Baumgartner et al., 2009). However, even though physical shocks caused by climate change prevent firm-level risks, the impacts are inconsistent, and any gains from related legislation are diffuse. Thus, we expect that physical exposure to climate change will have a more limited relationship with lobbying than other types of exposure. This is consistent with other findings in the literature that experience of weather extremes only has a moderate (and often divisive) impact on attitudes (Bergquist and Warshaw, 2019; Hai and Perlman, 2022; Hilbig and Riaz, 2023), and natural disasters do not predict changes in climate policy (Rowan, 2023). This is in comparison to business opportunity related to climate change, which generates more near-term and direct gains, so it may have a greater impact on company behavior. Firms may also be more likely to lobby for opportunities through government subsidies or incentive programs, as these are "private goods",

especially if they have a competitive advantage over others in their industry to respond. This idea aligns with the findings for other types of lobbying whereby firms seek to secure individual benefits (Kim and Milner, 2021).

There is also reason to expect variation across and within industries in the exposure to different types of climate impacts, and thus variation in lobbying activity. Some industries are more exposed to climate change, including oil and gas, agriculture, heavy industry and manufacturing, transport, construction, and utilities. Common factors include a dependence on mining, fossil fuels, and energy-intensive production and the potential for natural disasters and climate extremes to disrupt productivity and investment. Firms within highly exposed industries, in both absolute and disaggregate terms, should be more likely to lobby on climate-related policies. However, we also see reasons for the variation within industries. For example, the insurance industry is highly exposed to the physical impacts of climate change as they provide coverage to households and businesses impacted by natural disasters made worse by climate change. Some insurers made early steps to reshape their business models by incorporating climate-risk considerations into new products and underwriting processes, while others lagged behind. Similarly, some automakers made early investments in electric vehicles, while others have remained slow to roll out alternative powertrains. Such discrepancies in capital and R&D investment create relative leaders and laggards within industries while other factors such as geographic distribution, differences in supply chain, efforts to retire or repurpose assets, pursuance of new M&A, and even firm mission and leadership can also play a role in explaining the variation of climate exposure across firms.

Given this likely variation, and the relevance of the different impacts of climate change, we test a three-part hypothesis. First, following the consensus in the literature, we expect that the more important climate change is to the operations and future of a firm, the more likely that firm will lobby on climate policy. Greater exposure to the physical aspects of climate change should be associated with proclimate lobbying to protect firm assets, while concern over regulatory costs should be associated with lobbying against climate-preserving policies. Business opportunity as a result of climate change should also be linked to increased proclimate political activity.

Secondly, we hypothesize that the variation in firm experience of the physical, regulatory, and opportunity aspects of climate change explains within-industry heterogeneity. In particular, firms with greater opportunity related to climate change than their competitors will be more likely to engage in pro-climate political activity even if regulation increases their overall costs. Higher levels of physical risk relative to competitors should also be associated with more pro-climate lobbying. Differences within industries should also explain a firm's individual entry into climate lobbying. If a company experiences high (low) levels of opportunity or physical risk compared to others in their industry, they will be motivated to lobby in favor (against) climate policy to counter political activity by others in the industry (e.g., trade associations). This should lead to additional political activity and higher levels of lobbying spend compared to firms whose interests align with others in the same industry.

Finally, we expect that the type of exposure should predict different levels of lobbying behavior due

to sensitivity and expectations about what the impact of lobbying. Firms should be more sensitive to the near-term costs and opportunities of climate change, and thus we expect a stronger relationship between exposure to regulation or opportunity impacts with lobbying than physical shocks.

# 3 Data

## 3.1 Climate Exposure

To understand the importance of climate change to a firm, we use a measure of "exposure" based on the amount of attention that publicly traded firms dedicate to climate change on quarterly earnings conference calls developed by Sautner et al. (2023) through the European Corporate Governance Institute (ECGI). Exposure should be thought of as "firm-level exposure to a particular impact of climate change" where the impact may be positive or negative (e.g., electric vehicle subsidies, sea-level change) and may also originate from within the firm (e.g., acquisition of a new green business unit). We do not assume that firms are focusing on climate with an inherently negative, or risk-focused, lens - composition across the sub-components of attention render exposure as positive or negative for a specific firm.

This proxy measure is useful for gaining insight into the importance of climate for a given company because it is difficult to assess the impacts of climate change, especially since many existing measures are either fully historical, subject to greenwashing, or face selection bias. Publicly traded companies hold regular earnings conference calls open to financial analysts, journalists, and other interested parties such as institutional or individual investors. The company discusses earnings for a particular period (i.e., related to quarterly 10-Q or annual 10-K reports) and provides a sense of future goals, milestones, and performance expectations.[4] Calls typically begin with presentations by members of a firm's management team such as the Chief Executive Officer (CEO) and Chief Financial Officer (CFO) who share information they wish to disclose and/or emphasize. These presentations are followed by a question-and-answer (Q&A) session with interested parties who get the opportunity to ask executives about relevant developments. Such calls have been shown to improve analysts' ability to forecast earnings accurately (Bowen et al., 2004; Frankel et al., 1999; Hollander et al., 2010). Additionally, as the information shared during calls can be verified ex post,[5] firms have an incentive to be honest (Demers and Vega, 2008), and they also typically provide additive information to the earnings report and the associated press release (Matsumoto et al., 2011). There is evidence that firms talk more about climate on earnings calls when climate matters are more material to a firm (Dzieliński et al., 2022), even if management teams are using the calls strategically to send a message to potential investors. However, firms can be held accountable in legal proceedings based on information they share in such calls - for

[4] Earnings calls are typically held within 30 days of the new quarter. However, the median call for the first quarter is usually more delayed (Hassan et al. (2019) estimate the median call to be on the 45th day of the first quarter) because the first-quarter call is typically held after the annual report (i.e., Form 10-K) is made public, which goes with longer statutory due dates and is more labor intensive.

[5] In addition, the SEC's Regulation Fair Disclosure Act forbids companies from sharing "material nonpublic" information with analysts/investors, which is also why most firms make the transcripts public via transcript or audio.

example, in the US, the Exchange Act of 1934 holds firms liable to investors for any statement that is "false or misleading"[6] - although many invoke "safe harbor" protection for forward-looking statements. While such regulation makes it more likely that firms will be truthful, it also means that legal teams discourage management from providing information that is not already public. Publicly traded firms are required to file quarterly reports although earnings calls are voluntary - still, there are strong norms to hold such calls with the vast majority doing so[7] but it is possible there is some selection into hosting earnings calls. Even with the potential drawbacks, there is strong reason to believe that earnings calls provide meaningful and unique information about the market's perspective on a firm's exposure to climate change given the exchange of information between management and analysts.

We retrieve data on attention to climate change in earnings calls from Sautner et al. (2023) who use the complete database of English-language transcripts from 2002 to 2021 from the Refinitiv Eikon database. They adapt the keyword discovery algorithm proposed in King et al. (2017) to produce bigrams related to climate change. These "bigrams" are associated with different sub-components of corporate attention to climate change: physical shocks, regulation, and technological opportunity. See Table 1 for examples of the types of bigrams associated with overall climate change attention. There are many additional bigrams associated with the attention to physical change (e.g., "global warm", "coastal area", "snow ice"), regulation (e.g., "reduce emission", "carbon price", "environmental standard") and opportunity (e.g., "plug hybrid", "solar farm", "opportunity clean"). We have included the top 100 bigrams for each of the measures in the appendix. The overall climate change attention measures include both general bigrams and those pertaining to each of these subcomponents. The physical, opportunity, and regulatory measures are distinct subsets of the overall measure.

Table 1: Top-10 Bigrams Captured by Overall Climate Change Exposure

| **Bigram** | **Frequency** |
|---|---|
| renewable energy | 15605 |
| electric vehicle | 9508 |
| clean energy | 6430 |
| climate change | 4374 |
| wind power | 4253 |
| wind energy | 4035 |
| energy efficient | 3899 |
| greenhouse gas | 3416 |
| solar energy | 2511 |
| air quality | 2409 |

Each exposure variable is the relative frequency with which bigrams related to climate change occur in earnings call transcripts, constructed by counting the number of such bigrams and dividing it by the total number of bigrams (Sautner et al., 2023). The frequency with which these bigrams occur within the transcript of a given quarter provides measures of the attention paid to climate change on these calls. Quarterly data as well as annual data (created by averaging the quarterly

[6] Pub. L. 37-291, sec. 10(b)

[7] According to the National Investors Relations Institute, as of 2016, 97% of publicly traded firms in the US hold earnings calls.

measures) are available. Table 2 summarizes climate change exposure across the sample. On average, there is some discussion about climate change, and it appears earnings calls focus discussion more on climate change-related opportunities than physical impacts and regulation. While they do not directly

Table 2: Climate Change Exposure Variables - Summary Statistics

| | Mean | SD | P25 | Median | P75 | N |
|---|---|---|---|---|---|---|
| Exposure | 1.06 | 2.74 | 0.00 | 0.29 | 0.88 | 404260 |
| Opportunity | 0.42 | 1.48 | 0.00 | 0.00 | 0.30 | 404260 |
| Regulatory | 0.06 | 0.35 | 0.00 | 0.00 | 0.00 | 404260 |
| Physical | 0.01 | 0.14 | 0.00 | 0.00 | 0.00 | 404260 |
| Positive Sentiment | 0.39 | 1.23 | 0.00 | 0.00 | 0.31 | 404260 |
| Negative Sentiment | −0.20 | 0.68 | 0.00 | 0.00 | 0.00 | 404260 |
| Risk | 0.04 | 0.23 | 0.00 | 0.00 | 0.00 | 404260 |

***Note:*** The climate exposure measures are transformed by $10^3$ to ease comparison.

measure fundamental risk or opportunity to a company, we believe these measures are effective proxies for firm's climate change risk and opportunity in that period given the extensive validation used by Sautner et al. (2023).[8] We also build on a growing literature linking these measures to outcomes such as green patenting (von Shickfus, 2021), physical risk disclosure in 8k filings (Gostlow, 2020), carbon risk management (Duong et al., 2023), and bank lending after the Paris Agreement (Ginglinger and Moreau, 2019).

Table 3: Climate Change Overall Exposure for Top 10 SIC Industries

| Industry | Mean | SD | Median | N |
|---|---|---|---|---|
| Automotive Dealers & Service Stations | 1.63 | 3.82 | 0.69 | 558 |
| Coal Mining | 2.39 | 2.14 | 1.86 | 332 |
| Construction | 2.65 | 2.91 | 1.69 | 183 |
| Electric, Gas, and Sanitary Services | 7.48 | 6.59 | 5.84 | 4450 |
| Electronic & Other Electric Equipment | 2.17 | 4.26 | 0.60 | 6820 |
| Heavy Construction, Except Building | 3.39 | 4.70 | 1.64 | 699 |
| Local & Suburban Transit | 2.11 | 2.40 | 0.98 | 153 |
| Petroleum Refining | 1.99 | 2.51 | 1.14 | 1180 |
| Primary Metal | 1.73 | 1.70 | 1.28 | 1801 |
| Transportation Equipment | 2.34 | 3.36 | 1.23 | 2852 |

The exposure to climate change varies at the industry level. In Table 3, we compute summary statistics averaged by sector, including data for the industries with highest exposure scores.[9] This

[8] The authors validated their measure using several strategies. First, the bigrams pass a simple face validity test. Second, a team of graduate students performed a structured human audit to manually code a 2000+ transcript excerpts. The findings confirmed that the algorithm reliably captured bigrams in climate change discussions. Thirdly, the measures are robust to excluding one keyword at a time from the initial. Fourth, the keyword search-based algorithm performed much better than an alternative approach that uses only the initial keywords. Fifth, industry patterns among the measures are plausible. And finally, tests of the relationship between the estimated measure and a number of covariates, including carbon emissions and an index of public attention to climate change. They found positive correlations with each covariate, indicating that the regulatory and opportunity subcategories were performing as expected. Sautner et al. (2023) also ensure that variance within the firm-year captures meaningful economic heterogeneity rather than idiosyncratic error.

[9] For industry, we use the two-digit Standard Industrial Classification (SIC) code.

variation aligns with expectations, where industries that produce significant greenhouse gas emissions are more likely to have high climate exposure. As demonstrated in Table 3, the Electric, Gas, and Sanitary Services sector (SIC49) is much more likely to discuss climate change on earnings call than other industries, followed by Heavy Construction (SIC16), Construction (SIC17), and Coal Mining (SIC12). When examining the sub-components driving climate change exposure, utilities are most likely to discuss both opportunities and regulatory concerns (see Tables **??-??** in the Appendix). This provides evidence of how firms can find opportunity in climate adaptation even if they may face increased costs as a result of pro-climate regulation.

Table 4 compares scores of the Q4 2019 quarterly earnings calls of three sample automobile producers: Tesla, Ford, and Mitsubishi. Excerpts are taken from the presentation portion of the calls, specifically the opening statements given by the then-CEOs (Elon Musk, Jim Hackett, and Takao Kato, respectively), and are meant to provide a sense of how topics discussed on the calls relate to issues of climate and the environment. Review of the full transcripts confirms the calculated variation between the firms, whereby Tesla dedicates the majority of the call to discussing their competitive advantage for electric vehicles, Ford provides some attention to their growing electric business, and Mitsubishi only briefly mentions the costs of regulatory compliance.

Table 4: Quarterly Earnings Call Scores and Excerpts from Q4 2019

| Firm | Overall | Opp | Reg | Phys | Excerpt from CEO Presentation |
|---|---|---|---|---|---|
| Tesla Inc | 20.7 | 11.7 | 0 | 0.3 | "So Q4 was another strong quarter for the company. Deliveries reached over 112,000 vehicles in a single quarter...I think it's overlooked, but to have the highest demand electric vehicle in the world with no advertising spend is...quite remarkable and speaks to the nature of the project itself... And we managed to achieve, by far, the highest energy efficiency of any electric SUV ever produced at 4.1 miles per kilowatt hour, which means Model Y all-wheel drive got an EPA rating of 315 miles... we've got Model Y, we've got Giga Berlin, Tesla Semi, Solarglass Roof, Cybertruck, some very exciting improvements in battery technology..." |
| Ford Motor Co | 08.4 | 7.3 | 0 | 0 | "I believe, as I've said before, there is an incredibly bright future for Ford within what has become a very disruptive environment...A powerful example of our company's move into the digital future was the November reveal of our Mustang Mach-E, an exciting zero-emissions vehicle... In Europe, we started the rollout of 17 new hybrid and all-electric passenger and commercial vehicles, including the all-new Puma SUV... Now all of these products support Ford's commitment to achieve the Paris Climate Accord glide path for lower CO2 emissions. And, at the same time, we maintain leadership with our franchise vehicles..." |
| Mitsubishi Motors Co | 0 | 0 | 0.8 | 0 | "Our basic policy was to grow on all fronts. However, during the present period, competition intensified by the slowdown in the global economy, compliance with environmental regulations in the middle markets, and more sophisticated services demanded by customers have increased the burden of investment in R&D. Consequently, as shown in the slide, fixed costs as a whole rose 1.2 times from FY'15...we will concentrate our management resources in ASEAN and in other regions, we have stressed in working temporarily and strengthening our sales network and production system..." |

This independent variable limits our focus to publicly traded firms, but there is good justification for this. First, publicly traded firms make up a significant part of the world economy. In addition, it is especially interesting to understand the types of political behavior that public firms undertake given the potential role (or lack thereof) of stakeholder capitalism. Public firms are supposed to be more transparent, with financial obligations to shareholders and increasingly with environmental, social, and governance (ESG) commitments as well. Understanding trends in exposure to climate change and associated political activity among public firms may yield insights both on current policy direction and on the potential of stakeholder capitalism.

### 3.1.1 Variation Within Industries

We are ultimately interested in explaining variation in climate policy lobbying by firms *within* the same industries, as one of our key theoretical hypotheses is that some companies lobby in favor of more stringent climate policies because they are better positioned to adapt to these policies than their competitors. Therefore, it is crucial to verify that there exists considerable variance in exposure to climate change between companies within the same industry.

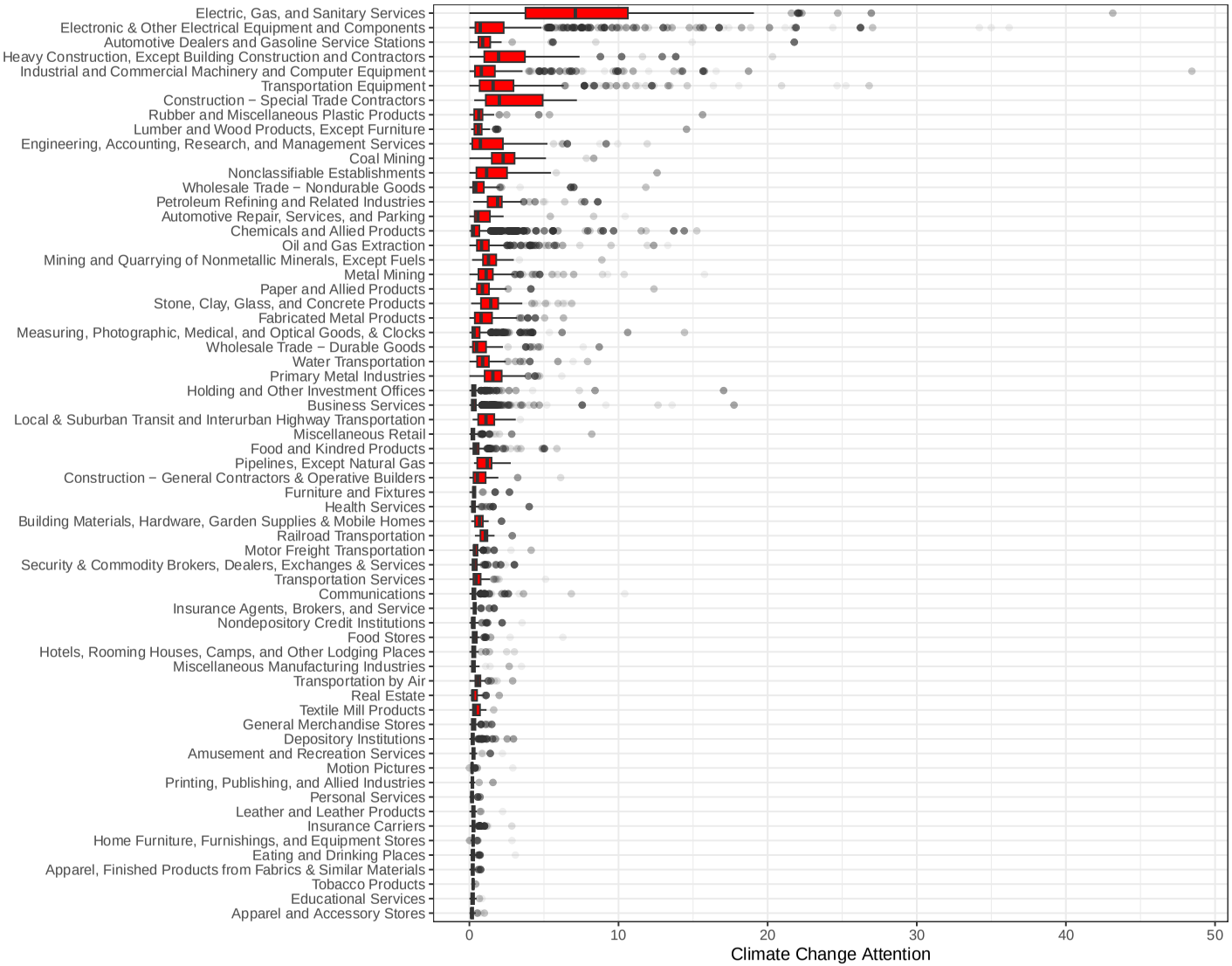
For this purpose, we calculate the averages of the four climate change exposure variables for each firm in our dataset across all firm-year observations. Then we map each firm to its SIC industry code and calculate the variance of these averages for each SIC industry. The results of this exercise are illustrated by Figures 1 which depicts within-industry variance of the overall climate change exposure variable and 2 which compares the within-industry variance measures for all four exposure variables.

Evidently, there exists meaningful variation of these measures within industries. In particular, segments of the energy industry such as Electric, Gas, and Sanitary Services ($s^2 = 28.31$), Petroleum Refining ($s^2 = 2.86$), and Oil and Gas Extraction ($s^2 = 1.94$) show high levels of variance. This seems to capture perceptions about how firms embrace renewable energy to varying degrees in their business models. For example, TotalEnergies scores slightly lower than ExxonMobil for regulatory exposure but scores four times higher in terms of measured exposure to opportunities. TotalEnergies is a leader in the oil and gas industry for a shift to renewables, with a portfolio of 7.4 gigawatts (GW) of renewable energy as of September 2022 after recent investments such as the purchase of a 50% stake in Clearway, one of the largest US renewable firms.[10] In contrast, ExxonMobil has long been considered a slow mover within the industry in terms of a shift towards renewables.[11] But firms' exposure to climate change also differs significantly in the manufacturing sector, for example, in Construction ($s^2 = 16.50$), Machinery ($s^2 = 10.91$), and Rubber ($s^2 = 3.81$). Other industries with lower overall climate exposure such as Legal Services ($s^2 = 0.66$), Educational Services ($s^2 = 0.09$), and Tobacco Products ($s^2 = 0.01$) do not entail considerable exposure variance between related enterprises. Strikingly, firms vary in particular with regard to their overall climate change attention and to their opportunities, while within-industry variation in physical or regulatory risk is relatively low. We will later exploit the existence of such variation to test our hypotheses about why firms within the same industry engage in climate lobbying.

[10] Bousso, Ron. "TotalEnergies Leads Shell, BP in Renewables Race, but Shares Sag." Reuters, November 7, 2022. https://www.reuters.com/business/energy/totalenergies-leads-shell-bp-renewables-race-shares-sag-2022-11-07/.

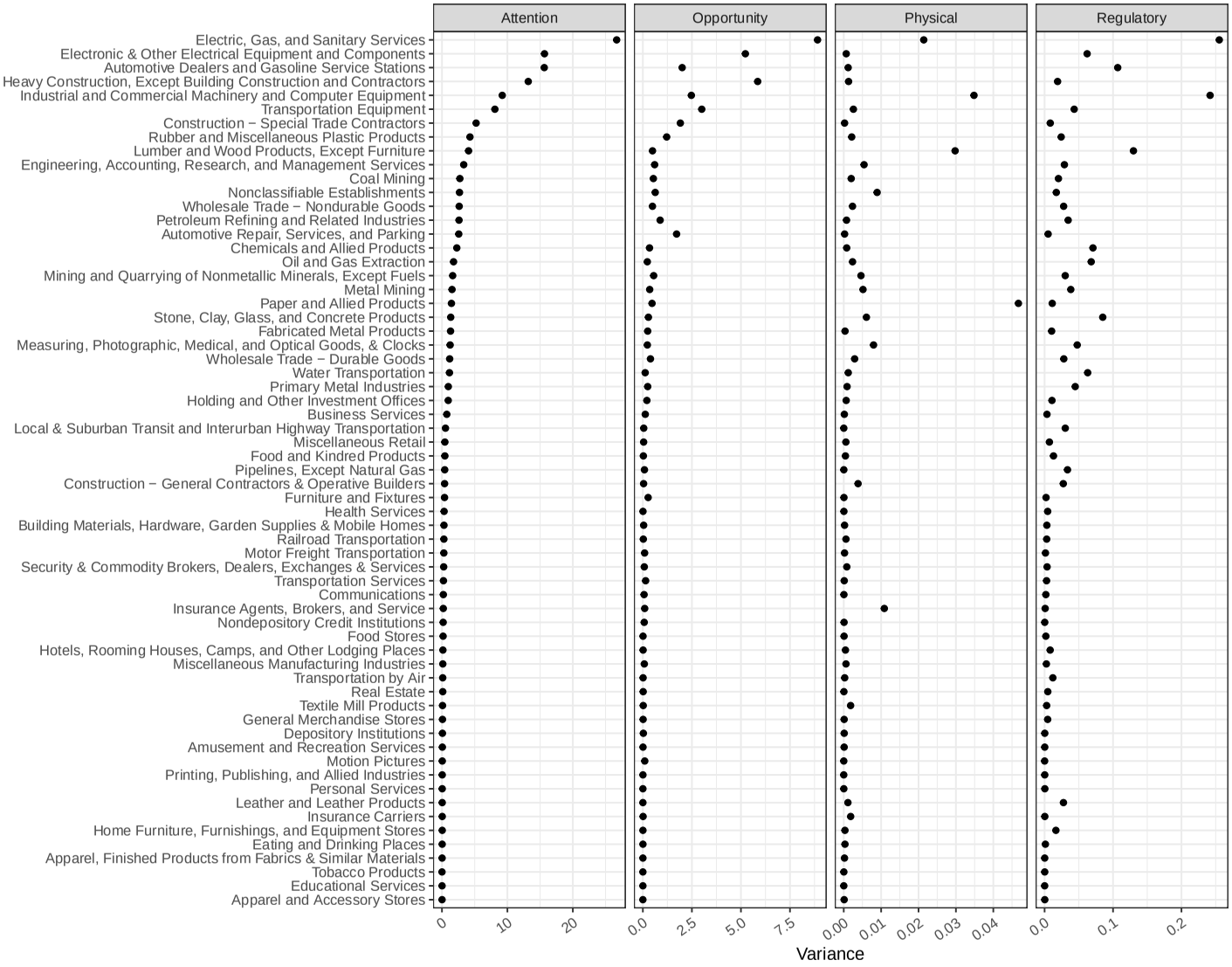
[11] Gregg, Aaron. "ExxonMobil Aims for Net Zero Greenhouse Gas Emissions from Operations by 2050." Washington Post, January 18, 2022. https://www.washingtonpost.com/business/2022/01/18/exxon-greenhouse-gas-net-zero/.

Figure 1: Within Industry Variation of Climate Change Exposure




***Note:*** The figure visualizes within-industry variance of climate change exposure. The boxplots summarize the variance of firms' average climate change exposure scores across all of their earnings calls for each industry. Points represent outlier values of these scores.

Figure 2: Within Industry Variation of Exposure Variables




***Note:*** The figure visualizes within-industry variance of the four different climate change exposure variables. Points summarize the variance of these variables for each industry.

## 3.2 Lobbying Activity

Lobbying activity data comes from the LobbyView dataset (Kim, 2018). This is a firm-level lobbying dataset based on the universe of lobbying reports that became available under the LDA of 1995 and went into effect in 1999 (N=1 267 469). The purpose of the LDA is to document the federal lobbying activities of business entities, nonprofit organizations, and paid lobbyists. Registrants must file reports that disclose approximately how much was spent on lobbying activities and describe the issues that were the subjects of the lobbying activities. To illustrate the nature of the data, Table 5 summarizes the information included in a lobbying report for General Motors in 2020. Each report is filed by a specific registrant for a given quarter-year. Reports indicate the amount of this registrant's lobbying expenditure in the quarter as well as detailed information about the specific lobbying issues, including bill numbers, and government entities that are lobbied. For example, Report #301179589 filed by General Motors Company, the general issue code was "ENV" for Environment, and they lobbied on specific bills related to higher octane fuels, electric vehicles, and greener air standards.

Table 5: Lobbying Report by General Motors, 2020 First Quarter

| | 301179589 |
|---|---|
| Registrant Name | General Motors Company |
| Year | 2020 |
| Quarter | 1 |
| Expense | $ 3,240,000.00 |
| General issue area code | ENV |
| Specific lobbying issues | - H.R.4690, The 21st Century Transportation Fuels Act, higher octane fuels;<br>- H.R.2256/S.1094, Driving America Forward Act, EV tax credit, EV infrastructure;<br>- H.R.431, CAFE Standards Repeal Act of 2019, fuel economy;<br>- H.R.978, Clean and Efficient Cars Act of 2019, CAFE;<br>- S.1022, Greener Air Standards Mean Our National Security, Environment and Youth Saved Act, CAFE;<br>- H.R. 5545, No Exhaust Act of 2020, EV infrastructure;<br>General sustainability and climate change related issues; harmonization; ongoing engagement on fuel economy regulation and EV deployment; Tailpipe emissions proposed Tier 3 rule; EV policy development; Consumer and Fuel Retailer Choice Act; fuel economy harmonization; and, RFS Reform/future fuels. |
| Government entities | Department Of Energy, Department Of Transportation, Environmental Protection Agency, House Of Representatives, National Economic Council, National Highway Traffic Safety Administration, Senate, White House |

Reports can be associated with multiple general issue codes. Unique report identifiers enable us to link each issue to the textual description of the lobbying activity for each lobbied issue. Furthermore, each issue is assigned to its three character lobbying issue code.[12] The database provides unique

[12] See Lobbying Issue Codes for details.

reporter identifiers that allow us to merge each reported issue with information about the reporter such as primary NAICS industry codes as well as firm databases such as Compustat, ORBIS, and Bureau van Dijk. As Sautner et al. also include these identifiers, we merge the above outlined quarterly and yearly climate change exposure variables with the LobbyView data in order to analyze exposure and lobby activity (including a binary variable and total expenditure) at the firm-year and firm-quarter level. In total, we have exposure data for 2 281 033 lobbied issues from 2001 to 2020.[13]

As there is no overarching "climate" category under the LDA, we investigate issues that reasonably relate to climate change mitigation and adaptation, along with those that involve environmental quality and conservation. We create a series of binary variables indicating whether a report is coded as being related to a) CAW: Clean Air & Water (Quality); b) ENG: Energy/Nuclear; c) ENV: Environmental/Superfund; and d) FUE: Fuel/Gas/Oil. Within the sample, 6750 ($\sim$ 3%) fall into CAW, 28 205 ($\sim$ 13%) into ENG, 4259 ($\sim$ 2%) into FUE, and 16 881 ($\sim$ 8%) into ENV.[14] In addition, we construct a summary variable, "climate," as to whether a report is tagged to any of these issue areas. For this aggregate climate variable, 40 699 ($\sim$ 18%) fall into this category.

We also construct a measure to estimate whether a registrant lobbied in favor or against climate policy. Measuring directionality of lobbying is one of the most complex dimensions of empirical research in this area, as "what [a firm] demands may be extremely specific, possibly buried in pages of regulatory rulemaking or multiple statutes [...], and heterogeneous, often incomparable between firms within the same industry, much less between firms from different sectors" (Bombardini and Trebbi, 2020). However, there is value in trying to understand whether a firm primarily supports climate mitigation and adaptation policies or not. To construct a measure of time-varying lobbying directionality that is available to many potential lobbying registrants we use data compiled by Lerner and Osgood (2022) on membership of publicly traded firms in ad hoc groups supporting and opposing climate action. As the authors describe "these coalitions are convenient vehicles to express sincerely held beliefs and to show important constituencies that the firm is on the right side of an issue. Coalitions also take action to encourage politicians or other interest groups to alter their behavior in line with the coalition's aims" (p. 10). We build dichotomous variables that take the value 1 if a firm is member of a coalition supporting (opposing) climate action in a given year and 0 otherwise. We code a lobbying instance on a climate issue to be "Pro Climate Action" if the registrant is a member of at least one pro climate coalition in a given year (and is not a member of a coalition opposing climate action at the same time). We construct a similar measure for lobbying "Contra Climate Action" based on whether a registrant is a member of at least one anti climate coalition (and not a pro coalition) in a given year. While this is not a perfect indicator of whether a firm is lobbying in favor or against climate policy, we follow other scholars who employ this approach to get a sense of the direction of lobbying (Lerner and Osgood, 2022) given the importance of coalitions (Nelson and Yackee, 2012).

[13] The total number of issues covered in the LobbyView database is 9 801 473. Therefore, we investigate around 23% of the universe of lobbied issues.

[14] For a point of comparison, the original LobbyView database (before merging with climate change exposure data) 338 437 issues are on the environment ($\sim$ 4%).

Table 6 summarizes the distribution of these directionality measures for all climate issues. In total 53 743 lobbying issues of 454 619 in the LobbyView dataset are on climate (12%). Of these issues 12% are coded as being pro climate action and 7.5% against climate action. Note that for 3.7% of all climate issues, the reporting registrants were members of both supporting and opposing climate coalitions. We do not consider these cases in the empirical analyses.

Table 6: Direction of Lobbying on Climate Issues

| Lobbying Direction | N | Percent |
|---|---|---|
| Pro | 6453 | 12.0% |
| Contra | 4010 | 7.5% |
| Both | 1969 | 3.7% |
| None | 26977 | 50.2% |
| NA | 14334 | 26.7% |

# 4 Empirical Analysis: Climate Exposure and Lobbying

## 4.1 Climate Lobbying Patterns

First, we present some descriptive facts about lobbying behavior on climate policies. Using total reported lobbying expenditures by issue area, we first compare climate issues to all other issue areas. Figure 3 shows that total lobbying spend increased from 2000 to 2020 whereas climate lobbying expenditures spiked around 2010 (likely due to ACES) and has since decreased, although with some fluctuation. This is somewhat surprising, as the distributive implications of climate change have grown in recent years, although the failure of ACES and the 2016 election of President Trump decreased the opportunity for significant federal climate policy progress from 2011 - 2020.

Figure 3: Lobbying Expenditure on Climate Lobbying vs Other Issues Over Time

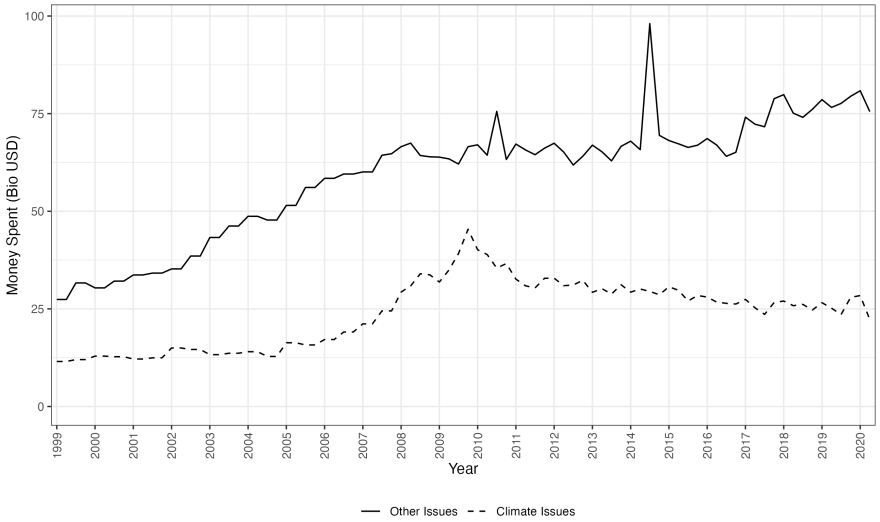
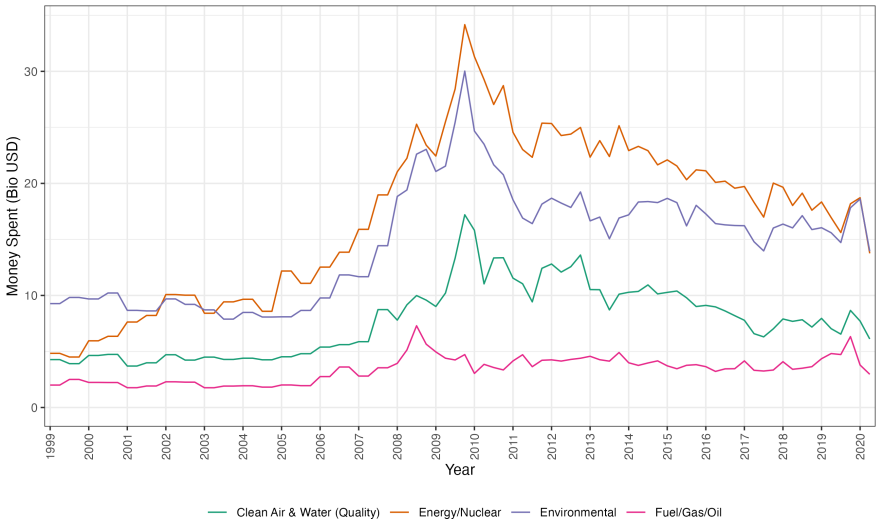


Figure 4: Lobbying Expenditure by Climate Issue Over Time




Disaggregating climate lobbying expenditures by issue area illuminates additional variation. Figure 4 divides spending into the four subcomponent issue areas. Energy and nuclear topics receive the most dollars, followed by environmental issues, then clean air & water, and finally, fuel/gas/oil. Most of these issue areas spiked around 2010, but there is also fluctuation throughout the 2010s to be explained.

Figure 5: Pro vs. Contra Climate Lobbying Over Time

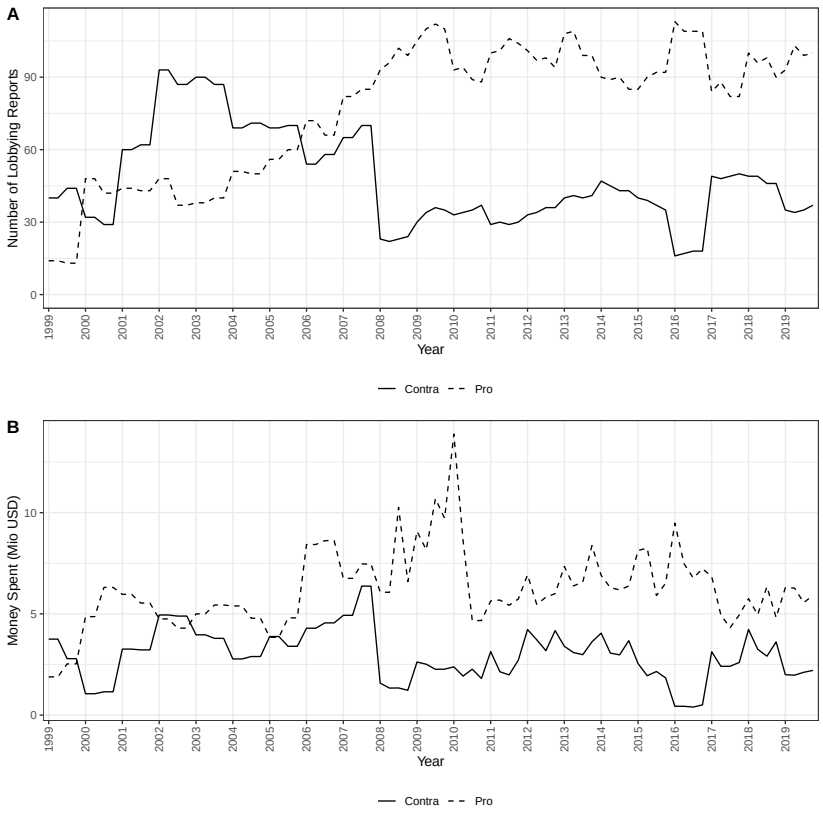


Figure 5 differentiates between pro- and contra-climate lobbying. The existence of lobbying reports (y-axis of panel A) indicates that there was lobbying on a given issue. The trends show that since 2006, more firms that are part of pro-climate coalitions have filed reports than those who are members of anti-climate action coalitions. In a similar vein, the latter have consistently spent less money on lobbying on climate policy overall. There is also variation over time in the amount of lobbying activity for both pro- and anti-climate coalition members, with clear spikes in pro-climate lobbying spend around 2009-2010.

Figure 6 shows the spending behavior of firms differentiated by their climate change exposure measure scores. Firms are sorted into four quartiles of the score distribution within their industry in a respective quarter. Firms that have among the highest climate exposure scores in their industry spend the most money on climate lobbying. This is particularly striking for the physical and regulatory risk measures as firms within the top quartile spend substantially more money than their contraries falling into the lower quartiles. Interestingly, the figure suggests that more money is spent in quartiles by firms that are part of coalitions that support climate action rather than oppose it.

Figure 6: Pro vs. Contra Climate Lobbying Over Time By Climate Exposure

## 4.2 Climate Exposure and Lobbying Occurrence

Next, we estimate the effect of overall climate change exposure on the probability of lobbying on any climate issues to test our hypotheses. In particular, we estimate the following model:

$$\mathbb{E}[Y_{ict}] = f(\alpha + \beta_1 * Regulatory + \beta_2 * Physical + \beta_3 * Opportunity + \delta_t + \delta_c + \delta_{tc} + \gamma \mathbf{X}_{ict} + \epsilon_{ict})$$

where $Y_{ict}$ is a binary variable indicating whether a firm lobbied on a climate change issue in a given year, *Regulatory*, *Physical*, and *Opportunity* represent the individual climate exposure measures, $\delta_t$, $\delta_c$, and $\delta_{tc}$ represent fixed year, industry, and year-by-industry effects, respectively, and $\mathbf{X}_{ict}$ represents a vector of firm-year-level covariates that might affect both climate change exposure and lobbying behavior. The function $f$ represents the logistic transformation of the linear equation.

We include a few additional important variables pertaining to climate change exposure at the firm level and its impact on political activity. We control for key financial variables that are commonly used in finance and economics literature related to firm size and productivity. These include earnings before interest and tax (EBIT), total assets, and the EBIT to asset ratio, which is a measure of firm productivity. Data on firm financial variables are from the ORBIS global company database. We also assume that certain characteristics of a firm may make them more likely to lobby in general, regardless of the issue area. Thus, we control for total lobbying in terms of the dollar amount spent on lobbying in a given year of any type, by firm. This is a proxy measure for the general propensity of a firm to lobby, which may impact whether or not it lobbys on climate-related issues. Finally, we also include a dummy variable indicating whether a firm's headquarters (HQ) is located in the US as it is likely that US-based firms are more likely to lobby the US government.

We begin by assessing the composite effect of the various measures of climate change exposure on whether a firm lobbies on related issues in a given year. The results of these models are summarized in Table 7. The first column demonstrates a positive unconditional correlation between firm exposure to climate change and lobbying on climate issues. This relationship holds across specifications. As expected, we find that firms with greater climate exposure are more likely to lobby on climate issues. The interpretation of column 6 changes as we incorporate the year-by-industry fixed effect such that the "overall exposure" variable can now be interpreted as the degree of exposure towards climate change *relative to the exposure of other members of the same industry in a given year*. This most rigorous specification allows us to evaluate how within-industry heterogeneity in climate exposure affects the decision to engage in climate lobbying. It reflects the importance of a firm's relative position to industry competitors for explaining political activity, despite how policy might impact a firm in absolute terms.

The consistent results in Table 7 suggest that the more exposed a firm is to climate change, the more likely that firm is to lobby on climate-related topics. It is also apparent that the firm-specific exposure relative to industry rivals is driving the positive relationship, as the magnitude of the coefficient actually increases once year-by-industry fixed effects are included. However, these results only represent the impact of *composite* firm exposure to climate change. They do not account for the various impacts

climate change may exert on a firm. To evaluate how these varied forms of exposure affect climate lobbying independently, we break down our overall exposure measure into its component parts.

Table 7: Effect of Exposure to Climate Change on Lobbying on Climate Issues

| DV=Clim. Lobby Dummy | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| Overall Exposure | 1.466*** | 1.476*** | 1.465*** | 1.509*** | 0.874*** | 0.896*** |
| | (0.378) | (0.382) | (0.347) | (0.349) | (0.222) | (0.235) |
| EBIT | | | 0.075 | −0.059* | 0.024 | 0.005 |
| | | | (0.052) | (0.035) | (0.036) | (0.041) |
| EBIT/Assets | | | −0.001*** | −0.001*** | −0.001*** | −0.001*** |
| | | | (0.000) | (0.000) | (0.000) | (0.000) |
| US HQ | | | | −0.175 | −0.033 | −0.040 |
| | | | | (0.179) | (0.245) | (0.248) |
| Total Lobbying ($) | | | | 2.175*** | 2.349*** | 2.435*** |
| | | | | (0.417) | (0.404) | (0.436) |
| Observations | 59 531 | 59 531 | 47 433 | 47 433 | 47 156 | 43 976 |
| R2-Pseudo | 0.129 | 0.132 | 0.132 | 0.181 | 0.303 | 0.290 |
| Year FE | | X | X | X | X | X |
| Industry FE | | | | | X | X |
| Year*Industry FE | | | | | | X |

* p < 0.1, ** p < 0.05, *** p < 0.01. Standard errors clustered by year and industry.

Table 8 displays the results when we distill the exposure measure into opportunity, regulatory, and physical exposure and run an otherwise identical set of models. The results are again consistent across specifications - all three exposure measures exert a positive and statistically significant impact on the decision of a firm to lobby on climate change, although the physical exposure measure is statistically insignificant at the 90% level prior to the inclusion of firm-level covariates. The relatively larger coefficients for opportunity and regulatory exposure relative to physical exposure suggest that physical vulnerabilities are a weaker driver of climate lobbying. This result is sensible considering that physical vulnerabilities, stemming from increased risk of events such as sea level rise or severe weather, can often be dealt with only through policies that have long horizons and produce diffuse benefits. It is more difficult for a firm to justify private lobbying costs in return for such slow-developing and diffuse policy outcomes.

In Table 9, we estimate separately the effect of exposure to climate change on lobbying in each of the individual areas of climate-related issues. We find that increased overall climate change exposure is positively associated with lobbying on clean air and water, energy, and the environment. However, we find no relationship between climate change exposure and the likelihood that a firm lobbies on issues related to fuel, gas, and oil. This is somewhat surprising, as the outcome variable is a binary indicator as to whether a firm lobbies on the issue and is agnostic of the direction of lobbying (i.e., in favor or against certain regulation). We would expect industries such as Automotive Dealers & Service Stations, Electric, Gas, and Sanitary Services, and Petroleum Refining that have a high degree of exposure to climate change, would also be lobbying on issues related to fuel, oil, and gas (at least in order to curtail the extent of regulation). Similarly, we might expect that firms competing with traditional fossil fuels

Table 8: Effect of Exposure on Lobbying, by Exposure Type

| DV=Clim. Lobby Dummy | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| Opportunity Exposure | 0.827** | 0.828** | 0.801** | 0.810** | 0.469*** | 0.479*** |
| | (0.348) | (0.344) | (0.328) | (0.329) | (0.143) | (0.151) |
| Regulatory Exposure | 0.807*** | 0.830*** | 0.869*** | 0.890*** | 0.469*** | 0.471*** |
| | (0.063) | (0.060) | (0.063) | (0.056) | (0.108) | (0.114) |
| Physical Exposure | 0.186 | 0.185 | 0.269*** | 0.285*** | 0.162** | 0.182** |
| | (0.129) | (0.126) | (0.104) | (0.106) | (0.073) | (0.080) |
| EBIT | | | 0.066 | −0.065* | 0.022 | 0.005 |
| | | | (0.052) | (0.036) | (0.036) | (0.041) |
| EBIT/Assets | | | −0.001*** | −0.001*** | −0.001*** | −0.001*** |
| | | | (0.000) | (0.000) | (0.000) | (0.000) |
| US HQ | | | | −0.145 | −0.038 | −0.047 |
| | | | | (0.207) | (0.263) | (0.267) |
| Total Lobbying ($) | | | | 2.080*** | 2.308*** | 2.389*** |
| | | | | (0.407) | (0.399) | (0.429) |
| Observations | 59 531 | 59 531 | 47 433 | 47 433 | 47 156 | 43 976 |
| R2-Pseudo | 0.113 | 0.116 | 0.118 | 0.165 | 0.300 | 0.288 |
| Year FE | | X | X | X | X | X |
| Industry FE | | | | | X | X |
| Year*Industry FE | | | | | | X |

* p < 0.1, ** p < 0.05, *** p < 0.01. Standard errors clustered by year and industry.

(e.g., renewables) will lobby in an attempt to hurt the fuel, oil, and gas industry. However, as the exposure coefficient in Model 4 is statistically insignificant, we treat this as a null result. The large exposure coefficient in Model 2 suggests that exposure to climate change is a particularly strong driver of lobbying related to energy issues. One explanation for this particularly strong relationship is that the government is often an active partner in subsidizing clean energy development, so opportunity exposure could translate more directly into government lobbying on this issue. Firm with high opportunity exposure, especially relative to others in their industry, are likely investing in clean energy technology and seek to secure individual benefits through specialized lobbying. To investigate whether this is the case, we again break down our overall measure into its components and estimate their effects on climate lobbying separately by issue area.

The results are shown in Table 10. Since, as before, we expect that greater overall exposure should be associated with a higher probability of lobbying, we assume that each of the specific components of exposure will also have a positive association with lobbying. Our hypothesis is confirmed for lobbying on environment issues across measures of exposures (and for overall climate issues, given that it aggregates these topics). Furthermore, exposure to regulatory aspects of climate change is associated with increased lobbying activity in all issue areas. Furthermore, it appears that opportunity exposure is the main driver of increased lobbying on energy issues. This reinforces the suggestion that the strength of the relationship between exposure and energy lobbying may be attributable to patterns of government investment in renewable energy where firms can obtain specialized subsidies or incentives. However, we find little evidence of a relationship between exposure and lobbying on the fuel, gas, and oil issue area. Only the regulatory exposure measure is statistically significant and weakly so. This result

Table 9: Effect of Exposure on Lobbying, Decomposed by Issue Area

| | Clean Air and Water | Energy | Environment | Fuel, Gas, and Oil |
|---|---|---|---|---|
| DV=*Issue* Lobby Dummy | (1) | (2) | (3) | (4) |
| Overall Exposure | 0.148*** | 0.735*** | 0.288*** | 0.056 |
| | (0.026) | (0.193) | (0.077) | (0.246) |
| EBIT | 0.134 | 0.000 | 0.038 | 0.171 |
| | (0.100) | (0.049) | (0.053) | (0.198) |
| EBIT/Assets | 0.008*** | −0.001*** | −0.001*** | 0.011* |
| | (0.001) | (0.000) | (0.000) | (0.006) |
| US HQ | 0.590 | −0.150 | 0.042 | 0.369 |
| | (0.368) | (0.241) | (0.254) | (0.269) |
| Total Lobbying ($) | 1.508*** | 2.078*** | 2.371*** | 0.226* |
| | (0.314) | (0.313) | (0.432) | (0.134) |
| Observations | 32 239 | 42 353 | 41 730 | 30 447 |
| R2-Pseudo | 0.274 | 0.275 | 0.234 | 0.134 |
| Year FE | X | X | X | X |
| Industry FE | X | X | X | X |
| Year*Industry FE | X | X | X | X |

* p < 0.1, ** p < 0.05, *** p < 0.01. Standard errors clustered by year and industry.

implies that even as the exposure of companies to climate change varies across the various dimensions, they see little benefit from increased engagement with government officials on issues related to fuel, gas, and oil. Collectively, these results suggest that the relationship between firm exposure to climate change and climate lobbying depends on both the character of a firm's exposure and varies by climate issue.

Table 10: Effect of Exposure on Lobbying, by Exposure Type and Decomposed by Issue Area

| | Climate | Clean Air and Water | Energy | Environment | Fuel, Gas, and Oil |
|---|---|---|---|---|---|
| DV=*Issue* Lobby Dummy | (1) | (2) | (3) | (4) | (5) |
| Opportunity Exposure | 0.479*** | 0.056 | 0.535*** | 0.097** | −0.073 |
| | (0.151) | (0.037) | (0.133) | (0.047) | (0.170) |
| Regulatory Exposure | 0.471*** | 0.110** | 0.231*** | 0.203*** | 0.115* |
| | (0.114) | (0.045) | (0.072) | (0.049) | (0.067) |
| Physical Exposure | 0.182** | 0.107** | 0.062 | 0.110*** | 0.091 |
| | (0.080) | (0.043) | (0.050) | (0.029) | (0.092) |
| EBIT | 0.005 | 0.133 | −0.002 | 0.040 | 0.172 |
| | (0.041) | (0.100) | (0.049) | (0.053) | (0.197) |
| EBIT/Assets | −0.001*** | 0.008*** | −0.001*** | −0.001*** | 0.011** |
| | (0.000) | (0.001) | (0.000) | (0.000) | (0.006) |
| US HQ | −0.047 | 0.588 | −0.145 | 0.045 | 0.372 |
| | (0.267) | (0.372) | (0.252) | (0.264) | (0.284) |
| Total Lobbying ($) | 2.389*** | 1.499*** | 2.053*** | 2.344*** | 0.224* |
| | (0.429) | (0.313) | (0.313) | (0.430) | (0.131) |
| Observations | 43 976 | 32 239 | 42 353 | 41 730 | 30 447 |
| R2-Pseudo | 0.288 | 0.277 | 0.272 | 0.236 | 0.138 |
| Year FE | X | X | X | X | X |
| Industry FE | X | X | X | X | X |
| Year*Industry FE | X | X | X | X | X |

* p < 0.1, ** p < 0.05, *** p < 0.01. Standard errors clustered by year and industry.

### 4.3 Climate Exposure and Lobbying Directionality

In this section, we seek to identify how a firm's exposure to climate change affects its willingness to engage in pro- versus anti-climate lobbying. Up to now, we have considered only lobbying in absolute terms, not whether this lobbying supports action on climate change mitigation and adaptation. To do so, we leverage the lobbying directionality measures discussed in Section 3.2. We run similar logistic regressions to analyze the relationship between firms' climate exposure and propensity to lobby in a gien direction. In particular, we estimate the likelihood of a firm lobbying in favor of pro-climate action.

Table 11 summarizes the results of models that use the overall exposure measure, gradually adding control variables and fixed effects. As in Table 7, the exposure coefficients are positive and statistically significant in all specifications. In addition, the magnitude of the coefficient increases in column 6 when we restrict to within-industry-by-year comparisons. This suggests that within-industry advantages are powerful drivers of lobbying in favor of pro-climate policy, even when it may increase absolute costs for firms.

Table 11: Effect of Exposure on *Pro*-Climate Lobbying

| DV=Pro-Clim. Lobbying Dummy | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| Overall Exposure | 0.372*** | 0.361*** | 0.351*** | 0.332*** | 0.133*** | 0.138*** |
| | (0.062) | (0.064) | (0.049) | (0.048) | (0.018) | (0.021) |
| EBIT | | | 0.038 | 0.004 | 0.116 | 1.191 |
| | | | (0.057) | (0.041) | (0.087) | (1.019) |
| EBIT/Assets | | | −0.002*** | −0.002*** | −0.001*** | −0.002*** |
| | | | (0.000) | (0.000) | (0.000) | (0.000) |
| US HQ | | | | 15.776*** | 15.791*** | 16.000*** |
| | | | | (0.191) | (0.019) | (0.043) |
| Total Lobbying ($) | | | | 0.087 | 0.124 | 0.114 |
| | | | | (0.065) | (0.087) | (0.089) |
| Observations | 56 204 | 54 986 | 43 787 | 43 787 | 37 244 | 29 979 |
| R2-Pseudo | 0.043 | 0.047 | 0.048 | 0.079 | 0.160 | 0.160 |
| Year FE | | X | X | X | X | X |
| Industry FE | | | | | X | X |
| Year*Industry FE | | | | | | X |

* p < 0.1, ** p < 0.05, *** p < 0.01. Standard errors clustered by year and industry.

Next, we disaggregate the climate exposure measure and analyze the effect of exposure to opportunities, as well as regulatory and physical risks associated with climate change on pro-climate regulation lobbying. Table 12 summarizes the results. All three exposure measures are positive and significant across most specifications, although the relationship between regulatory and physical exposure and pro-climate lobbying is weaker than for lobbying of any kind. When adding covariates and fixed effects, the effect sizes decrease. Moreover, only the coefficient of the opportunity exposure measure remains significant at the 99% confidence level. The results suggest that climate change exposure in its various forms remains a powerful driver of pro-climate lobbying, particularly when climate change-related opportunities are growing for a firm. These results align with expectations - firms that see more technological opportunity are more likely to lobby for policies that advance decarbonization and

other efforts to mitigate climate change.

Table 12: Effect of Exposure on *Pro*-Climate Lobbying, by Exposure Type

| DV=Pro-Clim. Lobbying Dummy | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| Opportunity Exposure | 0.265*** | 0.252*** | 0.260*** | 0.245*** | 0.096*** | 0.106*** |
| | (0.061) | (0.060) | (0.055) | (0.051) | (0.022) | (0.025) |
| Regulatory Exposure | 0.109*** | 0.108*** | 0.079** | 0.075** | 0.018 | 0.023* |
| | (0.028) | (0.030) | (0.035) | (0.033) | (0.015) | (0.013) |
| Physical Exposure | 0.147 | 0.155 | 0.217** | 0.207** | 0.148** | 0.149** |
| | (0.097) | (0.095) | (0.092) | (0.090) | (0.069) | (0.069) |
| EBIT | | | 0.038 | 0.004 | 0.117 | 1.182 |
| | | | (0.058) | (0.042) | (0.089) | (1.013) |
| EBIT/Assets | | | −0.002*** | −0.002*** | −0.001*** | −0.002*** |
| | | | (0.000) | (0.000) | (0.000) | (0.000) |
| US HQ | | | | 15.779*** | 15.779*** | 15.979*** |
| | | | | (0.194) | (0.022) | (0.055) |
| Total Lobbying ($) | | | | 0.086 | 0.124 | 0.113 |
| | | | | (0.064) | (0.087) | (0.088) |
| Observations | 56 204 | 54 986 | 43 787 | 43 787 | 37 244 | 29 979 |
| R2-Pseudo | 0.046 | 0.051 | 0.054 | 0.085 | 0.166 | 0.165 |
| Year FE | | X | X | X | X | X |
| Industry FE | | | | | X | X |
| Year*Industry FE | | | | | | X |

* p < 0.1, ** p < 0.05, *** p < 0.01. Standard errors clustered by year and industry.

The results in this section should be treated with caution. Membership in a pro-climate coalition does not preclude a firm from lobbying *against* climate change mitigation even it does indicate that a firm is more likely to lobbying in support of such policies. We acknowledge that using this measure to attribute any lobbying from pro-climate coalition members to be pro-climate lobbying may introduce unanticipated biases into this section of analysis. However, the results are presented as suggestive evidence and a first-cut effort at identifying how variation in firm exposure to climate change may support or undermine government efforts to mitigate climate change.

# 5 Conclusion

When do firms become politically active on topics related to climate change and what determines which policies they support? We argue that firms that face high regulatory costs lobby against pro-climate regulation to avoid consequent economic costs. In contrast, entities which are more concerned about physical risks or opportunities from climate change are expected to lobby in favor of such regulatory policies. A major challenge for previous research studying firms' climate change preferences has been to measure companies' varying costs and potential benefits from more ambitious climate change policies. To overcome these challenges we use novel firm-level earnings call data from 2002-2020 to understand the level of climate change exposure and relative risk-opportunity exposure for over 2000 public firms. We map these measures to firms' federal lobbying activity, as reported under the LDA. This allows us to analyze the relationship between both positive and negative types of exposure to the effects of climate change with related political activity.

We provide evidence that greater general exposure to climate change increases the likelihood that firms engage in lobbying on climate issues. Furthermore, differences in physical risk, regulatory risk, and market opportunities explain the variation between and within industries of lobbying activity. Lobbying activity is also more sensitive to technological opportunity and regulatory change exposure than to physical shocks. Our findings contribute to a growing literature that stresses the importance of firms and interest groups for policymaking on climate (Cory et al., 2021; Kennard, 2020; Lechner, 2016) and other areas of global engagement (Kim, 2017; Kim and Osgood, 2019; Osgood, 2018). We emphasize the importance of variation across and within industries, while also acknowledging that a single firm can be exposed to climate change in multiple ways and that this balance is critical for explaining lobbying activity.

In addition, these findings deepen our understanding of the distributive politics of climate change. The relative expected costs and benefits, and the evolution of these over time, help explain the political activity of firms to influence climate policy. If firms are more likely to lobby based on opportunity generation, rather than physical impacts, policies are likely to support technological advancement (as evidenced through the IRA). This provides reason for cautious optimism about the speed of decarbonization, but may also indicate that policies to support active adaptation to the increasingly felt physical impacts of climate change may be slow to develop. As physical impacts, regulatory effects, and business opportunities related to climate change become increasingly realized, it is likely that firms' policy preferences and related lobbying activity will continue to evolve with important implications for future contestation over climate policies.

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