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ORIGINAL ARTICLE

Beyond Group Membership: New Way of Measuring Environmental Interest Group Strength in the American States

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Abstract

Interest groups are an important influence in the subnational policymaking process. Previously, environmental policy scholars measured the strength of environmental groups in the American policymaking subnational process by using proxies like state-level group membership in major nationwide environmental organizations (e.g., Sierra Club). Although these prior measures of group strength have face validity, recent scholarship suggests that the utilization of group financial resources is a better measure of the influence of interest groups in state-level models. We take this approach and provide a new way to measure state-level environmental interests by using aggregated financial information (income and assets) from Internal Revenue Service (IRS) data obtained via the National Center for Charitable Statistics (NCCS). This measure provides several advantages over previous approaches because it varies over time, is derived from easily accessible public data, includes a greater diversity of environmental organizations, and it is considered reliable by prior scholars. We demonstrate its empirical value by deploying our measure in a model of state policy adoption. We encourage researchers to further utilize this new measure in their analysis of environmental advocacy at the subnational level.

Keywords: interest groups; environmental; financial measurements; policy; state

Environmental interest groups play an important advocacy role in the policymaking process in the United States. These groups represent interests aligned with environmental protection and ecological conservation, which spans a wide range of issues such as conservation and protection of air, water, and land, pollution prevention, sustainable development, and more recently – climate change (Rabe 2004; Vig and Kraft 2012). Since the 1970s, prominent nationwide environmental groups such as the

Sierra Club, National Wildlife Federation, and Greenpeace have grown in number, size, capacity, and professionalism with many subnational affiliated organizations (Bosso 2005; Dunlap and Mertig 2014), and as a result are important stakeholders in all levels of the political system.

Environmental interests are often pitched as an oppositional force to economic development, energy, and resource extraction (Bernaur and Caduff 2004; Switzer 1997). While some scholars argue that there are ways for environmental and developmental interests to collaborate (for example, on energy efficiency, renewables, or sustainable development), in many circumstances, environmental and economic interests are seen as adversaries and pull policymakers in different directions (Cheon and Urpelainen 2013; Vig and Kraft 2012). Given this, many environmental policy scholars incorporate measures of environmental interest groups and industry interests in their models of subnational policymaking to assess the influence of these competing pressures (Abel, Salazar, and Robert 2015; Bromley-Trujillo, et al., 2016; Daley and Garand 2005; Glasgow, Zhao, and Rai 2021; Krause, 2011; Rai 2020).

Despite its wide usage, many challenges persist in measuring subnational environmental interest group strength and interest group strength in general. Scholars have developed a variety of ways to measure interest group strength (Haider-Markel 2001; Hrebenar and Thomas 1992; Lax and Phillips 2009). Specifically, for environmental interest groups, scholars used proxies such as group membership data (Bosso 2005; Kassinis and Vafeas 2006; Hall and Kerr 1991; Rabe 2004), the count of organizations headquartered in different locations (Krause 2011), environmental attitudes and surveys (Dunlap et al. 2000; Hanegraaff and Berkhout 2020), and other approaches (Daley and Garand 2005). These measures advance scholarly understanding of environmental group influence, yet the quantifications are limited in their scope, reproducibility, validity, and these data are difficult to obtain. For example, the most used measure, Sierra Club membership, only represents about 9.5% of the total nationwide environmental organization membership, and it takes in under 4% of the total environmental interest group income (Bosso 2005). The Sierra Club is also a national organization that may or may not weigh in on state-level legislation or bureaucratic rulemaking, and researchers depend upon often unreliable private requests to gain access to the organization's membership data.

A better, more comprehensive way to measure the influence of state-level advocacy groups is to assess their finances (Vegter, Taylor, and Haider-Markel 2020), which contrasts to previous approaches that view interest group influence in narrower terms. As Loomis and Cigler (2007) note, "interests with more resources (money, access, information, and so forth) usually will obtain better results than interests that possess fewer assets and employ them less effectively." Some prior studies conceptualize political influence through the interest group using political action committees (PACs) and find little evidence of so-called "vote buying" or a direct connection between financial contributions and changes to legislative voting behavior (Ansolabehere, de Figueiredo, and Snyder 2003). These studies are useful but limited in scope, as PACs only measure one form of political influence, direct contribution to candidates. This study views influence in much broader terms which encapsulates a greater diversity of political activities, as well as the financial capacity of an organization as directly connected to the ability of an organization to achieve both its political and non-political goals. For instance, depending on relevant tax code restrictions on specific activities, this money funds key activities ranging from public relations campaigns that shift public attitudes to activist mobilization, to lobbying the

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executive or legislative branches, to participation during the rulemaking process. Further, 501(c)(4) organizations also have some ability to engage in campaign activities that are coordinated with candidates and their independent campaign expenditures are not restricted.

Our study's major contribution is providing a new way for subnational environmental policy scholars to measure environmental interests through the financial strength of environmental organizations in the American states. We argue that financial resources are a more comprehensive way to capture the myriad ways that interest groups can influence state-level policymaking. We build on earlier LGBT interest group work by Taylor, Haider-Markel and Rogers (2019) to create two variables for the financial strength of environmental groups – state-aggregated per capita income and assets for environmental advocacy groups. We then compare changes in state rankings on environmental interest strength by using these new measures and Sierra Club group membership data, as well as test the efficacy of these measures in models of studying climate change state policy adoption.

Our results show that the aggregated per capita income or aggregated per capita assets of environmental groups provide superior ways to measure the influence of interest groups in subnational environmental policymaking. The new measure also provides better content validity due to its state-level aggregation of the assets and income of more than 34,000 environmental organizations across the United States. It is more inclusive in the span of environmental policy issues covered and even includes memberless organizations, as compared to major nationwide organization group membership measures. Further, compared to earlier measures, this approach is more reliable and reproducible. We use Internal Revenue Service (IRS) data obtained from the National Center for Charitable Statistics (NCCS) which is advantageous due to its annual availability, transparency, and verification by taxation authorities. Group membership data, on the other hand, poses consistency challenges as organizations vary in policy area niches and membership size and are accessible to researchers on an inconsistent basis (Johnson 1995). Additionally, the new measurements are more reliable and robust when tested in models predicting policy adoption. Given these positive advancements, we encourage scholars to use more robust and reliable measures, like the financial strength of environmental interest groups, for subnational policy analysis.

Environmental interest group strength and policymaking

In response to the Reagan administration, environmental groups underwent a transformation with greater professionalization, and they shifted towards becoming mass-based advocacy organizations (Bosso 2005; Dunlap and Mertig 2014; Sale 1993). Simultaneously, the federal government devolved many aspects of regulatory decision-making from the Environmental Protection Agency (EPA) to state and local governments (Rabe 2004; Sale 1993; Vig and Kraft 2012). This increase in professionalization and the decentralization of power opened new opportunities for environmental interest groups to influence policymaking at the subnational policy arena (Shabecoff 2000; Thomas and Hrebenar 2018).

Environmental groups, like interest groups in general, influence the regulatory and policymaking process through various mechanisms. They provide information to policymakers, bureaucratic regulators, and the public to advocate for specific regulatory outcomes (Bernauer and Caduff 2004). This is particularly important in

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the context of environmental policies where there is a high reliance on technical and scientific data (Rabe 2004). For example, pollution regulation requires understanding the risk of different chemical pollutant exposures on human and ecosystem health. Environmental groups tend to gather and share this complex scientific information in a user-friendly manner, thereby providing policy-relevant data to decision-makers and influencing public opinion.

In addition to engaging with the policy officials and the public, environmental groups contest many of the interests of industry. Environmental organizations engage in "informational competition" with oppositional forces, typically from those in a regulated industry (Grossman and Helpman 2002). Frequently, environmental interest groups support regulations to reduce negative externalities and create social benefits. However, industry forces typically oppose regulations due to their imposed costs (Cheon and Urpelainen 2013). For environmental interest groups, the activities of information sharing, advocacy, mobilization, and political competition with industry require significant resources, and groups with fewer resources are less likely to achieve their goals (Bernauer and Caduff 2004).

There is an extensive debate on the ability for environmental groups and interest groups in general to achieve favorable policy outcomes without a clear scholarly consensus (see: Baumgartner et al. 2009; Cigler, Loomis, and Nownes 2015; Gilens and Page 2014; McKay 2012). Bacot and Dawes (1997) find a positive relationship between the strength of environmental groups and state environmental budgetary expenditures, and Potoski and Woods (2002) find a link between environmental groups and higher Ambient Air Quality Standards and more Clean Air Act enforcement actions in a state. However, Bromley-Trujillo et al. (2016) find mixed results between Sierra Club membership and the adoption of more stringent environmental policies among states. Other scholars find conditional evidence that environmental groups can influence the adoption of certain policies like subnational climate targets (Glasgow, Zhao, and Rai 2021) and climate adaptation plans (Rai 2020). Additionally, Yi and Feiock (2012) find no connection between the number of environmental interest groups in a state and the adoption of different policy instruments within Renewable Portfolio Standards.

As such, there is a need to develop a consistent measure of interest group resources that scholars within the field of environmental policy can employ and compare. Ringquist (1993) systematically evaluates the effectiveness of state-level pollution control policies and critiques previous studies for their lack of consistent and accurate measurements that could evaluate input and output of policies. He also criticizes the lack of consistent and reliable measures of interest group resources. In short, Ringquist and other scholars clearly point to the need for more consentient measuring of a variety of concepts in environmental policy research. Such an effort will allow us to more clearly understand whether and how environmental interest groups influence the policymaking process.

Measurement of interest group and environmental interest group strength

Scholars have attempted to parse out the influence of powerful interest groups on the policy process. One of the major avenues of research focuses on the effect of PAC contributions on the state legislative process. Yet scholars note the mixed evidence of the effect such contributions have on "vote buying" in the legislature (Ansolabehere, de Figueiredo, and Snyder 2003). Subsequent scholars focus on other ways in which

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these powerful groups use their resources to influence the process, such as how interest group lobbyists support legislators and allies through PAC contributions (Hall and Deardorff 2006) or how legislators can rely on ideologically aligned pro-business groups for bill development (Hertel-Fernadez 2014). These studies suggest that the strength of interest groups still matters, and measuring this through either membership and/or the financial resources of a group is still an important avenue to explore the impact of powerful interests on the political system (Cigler, Loomis, and Nownes 2015; Taylor et al. 2019; Vegter, Taylor, and Haider-Markel 2020).

Interest group scholars often lacked common large-scale data sources to measure the influence of interest groups (Leech 2020). Prior subnational policy scholars utilized a diversity of measures with mixed quality. Some scholars rely on expert assessments of lobbying organizations in states (Hrebenar and Thomas 1992), the number of donors to organizations (Norrander and Wilcox 1999), the size of a supportive population (Barclay and Fisher 2003; Lax and Phillips 2009), and the size of the district which is associated with the strength of an interest group (Hartney and Finger 2021). Other scholars rely on more precise and direct measures of interest group strength through the number of members in an organization (Finger 2019; Haider-Markel 2001; Hall and Kerr 1991), the financial assets and revenue of interest groups (Taylor et al. 2019), interest group PAC contributions (Finger 2019; Hartney and Flavin 2011), and the number of lobbyists employed by an interest group (Sylvester and Haider-Markel 2016).[1]

Historically, this debate concerning the proper measurement of the strength of interest groups also extends into environmental policy. The difficulty of obtaining data about environmental interest groups has led many interest group scholars to rely on indirect measures such as expert evaluations of groups and other proxy indicators (Cigler, Loomis, and Nownes 2015)[2]. A common measure used by environmental policy scholars is group membership data. For example, Williams and Matheny (1984) measured interest group influence on the private and public spending for the regulation of hazardous waste sites by gathering Sierra Club and Audubon Society membership data. Scholars have also used Hall and Kerr's (1991) Green Index data on nationwide environmental group membership in the Sierra Club, National Wildlife Federation, and Greenpeace to test the strength of interest groups on public policy outcomes (Bacot and Dawes 1997; Hay 1996; Potoski and Woods 2002). Unfortunately, the Hall and Kerr (1991) data has not been updated since the 1990s and is improper to use in more recent policy research. Thus, researchers more often use Sierra Club membership in each state to provide a timelier measure (Bromley-Trujillo and Holman 2020; Glasgow, Zhao, and Rai 2021; Newmark and Witko 2007; Rai 2020; Shipan and Lowry 2001).

However, a few studies utilize other indicators to estimate environmental group strength. Daley and Garand (2005) use a per capita measure of membership and donors to the Sierra Club based on "Names in the News," which aggregates the total number of members and number of donors by state. Other scholars examine the strength of environmental groups by the number of environmental non-profits headquartered in each relevant municipality (Krause 2011). Still others use NGO surveys

[1]For a more detailed explanation of these subnational measures, see, Finger 2021 and Vegter et al. 2020.

[2]For a more detailed exploration of the history of national and subnational interest group strength measures, see Vegter et al. (2020).

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and environmental group density (Hanegraaff and Berkhout 2020) and environmental attitudes within a state (Dunlap et al. 2000). Finally, Kassinis and Vafeas (2006) use the number of paying members of major nationwide environmental organizations with budgets that exceed $1 million per 1000 residents, arguing that these groups represent more of a diversity of perspectives within the environmental movement.

Overall, environmental scholars tend to depend primarily on membership data from Sierra Club, Greenpeace, the National Wildlife Federation, the Audubon Society, or different combinations of these organizations in capturing interest group resources. However, there are several shortcomings of solely depending on membership data as a measurement.

Limits of using membership data

One of the main flaws of using a major national environmental organization's state-level membership data to measure group resources is its inability to capture the universe of local and state environmental interest groups (Johnson 1995).[3] There are justifiable reasons why scholars would pick national environmental organizations to explain subnational environmental interests: they are considered the "keystone" environmental groups that influence the entire environmental advocacy population and advocate for a large diversity of environmental issues compared to other smaller groups (Bosso 2005). Additionally, many of these groups have effectively maintained and even grown their organizations since the 1970s (for the Sierra Club, before from the 1800s) (Bosso 2005), so they accurately represent the major ebbs and flows of public interest in environmental protection and the size and scope of the environmental movement. However, they may not be active on state policy in all states.

Additionally, there are limits to the explanatory power of only using the membership data of these three major national environmental organizations. In 2003, the Sierra Club, Greenpeace, and the National Wildlife Federation only accounted for 28% of the membership of major national environmental organizations, and their revenue stream only consisted of 10% of the total estimated professionalized environmental group revenue (Bosso 2005). Additionally, Bosso (2005) found that historically these three organizations, while advocating for an array of environmental policy areas, did not advocate for all categories of environmental issues. Of the policy agendas of 33 of the most important national environmental groups, these major organizations focused less on the advocacy of wetlands, land conservation, national parks, cultural diversity/native populations, recycling, urban issues, transportation, corporate issues, genetically modified organisms, as well as the training and funding of other environmental groups (Bosso 2005).

Some critics could argue that a membership-only measure gauges the financial pressure that these groups can apply to influence policy outcomes. However, evidence suggests that for non-profit groups, the revenue does not solely originate from membership fees. From the mid-1970s to the early 2000s, membership fees accounted for only 30–40% of the Sierra Club's revenue. Organizations' dependence

[3]Several exceptions include local interests (Andrews 1998; Kassinis and Vafeas 2006; Krause 2011).

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on dues declined over time with an increase in reliance on individual contributions, which was a common trend across many major environmental groups (Bosso 2005). Additionally, not all environmental groups consist of members, and there is a contingent of memberless organizations that are typically excluded by scholars yet have an influence on policy issues. For example, Vegter, Taylor, and Haider-Markel (2020) critique prior usage of the *Encyclopedia of American Associations* to accurately represent an interest group ecosystem, which does not include memberless organizations. Finally, it is possible that the money from membership dues in certain states flows to out-of-state political activity. The Sierra Club is a federated organization, and there is no guarantee that this money is utilized in the same state as its source (see: Finger and Hartney 2021 for an example of money in federated unions moving from pro-Union affiliates to Right to Work ones).

To cast further doubt upon using membership data, modern interest group scholars indicate a shift in how the American public interacts with voluntary associations. Evidence shows a rise in "checkbook" memberships in organizations, or those members providing monetary support while not necessarily attending meetings, versus the decline of active or "face-to-face" memberships, or those members that attend meetings, participate in committee, and/or hold office in the association (Painter and Paxton 2014; Putnam 2000). This makes differences between terms for a "member" versus a "donor" conceptually blurry with variations in levels of engagement within these organizations (Baumgartner and Leech 1998; Bosso 2003), thus casting doubt on the reliability of membership data from interest groups. It is no coincidence, therefore, that emerging scholarship suggests not depending solely on group membership data as a measurement. Wright (1996) suggests that both membership and financial resources may be important in measuring the strength of interest groups at the national level. Financial resources may be more important prior to Congressional floor debates, but the size of interest group members may be more important in influencing floor votes (also see Hoberg 1992). Despite the importance of continual utilization of membership data, financial strength of groups is argued to be a better representation of the resources available for organizations to influence policymaking (Cigler, Loomis, and Nownes 2015). For example, economists theorize that the size of an environmental organization's budget could better sustain efforts like consumer boycotts driving up the costs on "brown" firms and therefore end "dirty" environmental practices (Innes 2006). Money is used to pay staff, advertise, organize, lobby, and engage in the policy process. In line with this, recent studies like Taylor et al. (2019) aggregate financial data of lesbian, gay, bisexual, and transgender (LGBT) related nonprofit organizations among states to measure their collective influence. It is argued that financial resources provide greater content validity in interest group measurement when compared to group membership.

Our study builds on their methodological approach and creates state-level measures of environmental interest group strength by separately aggregating their income and assets.[4] We operationalize interest group strength as these financial measures, given that money is vitally important in politics (Loomis and Cigler 2007).

[4]Organizations' policy focus areas and their efforts in mobilizing action at the subnational level are directly shown in the data but aggregated to the state level. These studies should be followed by future research.

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Data and methods

This study utilizes data from IRS Business Master Files (1995–2015) held by the National Center for Charitable Statistics.[5] Prior non-profit scholars note the difficulty in finding reliable secondary sources on non-profit organizations. The NCCS is an effective dataset to measure organizations that file Form 990 with the IRS (Bielefeld 2000). Scholars utilize this dataset to explore non-profits across multiple sectors, such as immigrant (Hung 2007), women (Jones and Jones 2017), and LGBT groups (Taylor et al. 2019). The Business Master Files contain financial data on active nonprofit organizations that have registered for tax-exempt status (e.g., 501[c][3] and 501[c][4] organizations) with the IRS (National Center for Charitable Statistics, n.d.). These files also provide a classification system that rates nonprofit organizations by their primary mission, the National Taxonomy of Exempt Entities (NTEE) (Barman 2013; Tinkleman and Neely 2011). For the last available Business Master File in each year, we queried all nonprofit organizations within the following NTEE codes: C – Environmental Quality Protection Beautification; and D – Animal-related.

These "C" and "D" codes have many sub-groups for classification of organizations (see appendix #1) that cover useful categories such as C20 – pollution abatement, C30 Natural Resource Conservation and Protection, and D30 Wildlife Preservation/Protection. For this research, we are creating a general environmental interest group measurement and aggregating all relevant organizations. However, we encourage researchers to investigate these sub-classifications, and when appropriate, narrow the types of organizations included to better fit the measurement to their own policy analysis and research questions. Selecting the groups in "C" and "D" resulted in 991,190 observations with 89,902 unique organizations between the years 1995 and 2015.

Thereafter, the dataset was cleaned through several steps. First, we applied the theoretical justification by Bosso (2005) to remove certain subcategories that did not fit the definition of an environmental interest group. While all organizations registered under the "C" and "D" NTEE classifications are groups involved with some aspect of environmentalism (either as their focus or an auxiliary non-profit effort), Bosso (2005)'s research provides a guide to narrow the categories to those deemed "environmental" interest groups. We use Bosso's "spatial map" to assist with filtering these organizations from the dataset. This spatial map consists of a topography of the policy agendas of the national environmental organizations that are broadly grouped into 33 categories (Bosso 2005, 72; see Appendix #1 for a full list of issues). As such, NTEE subcategories such as C42 Garden Club, Horticultural Programs, D20 Animal Protection and Welfare (including Humane Societies and SPCAs), D40 Veterinary Services, D61 Animal Training/Behavior were excluded from the dataset, as these policy areas fell outside Bosso (2005)'s classifications. Indeed, garden clubs from "C42" were mainly small neighborhood hobby groups and functioned differently from: "C41 Botanical Gardens" which are likely to be more influential in urban green zones and ecological species protection. Similarly, "D61 Animal Training/Behavior" were primarily private services provided to pets and domestic animals and were

[5]The NCCS data are available through, 2020 and the IRS adds information for organizations each year. Given that we only have access to the Sierra Club data through 2015 to compare with, for the purpose of this paper, we are using data from 1995 to 2015.

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excluded, while categories like "D50 Zoo, Zoological Society" that were involved in public services and species preservation were included in the dataset.[6]

Second, many organizations in the dataset had few or no financial revenues and assets. We removed all organizations that had a total of assets and revenue less than $100 in a year. This minimum threshold ($100 a year or $8.3 a month) was set to filter organizations that may be registered but are most likely inactive.[7] This reduced the number of observations to 200,439 with 34,212 unique organizations. To obtain state level measurements, we aggregate the income and assets by state and year. The resulting collapse of the data generates 1,050 state-year observations ranging from 1995 to 2015. After collapsing the data at the state-level, we convert the nominal financial data to real terms by dividing the total amount by a yearly price index from 1995 to 2015 U.S. Bureau of Economic Analysis (BEA). Real income and asset variables are then further transformed to per capita[8] variables by dividing each state's income and assets by the state's total population using census 2010 data.[9]

Figure 1 shows the mean square root[10] environmental interest group assets per capita, and Figure 2 presents the mean square root environmental group income per capita in a map format to visualize a broad trend. We use the mean square root transformation to control for outliers in the data. To show how our new measurements differ from the previously used Sierra Club group membership measurement, we also graphed the percentage of Sierra Club members in Figure 3. To make the comparison consistent, we used the same year period for Sierra Club membership.

The maps indicate that states with more environmental group income and assets tend to be either in wealthier states and/or states with more natural resources. For example, some of the wealthiest states in terms of gross state product per capita, like Massachusetts, New York, California, Wyoming, and Washington, have more aggregated income and assets for environmental interest groups (Statista Research Department 2021). Noticeably, many of these states also depend extensively on ecotourism and other natural resources.

When comparing the asset and revenue geographic distribution to the past Sierra Club membership measurement, we see different spatial patterns. Figure 3 uses the traditional measurement, the percentage of Sierra Club members in a state's population. We see that the Sierra Club's membership is more concentrated on the West Coast and the Northeast. The assets and income measure indicates a more complex story with

[6]Refer to Supplemental Materials for the full explanation of included/excluded classifications.

[7]Financial resources are needed for operational expenses and advocacy action. Literature does not have a minimum monetary threshold for interest groups being active/effective. We use the conservative threshold of $100 for this research, arguing less than $100 could not result in any operational or lobby activities.

[8]We follow Taylor, Haider-Markel and Rogers (2019) standardization process by using state population. One may argue that standardization for organizations may be based on the total number of nonprofits in each state. However, in order to compare environmental groups' strength, the number of organizations is not directly correlated to their strength. States many have few organizations, but the few organizations may possess significant resources and influence on state policy-making process.

[9]We present the rankings of all real per capita income and asset data for the year 2015 to show a cross-section of this dataset and indicate the strength of each state's environmental group ecosystem.

[10]We follow Taylor, Haider-Markel and Rogers (2019) approach to further take the mean square root to obtain a yearly average and avoid negative values in the data to allow for better comparison across states. Whenever dealing with financial data assets and income – we always have the possibility run into zeros and organizations in debt; hence, negative numbers are not uncommon in financial data, which needs standardization for cross-comparison.

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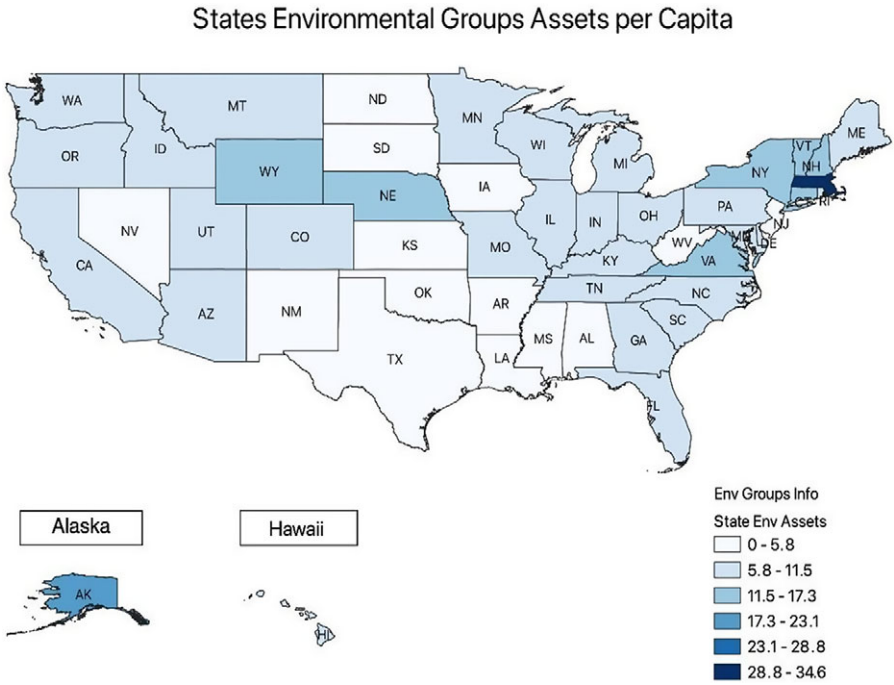

Figure 1. Mean state per capita environmental interest group assets, square root.

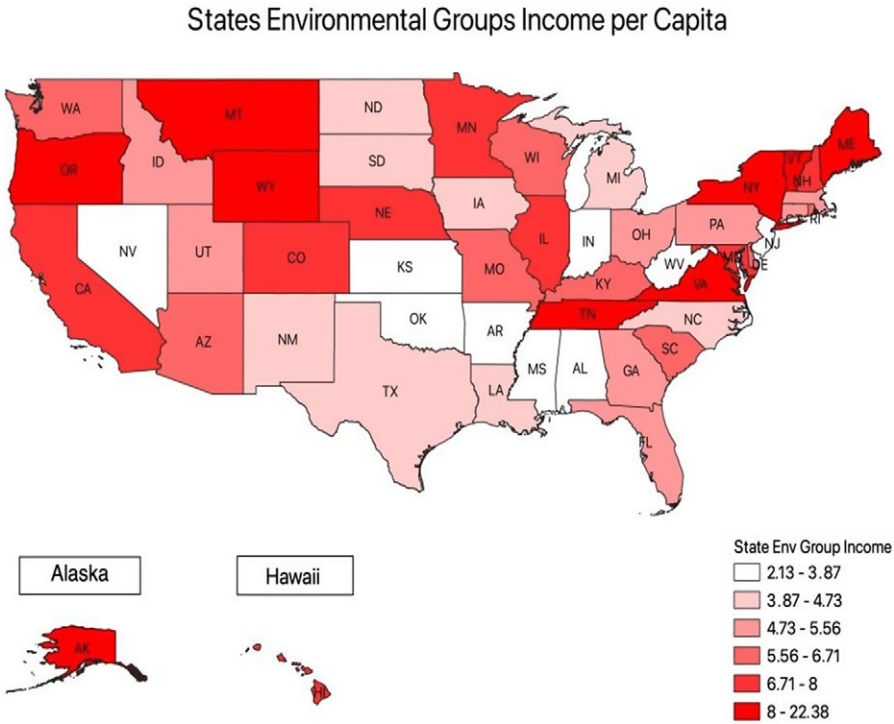

Figure 2. Mean state per capita environmental interest group income, square root.

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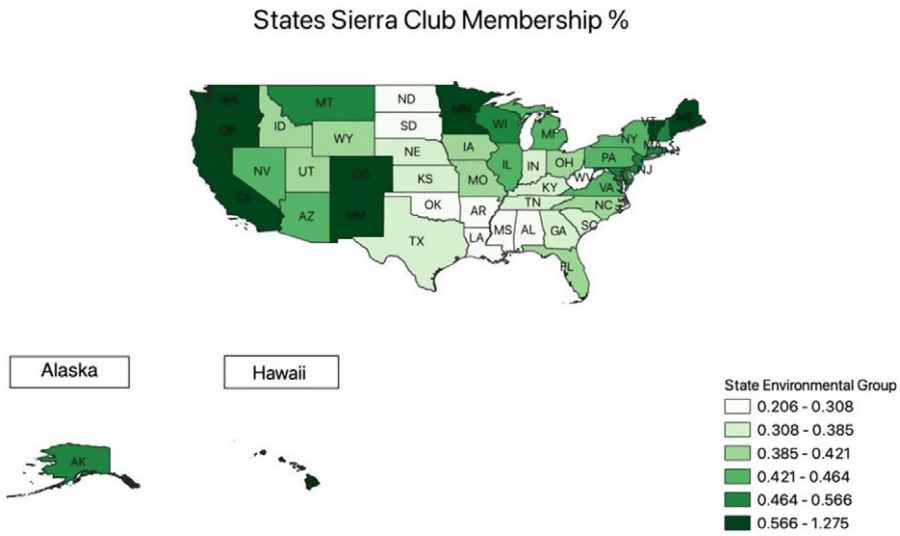

Figure 3. Mean state percentage of Sierra Club members, square root.

these resources aligning with some states but not for others. For instance, while Alabama does have some Sierra Club members, there were virtually no financial resources for environmental organizations; hence, scholars normally observed weak environmental advocacy impact on Alabama's state environmental policies. Further analysis should evaluate the variation of these resources across time and space.

In the next section, we conduct three analyses using the assets per capita and revenue per capita measures. First, we conduct Pearson's correlation analysis between the new financial measurements with the traditionally used group membership measurement, Sierra Club membership per capita by state. Second, we present a simple ranking analysis of states using the different measurements. While the maps provide a broader trend of the location of stronger environmental group presence, the ranking indicates a more specific size of environmental group influence at the state level. Lastly, we test the explanatory power of the new measurements as independent variables in models of environmental policy adoption.

Following Glasgow, Zhao, and Rai (2021)'s work on environmental policy adoption, we develop a series of logit models using fixed effects to examine whether American states adopted climate mitigation goals – greenhouse gas (GHG) emissions targets.[11] GHG targets in this case are pledges to reduce GHG emissions to certain levels (during a previous year) by a certain year in the future. In our models, the dependent variable is a dichotomous indicator of policy adoption in American states between 2001 and 2011. States that adopted a GHG target (value = 1) and states that do not adopt this policy (value = 0).

[11]Interest groups are widely examined in state-level policy analysis. Within environmental policy, many studies investigate the influence of these pressures on policy adoption and policy change. While there is vast empirical literature on policy adoption, we use Glasgow et al. (2021) for the purpose of a proof of concept. This recent study focuses on climate mitigation policy adoption. We replicate their study with their original model using Sierra Club membership and run additional models with the new financial measurements for per capita state income and assets.

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We utilize the adoption of state GHG targets for two reasons. First, GHG targets include goals to reduce GHG emissions across all economic sectors, rather than policies with more narrow goals (i.e. Renewable Energy Portfolios for the energy sector). Therefore, environmental groups across numerous issues should have an interest in the outcome of the state's climate mitigation planning, etc. (Glasgow, Zhao, and Rai 2021), and this better encapsulates the state's level of climate change commitment. These targets were used as guides for the reduction recommendations by climate advisory groups/councils in the states (Maggioni et al. 2012; Pollak, Meyer, and Wilson 2011). Therefore, environmental groups across many issues should be interested in the state's climate mitigation planning outcome.

Second, this policy sets up a scenario in which there should be plenty of opportunities for interest groups to have influence on the process. Both industry and environmental groups often participate within stakeholder advisory councils that sometimes develop the details of these targets through climate action councils (Maggioni et al. 2012) and attempt to influence the adoption of these policies within the legislature (Glasgow, Zhao, and Rai 2021). Therefore, attempts to influence this policy process should require substantial financial resources since participation within this policy-making process is costly and time-consuming (Maggioni et al. 2012).

Despite both the potential interest and mechanism to influence these policies, there is no clear prior evidence concerning the influence of environmental groups on this policy. Glasgow, Zhao, and Rai (2021) indicate that there is a relationship between the size of the Sierra Club membership in a state and the size of a state's planned GHG reduction commitments, but no relationship between membership and adoption of the policy. Therefore, the Sierra Club measure may not encapsulate the entire environmental group ecosystem's attempt to influence the process.

To test if the new measurements of environmental groups provide a better understanding of states' policy adoption behavior, we run three models with each of the measurements. The independent variable of interest is the traditional Sierra Club membership per capita in Model 1. In Model 2 and Model 3, the independent variable of interest is substituted by real income per capita for environmental groups and real assets per capita for environmental groups, respectively.

Glasgow, Zhao, and Rai (2021) argue that both internal and external factors impact a state's decision to adopt a policy. External factors are largely based on policy diffusion theories that policy adoption could occur through learning from neighboring states or states with similar ideology. We include two external variables: (1) neighbor diffusion by measuring the percentage of states that have adopted GHG targets (lagged by one year) within a group of contiguous states; and (2) an ideology variable, which is like Grossback, Nicholson-Crotty, and David's (2004) construction based on the difference of the individual state's government ideology from the average ideology of all state adopters from the previous year (i.e., the average ideology of adopters lagged by one year). For this variable, the project uses state government ideological scores developed by Berry and co-authors (Berry et al. 1998; 2007–2013) and adoption patterns of GHG tracking and reduction policies.

Glasgow et al. (2024) also included a set of internal characteristics of a state that could plausibly influence a state's decision to adopt policy. First, we include party control of the state legislature and governor ideology variables. Past research suggests that Democrats are more likely than Republicans to support state interventions in the market to accomplish environmental goals (Berry et al. 1998; Ringquist 1994). We also include party control of the state legislature from 2003 to 2011. If a state legislature is controlled by Republicans, it is coded as 0, and if a state legislature is controlled by

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Democrats, it is coded as 1. Second, since liberal citizens within a state are likely to demand more stringent environmental protection measures from their political representatives (Krause 2011; Sharp, Daley, and Lynch 2011), we include the average citizen ideology using Berry et al. 1998's measurement. Third, we include competing interest group pressures – environmental interests using Sierra Club membership and the new financial measures, and the opposing forces of the carbon-intensive industry using the percentage of coal and natural gas production in a state (Krause 2011; Rai 2020). Fourth, we capture the severity of the problem of climate change via the lagged carbon dioxide emissions in a state. The more CO2 emissions a state has, the larger the total emissions reductions needed to address the problem (Bromley-Trujillo et al. 2016). In addition, like Glasgow, Zhao, and Rai (2021), we include variables to measure the potential for renewable energy in terms of wind and solar power using data from the Energy Information Administration (EIA) data. Fifth, we include the state's median household income from the US Census Bureau to measure a state's capacity to adopt a policy. States with more resources and wealth are more likely to absorb costs related to developing and implementing new policy measures (Lowry 2005). Lastly, we control for state population size. Using these variables, we apply Glasgow, Zhao, and Rai (2021)'s logit model with fixed effects controlling for the time trend.

Analysis, results, and discussion

Table 1 shows the Pearson's correlations between the traditional measure of per capita Sierra Club membership per state, real environmental group income per capita by state, and real environmental group assets per capita by state. We find the income and assets measurements have a high correlation with Sierra Club members per capita r = 0.69 and r = 0.71, respectively, which implies a strong and positive relationship between Sierra Club membership and financial strength.

Using different measurements, we also ranked the top ten states with the strongest environmental group influence. We find that state ranking in terms of environmental group strength changed significantly across the old and new measures (see Table 2). There are some states, such as Maine and Vermont, which rank high across all three measures, indicating a high degree of both human and financial capital. However, states like Wyoming and Alaska, which do not have a large Sierra Club membership, score higher in their size of environmental interest group financial strength, which suggests the financial measurements provide different perspectives into looking at environmental group strength.

Additionally, through the new measurements, we see a pattern that could not be identified using the Sierra Club measure, that is, states with more sparsely populated areas and abundant natural resources are the states with greater environmental assets. For example, Wyoming, the least populated state, depends heavily upon environmental tourism as a part of its state economy (Inman and McLeod 2002). Similarly,

Table 1. Correlations between competing measures (N = 1,050)

Measurements	Income per capita square root	Assets per capita square root	Sierra Club % of total population
Income per capita square root	1		
Assets per capita square root	0.9250	1	
Sierra Club % of total population	0.6922	0.7066	1

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Table 2. Top states ranked by income/assets and Sierra Club member

Top 10 states	Mean Square root of income per capita	Top 10 States	Mean Square root of assets per capita	Sierra Club Member Top 10 states	% Sierra Club of Population
Maine	675.3757	Maine	1829.2318	Maine	1.6014
Alaska	301.1895	Alaska	509.2824	Vermont	0.5478
Vermont	232.3870	New York	302.5450	Oregon	0.4661
Montana	185.0058	Wyoming	286.6167	California	0.4062
Wyoming	130.6629	Vermont	276.2743	New Mexico	0.3818
Oregon	124.0074	Montana	249.1703	Washington	0.3743
Tennessee	110.9702	Nebraska	247.1137	Colorado	0.3479
New York	99.6775	New Hampshire	213.3967	Hawaii	0.3253
Virginia	94.4161	Connecticut	206.7002	New Hampshire	0.3183
Nebraska	88.7792	Virginia	204.4078	Minnesota	0.2840

Alaska hosts many large environmental organizations, such as Alaska Clean Seas, Prince William Sound Aquaculture Corporation, and Yukon Delta Fisheries Development Association, which are working to preserve natural resources. This suggests that large foundations in the environmental field are more likely to be active in natural resource-rich states to protect these resources.

Our logit models of GHG target policy adoption are displayed in Table 3. We present the results using Sierra Club member measurements in Model 1, as well as our two financial measurements of income (Model 2) and assets (Model 3). Interestingly, we find that the new measurement of income and assets are both positive and statistically significant in the models, while the original variable of Sierra Club membership was also positive. However, the magnitude is smaller for both financial variables, with real per capita income's coefficient being 0.0527 and real per capita assets' being 0.0324. These results suggest that environmental groups need large financial resources to have any significant impact on policy adoption. To make further sense of the magnitude of these coefficients, we have also calculated the marginal effects. The marginal effect for real income is 0.0007. The magnitude appears to be small, which suggests that on average, environmental organizations that have 0.0007 more dollars in a state would increase the adoption of climate change policy in the state by 1%.[12]

Most of the time, marginal effects would provide a general idea about the magnitude of impact. To make more practical sense of these effects, we calculated predicted probability with changes of real per capita income and real per capita assets. The results show that holding other variables constant, a change from the first quartile ($21,707,260) of real income per capita in our dataset to the second quartile ($36,015,170) of our dataset, the probability of a state to adopt a climate change policy has increased from only 9.66% to 13.08%. If we further change the real per capita income value to the third quartile of the real per capita income in our dataset, the probability increased to 17.13%. Similarly, when we predict the probability of adoption using real per capita assets, the probability increased from 11.23% at the first quartile of real per capita assets value to 14.60% and further into 17.47% at the third quartile of real per capita assets value. The utilization of these measures

[12]This can be interpreted as financial resources greater than 1 billion are likely to have a meaningful impact on policy change.

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Table 3. Subnational GHG target adoption models by using old and new measurements

Model type	Model I using Sierra Club	Marginal effects	Model II using income	Marginal effects	Model III using assets	Marginal effects
Neighbor diffusion	8.2138	0.0889	5.9186	0.0823	5.2614	0.0715
	(4.8765)	(0.0619)	(5.8182)	(0.0885)	(5.5847)	(0.0784)
Ideology similarity distance	0.1031	0.0011	0.0624	0.0009	0.0787	0.0011
	(0.0959)	(0.0011)	(0.1041)	(0.0014)	(0.1126)	(0.0015)
State legislature party	1.6382	0.0177	3.7748	0.0519	−4.1118	0.0559
(0 = Republican, 1 = Democrat)	(3.2375)	(0.0348)	(3.9420)	(0.0505)	(5.2238)	(0.0604)
Governor Party	−4.9330	−0.0534	−3.1385	−0.0431	−4.1770	−0.0568
(0 = Republican, 1 = Democrat)	(3.5815)	(0.0402)	(4.3683)	(0.0590)	(5.2238)	(0.0691)
Citizen ideology	0.2698*	0.0029*	0.2143*	0.0029*	0.2335**	0.0032*
	(0.1210)	(0.0014)	(0.1244)	(0.0015)	(0.1172)	(0015)
Lagged $lnCO_2$	−4.8095*	−0.0520	−4.9324*	−0.0696	−5.3259*	−0.0724*
	(2.1621)	(0.0235)	(2.5742)	(0.0410)	(2.6173)	(0.0296)
% of Sierra Club members	44.5657**	0.4822***	–		–	
	(14.7141)	(0.1752)	–		–	
Standardized income	–		0.0520***	0.0007***	–	
	–		(0.0153)	(0.0002)	–	
Standardized Assets	–		–		0.0324***	0.0004***
	–		–		(0.0084)	(0.00002)
Ln income	13.6129	0.1473	10.3192	0.1418	11.0773	0.1506
	(9.1568)	(0.1088)	(16.6276)	(0.2661)	(10.5947)	(0.1672)
Coal production	−0.0032	−0.0000	−0.0039	−0.0001	−0.0036	−0.0000
	(0.0028)	(0.0000)	(0.0023)	(0.0000)	(0.0038)	−(0.0001)
Natural gas production	0.0018	0.0000	0.0011	0.0000	0.0009	0.0000
	(0.0016)	(0.0000)	(0.0016)	(0.0000)	(0.0018)	(0.0000)
Wind potential	−0.0023	−0.0000	−0.0028	−0.0000	−0.0026	−0.0000
	(0.0015)	(0.0000)	(0.0015)	(0.0000)	(0.0019)	(0.0000)
Solar potential	−444.3847	−4.8079	−695.6819	−9.5596	−641.0094	−8.7159
	(381.8999)	(3.9996)	(380.0675)	(5.6125)	(412.9937)	(6,2810)
Population	1.9369*	0.0209*	2.5793***	0.0354**	2.5398**	0.0345**
	(0.7998)	(0.0085)	(0.8815)	(0.0128)	(0.8564)	(0.0138)
Time trend (years in dataset)	4.2822***	0.0463***	3.1453***		3.1823***	0.0433***
	(0.6134)	(0.0094)	(1.0392)		(0.5156)	(0.0133)
Year fixed effects	Yes		Yes		Yes	
N	449		449		449	

*Robust standard errors in parentheses. *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$
*Results produced by STATA MP 16.0. Different versions of STATA software may produce slightly different output.

Table 4. Predicted probabilities with 1st, 2nd, and 3rd quartiles of income and assets

Real income	Predicted probabilities	Real assets	Predicted probabilities
21,707,260	9.66%	41,189,670	11.23%
36,015,170	13.07%	69,601,880	14.60%
69,541,670	17.13%	133,640,800	17%

highlights the importance of interest groups in the adoption of GHG targets. Earlier work by Glasgow, Zhao, and Rai (2021)was unable to identify the importance of these groups in policy adoption based on a membership measurement.

While mere improvement in variable significance and chi-square does not imply one measurement is superior to the other, it does provide an indication of differences in explanatory power between them. This may be due to the improved scope, validity, and reliability of the new financial measurements. The new measurements focus on financial capacity and are created using more than 34,000 different environmental organizations. These organizations span a large geopolitical scope, from local to national and even international efforts, and they cover a wide variety of environmental issues and policy areas. Given this and considering that the financial measures are more consistently accessible and reproducible, we recommend scholars explore and utilize financial measurements, like the one proposed in this study, to better represent environmental interests in policymaking. It should also be noted that financial resources can shape public attitudes and be used to recruit and organize activists, providing a theoretical linkage to the previous measure used in the discipline. However, financial resources tap additional ways to affect policymaking, like (but not restricted to) independent campaign expenditures, generating research, providing lobbyists, and funding impact litigation.

Challenges and limitations of employing financial measures of group resources

Although the use of financial data to assess the strength of interest groups provides many methodological advantages, there are several limits to this approach. First, the data included in this financial measurement are not exclusively connected to the political system— for example, there is no available political action committee data in this database. In other words, funds can be spent on group maintenance activities or other non-policy endeavors. There is also no indicator that differentiates groups that engage in pressure tactics and those that do not. There are federal laws, especially the tax code, that limit nonprofit organizations' roles in political campaigns and in some types of lobbying, yet non-profits can have independent campaign expenditures and do things like register voters, inform voters, and educate and lobby politicians (Political Campaign Activities – Risks to Tax-Exempt Status 2015). Certain groups (e.g., 501[c][4] organizations) can also engage in independent campaign expenditures. However, activities of an interest group depend on the section of the tax code under which they are registered.

Some critics may also suggest that the finances of a group do not reflect the expressive beliefs of the public and that an advantage of a group membership measure is that it is a proxy for the environmental support of the public. This is a fair critique as prior scholarship on environmental groups suggests that the income of environmental

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groups is increasingly dependent on large individual donations and foundation grants compared to membership dues (Bosso 2005). Specifically, Bosso (2005) found that, in 2003, almost a quarter of all Sierra Club revenue came from the Sierra Club Foundation, and in general, non-profits are encouraged to find frequent contributors "higher on the pyramid of support – where the real money is." Bosso (2005) further argues that this can be controversial, as this dependency is criticized for allowing foundations to set the environmental agenda for environmental groups and influence their decision-making processes. However, the role of patrons in interest group formation and maintenance is well established (Walker 1983). In addition, not all interest groups are membership groups. For example, in the gay rights policy area, the Equality Federation does not allow individuals to join because it is an organization of organizations focused on gay rights.

This may be one of the tradeoffs with the use of a financial measure versus a membership measure: membership might be an effective proxy for the citizen support for environmental issues, while financials may not. Furthermore, even for membership groups, the measure does include revenue from membership dues, so it is not completely ignored. Additionally, in our models, public environmental support is measured through a proxy of citizen ideology and therefore is distinct from interest group influence. Therefore, while membership might be an effective proxy for public support for environmental issues, future scholars should be aware there are other ways to approximate that public support.

Additionally, while this measure does not explicitly measure political activities or group expenditures, previous scholars note that financials are critical to the proper *access* to political makers, which is a key condition to affecting policy change (Berry and Arons 2003). Also, effective political activities like information sharing, advocacy, and mobilizing the public require significant group resources (Bernauer and Caduff 2004). Therefore, group resources are a condition of political effectiveness. Future research should follow up with this measure to explore the political activities of these groups to show the explicit connection between financials and political activity.

We did our best to choose NTEEC codes that best reflect what past scholars identify as "environmental" interest organizations (see: Bosso 2005). While using NTEEC codes as a guide to identify environmental groups is an effective method, this process is suggestive and not foolproof. Some non-environmental organizations could evade this filtering process or sometimes be misidentified during the IRS's non-profit classification process. Additionally, Taylor et al. (2019) used certain search terms to narrow down and identify LGBT rights organizations in their classification process, but this is quite difficult in a field such as environmental policy due to the vast number of search terms related to the environment. Future researchers could follow up with a search term-based form of coding to ensure the accuracy of our measurement.

Finally, researchers who use this measurement must be aware of the spatial limits of this measure. For example, there are potential limits in using the headquarters of an NGO, which is reported to the IRS, as its primary location of influence. This project assumes that organizational resources are spent in the surrounding geographic area. However, not all organizations, especially those with broader geographic scope (regional, national, and global) concentrate their resources primarily where their non-profit is headquartered. Finger and Hartney (2021) found that unions in more pro-labor states were transferring funds to support their federate affiliates in right to

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work states. This suggests that tracking the influence of organizations with federated structures may be difficult due to the lack of boundaries for these funds. Case studies of the activities of a sample of individual organizations could assess where resources tend to be geographically focused. Moreover, not all these organizations are interested in state-level environmental issues—many environmental organizations in the dataset focus on local, national, or global environmental issues. Therefore, future research could examine organizational missions and their advocacy efforts to differentiate between groups at various levels in the policymaking space. Additionally, it is important to note that future researchers should be aware that on some issues some environmental groups identified within this financial measure advocate on opposing sides. For example, conservation groups may work against other environmental groups on the issue of clean energy, like wind and solar farms. Therefore, future research should further refine this measure.

Conclusion

The concept of environmental interest group resources is clearly understood as a potentially important predictor in understanding the policymaking process. Past research used various measures to represent these predictors and relied on proxy variables such as group membership data. Among these, in more recent years, Sierra Club membership gained popularity amongst scholars (Dunlap and Mertig 2014). These measures are useful, but they are limited in scope and content validity. There is emerging scholarship that suggests the use of financial strength as a better indicator of the resources interest groups have at their disposal to influence policy outcomes (Cigler, Loomis, and Nownes 2015; Vegter et al., 2020). The centrality of money in politics gives greater content validity to financial measures of interest group strength.

To improve the content validity in the measurement of interest group influence in environmental policymaking, we propose using annual financial strength (real income per capita and real assets per capita) to measure environmental interest group resources in the American states. There are several advantages to this new measurement. First, the measurement is created using over 34,000 environmental organizations across the country which is more inclusive of existing types of organizations and their environmental issue focus. Second, it uses publicly available IRS and NCCS data that is reliable and updated annually. It does not rely on proprietary information held by individual interest groups. Third, these financial measures are composed of data from so many diverse types of environmental groups, and this can capture potential group influence in the policymaking process for a wide variety of environmental issues, from conservation to climate change.

Fourth, a measure based on financial resources might better reflect sub-national differences in environmental interest group strength. For example, our findings indicate that previously used Sierra Club group membership is concentrated more along the West Coast and the Northeast, while financial strength tends to correlate more with the availability of natural resources and the economic capacity of states.

Lastly, the new measurements present slightly more explanatory power when tested for efficacy. Although the results and variation explained by the measurements do not necessarily mean these new measurements are better than an interest group membership measure, they do indicate a new, more accessible way to measure the strengths of environmental groups at the state level.

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There is a long-standing debate within the interest group literature concerning how interest groups express their strength within the political system, and this measure does not resolve this debate. According to prior scholars, the first "face" of political power is the ability to convince somebody in the political process to do something they were not planning on or to support allies that could influence the policy outcome (Dahl 1958; Finger 2019), and the second "face" being the ability to influence the policy agenda (Bachrach and Baratz; Finger 2019). This measure does not explore how environmental interest groups support legislative allies through political action committee donations, but it does include money utilized to support political activities allowed under the tax code 501(c)(3) or 501(c)(4) organizations. Therefore, this measure includes both "faces" of the power previously described by scholars (Finger 2019). Environmental groups can spend money to shape GHG targets through their involvement on climate action councils/climate advisory councils or through direct lobbying of the legislative process to shape those who set the subnational climate policy agenda *and* determine the outcome of this legislation. One drawback to this current measure is its inability to disentangle between these forms of power due to the bluntness of the operationalization of strength. Future studies should operationalize how these groups engage in activities related to these "faces" of power, which may continue to provide support for the interest group's agenda-setting problem and resolve the continual problems of scholars finding a lack of evidence for the interest group's ability to change legislative outcomes through measures such as PAC spending and legislative outcomes (Finger 2019).

Overall, this study provides important advancements for the measurement of environmental interest groups. We do not propose doing away with measures like group membership. Instead, we encourage scholars to explore the financial strength of environmental groups using the NCCS data as an addition or an alternative measure as a robustness check. We contend that the financial measures are broader in scope, more reliable, and therefore potentially a better predictor of how environmental groups influence policy outcomes. These measures have greater content validity. Having a consistent, valid, reliable measure of interest group resources offers environmental policy scholars a better opportunity for resolving some of the conflicting findings concerning whether environmental interest groups influence the policymaking process.

Supplementary material. The supplementary material for this article can be found at http://doi.org/10.1017/spq.2024.30.

Data availability statement. Replication materials are available on SPPQ Dataverse at https://doi.org/10.15139/S3/PYHM3Z (Glasgow et al. 2024).

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