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Creating Climate Coalitions: Mass Preferences for Compensating Vulnerability in the World's Two Largest Democracies

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Combating climate change requires large economic adjustments with significant distributional implications. To build coalitions of support, scholars and policy makers propose compensating individuals who will bear decarbonization's costs. What are the determinants of public opinion regarding climate compensation and investment? We theorize that climate policy vulnerability and climate change vulnerability induce support for distinct types of climate policy. Fielding original surveys in the United States and India, we show that people who reside in coal-producing regions prefer compensation for lost jobs. The general public privileges diffuse redistribution mechanisms and investments, discounting compensation to targeted groups. Those who are both physically and economically vulnerable have cross-cutting preferences. Nevertheless, there is considerable support across our samples for policies that compensate different coalitions of climate-vulnerable citizens, in line with theories of "just energy" transition and embedded liberalism. We trace the distinctive compensatory preferences of fossil fuel communities to a logic of shared community identities.

Decarbonization is one of the most pressing and complex challenges facing governments around the world. It requires international coordination across countries seeking to ratify effective emissions reductions agreements (Keohane and Victor 2016). At the same time, it necessitates convincing domestic audiences to support national policies that will facilitate meaningful reductions in emissions (Bechtel and Scheve 2013; Meckling et al. 2015). Because these policies have significant distributional implications, they are poised to generate vigorous opposition from adversely affected communities (Breetz, Mildenberger, and Stokes 2018; Jenkins 2019; Stokes 2016). To alleviate these "carbon transition" costs for the vulnerable and create momentum for climate policy cooperation, governments increasingly propose compensation and investment policies.

Although existing work explicates the determinants of support and opposition for climate action (e.g., Bechtel and Scheve 2013; Cooper, Kim, and Urpelainen 2018), there is currently a dearth of theory and evidence to clarify how individuals develop preferences regarding compensation and investment in climate policy. These policies can include transfers to individuals likely to lose their jobs when carbon-intensive industries shut down, investments in infrastructure to protect individuals from the deleterious ecological effects of climate change, investments in green energy technologies, or carbon taxes equally redistributed to all citizens. Given the critical role that compensation plays in legislative action on environmental regulation (Kono 2020) as well as in normative debates regarding the "just energy" transition (Carley, Evans, and Konisky 2018), elucidating how compensatory/investment mechanisms can shift public opposition into support for climate action is a matter of pressing scholarly and public policy concern.

What forms of compensation and investment are preferred by different coalitions of politically relevant voters? To the extent that compensatory mechanisms and investment choices activate policy buy-in from "climate losers," answers to these questions shed light on the linkages between different types of vulnerability, forms and targets of compensation policy, and climate action support among pivotal electoral coalitions in democracies seeking to implement meaningful emissions reductions.

This paper provides a theoretical framework and a series of novel empirical tests to explain the determinants of individual preferences for compensation and investments related to climate change policy. Individuals may be sensitive to the material costs of addressing climate change, which we term their *policy vulnerability*. We focus on employment-related costs associated with the implementation of decarbonization policies (Genovese 2019; Meckling 2011). We expect regions with many voters linked to policy-vulnerable sectors to be supportive of policies that compensate fossil fuel workers at risk.

We conjecture that *climate change vulnerability* crosscuts policy vulnerability when individuals susceptible to employment-related costs *also* face physical

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threats from climate change, which have been shown to drive climate preferences (Brody et al. 2007; Egan and Mullin 2012). We expect cross-pressured groups to support more mixed types of compensation compared with policy-vulnerable groups in regions less affected by climate change. These communities are predicted to value more investments in adaptation.

We test these theoretical predictions with new survey data from the United States and India, the world's two largest democracies and major emitters of greenhouse gases. We first implemented nationally representative surveys to benchmark preferences. Then, for each country we conducted the same surveys in targeted samples of citizens residing in fossil-fuel-producing regions that are either physically vulnerable, and thus cross-pressured, or less physically vulnerable. Our respondents were asked to allocate the revenue raised from increased costs associated with cleaner energy to different forms of compensation and investments. By examining how voters prefer to spend proceeds from costs imposed on carbon emissions, we place a lens squarely on the distributional politics of climate policy (Aklin and Mildenberger 2020; Bayer and Urpelainen 2016; Bergquist, Mildenberger, and Stokes 2020; Colgan, Green, and Hale 2021).

People in regions exposed to fossil fuel jobs but who are not particularly physically vulnerable (e.g., "coal country") prefer policies that direct resources to those who are economically vulnerable to climate policy. These groups of voters have less appetite for broad-based instruments such as investments in green technologies or payouts of carbon tax funds to all citizens. Individuals in cross-pressured regions mix in adaptation spending at higher rates, indicating that physical climate change vulnerability crosscuts policy vulnerability. The general population, by contrast, prefers less targeted investments in green technologies and broad-based redistribution. Nevertheless, the average voter in both the US and India is willing to allocate meaningful funds for transfers to fossil fuel workers and for infrastructural investments in climate-vulnerable communities, indicating considerable space for just energy policies that compensate the vulnerable.

We then focus on how compensatory transfers to the policy-vulnerable can be directed either at individual fossil fuel workers poised to lose jobs or at broader communities (in the trade context, see Broz, Frieden, and Weymouth 2021; Rickard 2020). We theorize and find that fossil fuel communities more often prefer community-oriented compensatory mechanisms to individual transfers than the general public. This is because fossil fuel communities such as coal country tend to be geographically concentrated, occupationally specialized, racially/ethnically homogeneous, and intergenerationally dependent on the carbon economy. Drawing on theories of social identity (e.g., Shayo 2009), we argue that perceived similarities between individuals in coal-producing regions create strong group-based affiliations, in turn influencing policy preferences regarding the disposition of compensation. By contrast, the general public pays relatively less attention to community issues.

Taken together, our findings underline how both the content of compensatory policies and the mechanisms by which they target households and communities can affect popular support for climate action in emissions-rich democracies. Our approach is the first to our knowledge to focus attention on the compensatory preferences of critical groups that lie at the center of climate policy decisions yet remain understudied in public opinion work. Analysis of these preferences elucidates how governments can build coalitions of support for decarbonization in large, heterogeneous societies. Our framework and results will be of interest to those designing climate policies and to those interested in the distributional politics of public policy more generally.

VULNERABILITY AND COMPENSATION PREFERENCES

Compensation is a mechanism for allocating resources to the losing parties of a redistributive economic policy. As a burden-sharing tool, its distinctiveness stems from its goal to redress past or future costs. Compensation can have important feedback effects on support for public policy for it can foster belief in the government's credibility in protecting vulnerable individuals and communities (Autor et al. 2014; Ruggie 1982). At the same time, compensation may fail to achieve policy goals if it is not judiciously calibrated or implemented (Jenkins 2019). How the public views compensation is critical for successful policy enactment and compliance.

For our theoretical framework, the issue area of climate change is instructive because the politics of emissions mitigation and climate adaptation are deeply rooted in distributive conflicts. "Climate losers" constitute a compelling group with strong material and normative claims. Their demand for redress is likely a condition for supporting credible policy (Bechtel and Scheve 2013).[1]

Forms of Compensation and Investment in Climate Policy

We first outline a range of policy instruments that provide compensation to either select groups or to broad sections of society. These policy instruments correspond to the main tools that policy makers and scholars have proposed in climate debates across the world (see Appendix B for an extensive discussion of policy debates regarding these instruments in the US and India, and the conclusion for discussion of other tools).

First, climate change action implies costly mitigation, bearing particularly on regions where socioeconomic

[1] Parallel political economy research is largely understood in the context of individual attitudes toward taxation, economic inequality, and trade adjustment (e.g., Autor et al. 2014; Margalit 2011).

activities contribute disproportionately to greenhouse gases, such as those with fossil-fuel-producing industries. Given the direct effects of decarbonization on job losses and household incomes in these industries, governments may choose to address vulnerability by providing *direct fiscal transfers* to affected workers.[2] More generally, directed transfers could provide spillover benefits to nondisplaced individuals in these geographically concentrated areas.

Second, climate change disrupts the livelihoods of those who are exposed to events such as floods, droughts, hurricanes, and wildfires—creating existential threats to entire communities. Adaptation-related costs could be addressed by *protective infrastructural investments.* These can materialize, for example, as seawalls in low-lying coastal communities made by governments to protect exposed communities from the adverse effects of climate change (Barbier 2014). Although some individuals in these regions may be able to afford building their own protections, vulnerable communities as a whole stand to benefit from higher levels of adaptation spending.

Although the policy levers discussed above concentrate compensation in the hands of a few, governments may wish to also design compensatory instruments that spread benefits across broader sections of society. *Investments in clean energy and green technologies* are redistributive to the extent that they contribute both to carbon mitigation and economic revitalization in the form of new jobs and the accompanying local economic growth that follows (Jenkins 2019). However, it is also a more diffused mechanism, as green energy infrastructure can be built in many places and the generation and distribution of renewable energy often spills over beyond the specific locales where infrastructure resides, therefore creating a collective good for the mass public (Bayer and Urpelainen 2016).

Finally, *rebates* for all citizens who directly or indirectly contribute to carbon taxes may also be considered an equitable and credible instrument of redress that immediately compensates large sections of society for the costs incurred in support of decarbonization efforts (Jagers, Martinsson, and Matti 2019). This last instrument is much more diffuse in nature.[3]

Types of Vulnerability and Compensation Preferences

Support for these policies depends both on the type and degree of vulnerability experienced by targeted groups and on how vulnerability is perceived by affected communities and society at large. Here we investigate two dimensions of vulnerability and, thus, two different sources of individuals' preferences related to the compensatory/investment mechanisms introduced above.

First, we consider *policy vulnerability*, which affects individuals whose economic well-being (notably their wages and employment) depends on carbon-intensive industries. Our focus on these concerns stems from prior work that highlights policy vulnerability as a catalyst of public opposition to climate cooperation (Bechtel, Genovese, and Scheve 2019; Bergquist, Mildenberger, and Stokes 2020; Bayer and Genovese 2020; Carley, Evans, and Konisky 2018; Kono 2020; Meckling et al. 2015). Second, we consider physical *climate change vulnerability*. The scholarship on public behavior has underlined this type of concern as an important source of political activism (Egan and Mullin 2012).

What preferences for compensatory climate policy does each form of vulnerability generate? We now theorize the determinants of preferences for individuals residing in regions with different exposures to vulnerabilities. We begin by focusing solely on policy vulnerability and then consider whether policy vulnerability can be moderated by physical climate change vulnerability and, therefore, if being exposed to both risks changes preferences. We also discuss the setting where individuals and communities face less policy vulnerability and climate change vulnerability. Finally, we briefly examine the case where they encounter only climate change vulnerability.

Policy Threatened but Not Climate Change Threatened

We first consider those who are exposed to the costs of carbon policy but who do not face immediate physical threats from climate change. This group includes people pressured by the anxiety of losing jobs, wages, or welfare were the government to pass stringent climate action legislation. Conceptually, two types of individuals may be affiliated with the fossil fuel industry: those directly employed in jobs that contribute to fossil fuel production and those dependent on the industry's affiliated sectors. This form of vulnerability can be existential (Colgan, Green, and Hale 2021), involving substantial dislocation and the potential destruction of one's community and way of life.[4]

In line with research that identifies a powerful effect of employment-based concerns in climate politics (Bechtel, Genovese, and Scheve 2019; Bergquist, Mildenberger, and Stokes 2020; Meckling et al. 2015), we predict that these individuals (both those directly and indirectly employed in fossil fuel jobs) are most eager to integrate employment-based compensation in climate policy. Consequently, individuals in employment-vulnerable environments should be most supportive of

[2] Based on surveys we fielded in 2016 and 2017, providing compensation to workers that lose jobs due to climate regulations has broad bipartisan support among American voters. Details are reported in Appendix A.

[3] Another distinction between these policies is that some entail ex ante efforts to cut emissions, whereas others involve ex post efforts to manage climate change consequences—and some may address both goals simultaneously (e.g., green energy). This distinction could also inform how individuals evaluate these policies.

[4] Although these individuals are less threatened by the physical effects of climate change, they of course may face other physical stresses due to the local externalities of pollution from fossil fuel extraction. We return to this consideration in the conclusion.

compensatory payments that offset potential wage or job losses. We conjecture that these individuals will prefer instruments that compensate material losses more than other groups. Therefore, we expect these individuals to support policies that emphasize transfers to affected households and communities over other investments (such as, for example, investments in adaptation infrastructure, green technologies, or tax rebates).

Policy Threatened and Climate Change Threatened

We next consider individuals who are exposed to the costs of carbon policy and who face clear and immediate physical threats from climate change. We classify this group as "cross-pressured" (Sprinz and Vaahtoranta 1994). Cross-pressured individuals may be inclined to support both transfers to affected individuals and more adaptation-oriented measures (e.g., infrastructural investments), as each compensatory instrument addresses a distinct category of vulnerability. We note that cross-cutting pressures may result in mixed preferences but may also be overwhelmingly driven by one pressure rather than by the other pressure. For example, individuals may weigh the probability of damage if no action is taken (e.g., odds that climate change will affect one's livelihood) against the cost of damage if action is taken (e.g., losing one's job if climate policy is enacted) differently and form their preferences accordingly. Overall, we expect those exposed to high costs on both dimensions to express support for policies that entail a mix of instruments, such as a combination of payments to offset workers' costs stemming from a climate mitigation policy as well as infrastructural investments designed to offset the environmental costs of climate change. We predict that spending for adaptation infrastructure among these individuals will be higher than among those who are not vulnerable to climate change, but support for targeted compensation will be lower than in the policy-threatened-only group.

Neither Policy Threatened nor Climate Change Threatened

As a benchmark, we consider individuals who are neither policy vulnerable nor physically climate change vulnerable—in other words, the general public. We expect both the economic and physical dimensions of climate change to be less salient for these individuals than for the other two groups. Consequently, we expect these individuals to be less supportive of climate-related compensation in the form of transfers to vulnerable workers or investments in adaptation infrastructure. Instead, these individuals are predicted to favor more spatially diffused allocations of compensation—that is, spending on projects that would benefit their collective interests rather than allocations that compensate specific material losses. We expect that individuals in the general public will on average support policies that emphasize investments in green technologies or the equal redistribution of public funds to tax payers at higher levels than compensatory schemes targeted at specific groups.

Climate Change Threatened but Not Climate Policy Threatened

Finally, there is a fourth category of individuals—those who are only climate change vulnerable. Individuals in these regions are predicted to weigh adaptation spending more than the other groups. This is because policies that build protective infrastructure will safeguard homes and assets threatened by the physical effects of climate change. We conjecture that individuals in communities facing high climate change vulnerability and no climate policy vulnerability will support climate policies that protect against material losses from climate change to a greater degree than in the other samples. We devote less attention to this group due to our focus on policy vulnerability and its moderation by physical climate vulnerability, besides space constraints. However, in the results section, we briefly discuss some findings for this important population from a US-based sample (see Appendix H).[5]

Individual versus Community Effects

In the preceding discussion we explain how these vulnerabilities affect individuals and the communities in which they live. Ultimately, individuals living in regions with a high degree of vulnerability can be more or less vulnerable compared to others. For example, wealthy individuals in climate-vulnerable regions can build their own adaptation infrastructure or even purchase costlier (and more protective) insurance policies. However, climate vulnerabilities can also produce broader effects that are harder to insulate against. For example, damage to others in the area can produce negative externalities or broader infrastructural damage that is difficult to avoid or at least harder to engineer around. Negative policy effects can similarly deteriorate the broader social community. Jobs and social institutions outside of the policy-affected sectors can erode, as can broader social ties and a sense of collective identity. Community-level effects can be stark; in the context of international trade, the knock-on consequences of sector-specific job losses for broader communities range from high rates of opioid abuse, mental illness, and suicide to support for populist politicians (Broz, Frieden, and Weymouth 2021; Rickard 2020). Section 4 thus engages with community-level considerations directly.[6]

[5] We note that climate change vulnerability may have both objective and subjective dimensions and that ongoing research building from earlier work on solution aversion (e.g., Campbell and Kay 2014) points to potential disparity between self-reported and objective climate concerns. We explore subjective measures of climate change vulnerability in Appendix G.

[6] Beyond individual-level factors like income that might insulate individuals from certain vulnerabilities, there are other theoretically interesting covariates like trust in government that may or may not

Furthermore, we do not argue that individuals who are not affected by policy or climate change will oppose transfers or infrastructure investments. A core philosophical principle in the concept of just energy transition is that citizens should pay attention to norms of equity and fairness when adjudicating support for climate policies and should be willing to incur personal material costs in order to compensate other groups that are perceived to be harmed by climate change or policy (e.g., Bhushan, Banerjee, and Agarwal 2020; Newell and Mulvaney 2013). Such other-regarding preferences play a powerful role in many areas of politics (Mansbridge 1990) and undergird theories of embedded liberalism (Ruggie 1982). Our argument is simply that less vulnerable individuals and communities will be less favorable of targeted forms of compensation/investment.

Our empirical design discussed below does three things: (1) we carefully sample individuals living in regions exposed and not exposed to these theoretically informed vulnerabilities (for use of a similar targeting strategy, see Malhotra, Margalit, and Mo 2013), (2) we collect individual-level covariates such that we can control for differences in attributes like resources, and (3) we investigate preferences for community- rather than individual-level investments in the case of policy vulnerability in Section 4.

RESEARCH DESIGN AND SAMPLING STRATEGY

To test the predictions outlined above, we collected new survey data from voting-age citizens in the US and India in 2019 and 2020. We selected these two countries for both substantive and methodological reasons. The importance of the US to global decarbonization efforts is widely acknowledged in the climate politics literature, and we chose this country to situate our analysis with other studies of climate policy and public opinion (e.g., Bechtel and Scheve 2013). India is the world's most populous democracy, third-largest emitter of greenhouse gases, and an influential country in global climate negotiations (Dubash 2012). It is also highly vulnerable to climate change. As the country undergoes rapid industrialization, addressing the physical and economic downsides of climate inaction has become a pressing task, yet one that is politically fraught (Gaikwad, Nellis, and Wilkinson 2021; Urpelainen and Pelz 2020).

Methodologically, our research design allows us to interrogate the theoretical determinants of preferences on climate policy across a set of distinct regions within each country. We further leverage the paired two-country comparison to study whether coalitions of voters in theoretically similar regions in two very different cases have congruent preferences regarding distributive climate policy. Although the US and India are democracies—serving as important cases for the study of voter preferences—they have markedly varying social, economic, cultural, and political milieus.[7] This allows us to make a controlled comparison, ruling out the role of country-specific factors in shaping policy preferences that are similar across the two cases.

In what follows we describe how we identified each of the three politically relevant groups theorized above in both countries. We then illustrate the questions asked to measure respondents' compensation choices and analyze the extent to which preferences vary across the samples.[8]

United States Sampling Strategy

In the US, we focused on the following samples: First, to capture the preferences of the average voter who is less exposed to policy and climate vulnerability, we fielded the survey on a nationally representative ("General Population") sample. Our second sample included individuals from coal country communities ("Coal Country"), which are US regions populated by a relatively high density of individuals with little physical vulnerability to climate change but high risks of job and wage losses due to climate policy (measured as per capita fossil fuel employment). Third, we concentrated on a sample of coastal fossil fuel communities with objective physical vulnerability to climate change due to their proximity to the coast as well as risk of job losses related to climate policy due to their reliance on the fossil fuel industry ("Cross-Pressured").

Our General Population sample was fielded in two waves by the survey firm Lucid. Setting aside participants with particularly high response speeds, this sample includes 3,702 American adults. The Cross-Pressured survey and the Coal Country survey were fielded by Qualtrics and include 1,428 and 516 individuals each, respectively. The identification of the counties to be included in the Cross-Pressured and Coal Country samples was done using zip-code level measures of fossil fuel employment from the U.S. Bureau of Economic Analysis. For the Cross-Pressured sample, our sampling strategy identified communities mostly in the coastal south (mainly Louisiana and Texas) and Alaska. For the Coal Country sample, the communities represented in our sample come for the most part from West Virginia, Virginia, Kentucky, Wyoming, and Pennsylvania. Polling the

modulate preferences over policy tools (Hetherington 2018; Peyton 2020). We return to this possibility in the conclusion.

[7] Apart from levels of economic development, the two countries differ in terms of their types of climate vulnerability and in terms of the socioeconomic characteristics of the subnational regions within the two jurisdictions, among other factors.

[8] A statement on research ethics is provided in Appendix 8. We thank Stanford University and the Center for Advanced Study in the Behavioral Sciences for hosting research workshops to give feedback on the theoretical hypotheses and research design used in this paper prior to data collection.

two targeted samples required intensive resources, and our sample sizes reflect the maximum number of respondents surveyors could reach in each region. Appendix D visualizes this geographic distribution and provides descriptive statistics.

The samples reflect expected patterns in terms of vulnerability to policy costs and concerns about physical climate change risks. In the General Population sample, 7% of respondents identify themselves or someone in their families as employed in the fossil fuel industry. This is realistic given that the U.S. Department of Energy calculated that traditional energy sectors employed approximately 6.4 million Americans in 2017. By contrast, in the Cross-Pressured and Coal Country samples, 29% and 38%, respectively, identify themselves or someone in their household as employed in the fossil fuel industry. Our coastal samples also reported higher levels of flood insurance ownership or desire for such insurance.

Our targeted sampling strategy enabled us to reach individuals in communities that are absent from other surveys that focus on national representativeness. For example, in Bergquist, Mildenberger, and Stokes (2020), only one respondent came from one of the US counties we targeted in our coal country and coastal fossil fuel samples. In a US nationally representative follow-up sample that we discuss below, we found no overlap.

India Sampling Strategy

Our samples in India parallel those chosen in the US, with some additions. Our nationally representative ("General Population") survey was fielded using telephone-based interviewing techniques (n = 2,102). The survey relied on the populationwide database of all landline and mobile phones; automated predictive dialers selected numbers randomly from all Indian telecom circles and digital exchanges.[9] Next, analogous to our US strategy, we sampled respondents vulnerable to economic policies poised to threaten coal production. The India coal communities ("Coal Country") sample (n = 1,556) combines (a) a representative sample of 706 individuals residing in 39 districts (from nine states) that have the highest reported rates of coal mining employment with (b) a sample of 850 coal miners from three of those states. In India's Coal Country sample, 62% of respondents are employed or have a member in their household employed in the coal industry.

To construct a cross-pressured sample, we collected data from two groups. The first, a coal mines cross-pressured sample, identified four districts (n = 735) containing at least one coal mine and that ranked high on a country-wide index of climate vulnerability.[10] The second, a coal plants cross-pressured sample, represents 25 districts containing at least one operating coal plant and ranking high in exposure to climate vulnerability (n = 838).[11] Our policy and climate change vulnerable ("Cross-Pressured") sample combines these two groups (n = 1,573).[12] In the Cross-Pressured sample, 10% of respondents report being employed in the fossil fuel industry. For all mentioned samples except for the targeted coal miners, respondents were polled proportionately to the population size of districts. Appendix D visualizes this geographic distribution and provides descriptive statistics for standard demographics. Additionally, Appendix E provides extensive details regarding our India sampling strategy, which created to our knowledge the most comprehensive samples to date of climate policy and climate change vulnerable groups across the country.

PREFERENCES FOR ALLOCATION OF COMPENSATION

We first focus on individual preferences for the allocation of public funds raised from higher fossil fuel prices to different compensatory mechanisms. After collecting pretreatment demographic indicators, climate science beliefs, and subjective measures of climate change concern, we introduced respondents to a series of climate policies directed at curbing the use of fossil fuels. These policies would raise the cost of fossil fuels, leading to higher energy costs (i.e., the equivalent of a carbon tax) for all citizens. In turn, these policies would be predicted to lead to job or wage losses in the fossil fuel sectors.

Importantly, the proposed policies would also include government allocation of the raised funds toward compensatory ends. Respondents were asked to allocate raised funds to four goals: (1) transfers to workers in fossil fuel industries who stand to lose jobs due to climate policy, (2) infrastructural investments to protect individuals whose homes and properties will be harmed by climate change, (3) spending on the development of green energy sources, and finally (4) an even distribution of funds to all taxpayers. These categories reflect the theoretically informed range of instruments available to policy makers and cover options that surfaced as priority policies in a pilot study as well in

[9] The survey was offered in Hindi, Punjabi, Gujarati, Marathi, Kannada, Malayalam, Tamil, Telugu, Odiya, Bangla, and Asamiya.

[10] We identified districts containing coal mines based on the Government of India's 2015 publication, "Statistics of Mines in India," which provides a comprehensive listing of all coal mines in the country. Climate vulnerability was ascertained using the Central Research Institute for Dryland Agriculture's "Atlas on Vulnerability of Indian Agriculture to Climate Change," which ranks each district in India based on climate vulnerability.

[11] To identify coal plants, we relied on the Global Coal Plant Tracker database, which contains information on the universe of coal plants that are located in India. The locations of coal plants in the Global Coal Plant Tracker database were webscraped and assigned latitude and longitude information. For this step in the research, we are grateful to Johannes Urpelainen, Ricky Clark, and Noah Zucker.

[12] In what follows, we present results for the combined Cross-Pressured sample, but similar findings obtain when we analyze the Coal Mines Cross-Pressured and the Coal Plants Cross-Pressured separately.

FIGURE 1. Proposed Policies and Allocations

To combat climate change, the use of fossil fuels like coal and oil will need to be reduced.

To reduce coal and oil production, the [United States/Indian] government is considering a policy to raise the costs of fossil fuels. This policy will affect average [Americans/Indians] because they currently use energy that comes from fossil fuels. Continuing to use these sources of energy will lead to higher household energy costs for average [Americans/Indians].

This policy can take different forms. It can increase the costs of fossil fuels a little or a lot. With higher costs, the demand for fossil fuels will fall. The government also needs to decide how to use the money collected from the policy that raises the cost of fossil fuels. The options of how the money can be used are:

- Compensate workers in the coal and oil industries who will lose jobs due to the policy.
- Help individuals whose homes and properties will be harmed by climate change, such as those who live in coastal areas.
- Invest in forms of renewable energy like solar or wind energy.
- Distribute the money equally to all citizens in order to offset the higher costs that they will have to pay for energy.

Please consider the scenario in which the government passes a climate policy that increases the average monthly household energy costs by **[$16, $64, $256] [₹140, ₹560, ₹2,240]**.

How would you want the money spent? (Please enter values for each option below so that all options together sum up to 100%. Each value must be greater than or equal to 0. If you do not want any money spent on an option, please enter 0.)

i. Transfers to compensate workers in the coal and oil industries who will lose jobs due to the policy: _____ %
ii. Infrastructural investments to protect individuals whose homes and properties will be harmed by climate change: _____ %
iii. Investments in renewable energy (e.g., solar or wind energy): _____ %
iv. Equal transfers back to all citizens: _____ %

Note: This figure shows the English version of the exercise presented to respondents (the $ and ₹ values were randomized).

contemporary policy discussions (see Appendix B for an overview of these policy discussions in the US and India).

We gave respondents three different scenarios that altered the cost per household associated with the policy: $16, $64, or $256 per month for the US and ₹140, ₹560, ₹2,240 for India.[13] The costs represented 0.5, 1.5, and 2.5% of the per capita GDP of each country, representing the range of values that scholars have argued countries would need to contribute to meaningful climate mitigation efforts (Bechtel and Scheve 2013). We randomized the order of the costs for each respondent.[14] After each scenario, we asked respondents what percentage of the money raised should be spent on each compensation option listed above (with allocations summing to 100), as shown in Figure 1.

Our outcome measure lets us understand how respondents would prioritize spending. Note that this measure does not directly tap unilateral support for policies or bundles of them (e.g., Bergquist, Mildenberger, and Stokes 2020). However, our results do not change when we asked individuals in a follow-up question to choose a level of spending that they would support and then allocated these funds across the four categories (see below and Appendix J).

Allocation of Funds and Choice of Climate Compensation

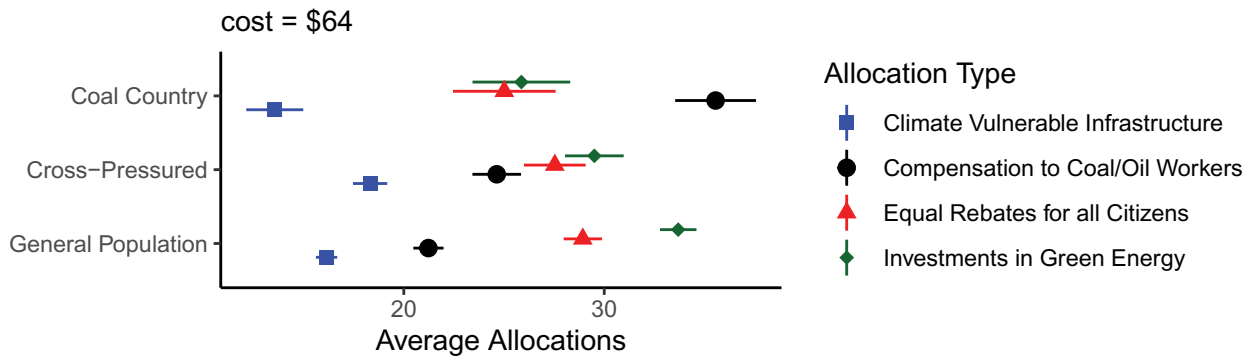
The allocations exercise returns a rich set of findings. We discuss each country separately and in comparative focus. Figure 2 shows the results in the US for the middle ($64) energy cost scenario. The results are largely similar to the allocations chosen at the other two cost levels; differences are noted below. Preferences are reported for each of our three samples of theoretical interest. Horizontal lines represent the average percentage contribution (mean with 95% confidence interval) across contribution categories.

Examining the General Population sample, we find that the average American is most in favor of green

[13] We intentionally presented these values as increased energy costs rather than taxes, given the well-documented opposition to tax increases in the US and given the reliance on sales and value-added taxes in India. We included different costs to explore whether the allocation choices between the studied samples would diverge more as costs increase. As shown in Appendix F, we uncovered few qualitative differences in allocation choices across the different cost levels; exceptions are noted below.

[14] For our India coal miners sample, each respondent saw all three prices and answered separately to each. For the other India samples, each respondent was randomly assigned to consider one of the three prices.

FIGURE 2. US Preferences for Allocation Purposes of Climate Policy Funds, by Sample



Note: This figure denotes how respondents in our three samples allocated funds raised. *Symbols* represent average allocation, and *lines* represent 95% confidence intervals.

investments (34%), followed by an equal rebate to tax payers (29%).[15] These results are consistent with our argument that average voters in the general population, who are not particularly vulnerable to either climate change or climate policy adjustments, are the least interested in targeted forms of compensation such as transfers and adaptation investments. Instead, they allocate more to compensatory options that benefit broad sections of society.

The Coal Country sample comprises individuals who are exposed only to the economic risks of climate policy. In contrast to the general population, these voters are decidedly in favor of direct transfers to workers whose employment is threatened by climate policy, allocating 35% of funds (significantly larger than the 22% allocated by the General Population) to transfers. This preference for direct fiscal transfers to policy-vulnerable individuals is evident even at the highest carbon tax level ($256). Coal Country is the only sample that consistently allocates more money to direct transfers than to other options.

The Cross-Pressured sample supported the highest level of adaptation spending across the three groups, although these investments feature as the sample's least favored option. Overall, this group's rankings mirror those of the general population, yet the rankings also evidence much more of a mixture compared with the other groups, with, for example, higher levels of support for fossil fuel worker compensation than the general public.[16] Cross-Pressured respondents are more evenly split among the different compensatory mechanisms proposed in the survey. This suggests that the Cross-Pressured group heeds concerns stemming from both policy and physical vulnerability while formulating compensation preferences.

Figure 3 presents results from India.[17] Strikingly, India's General Population sample ranks green investments first, selecting an allocation of funds—34%—that is identical to the proportion allocated in the US. This preference persists at the highest tax level (₹2,240). The general public in the world's two largest democracies converge in prioritizing green technology investments as their top target of compensation.

However, unlike in the US, the average Indian does not prefer equal rebates to taxpayers and in fact ranks this policy last. A similar aversion to equal taxpayer rebates emerges in all of the India samples. The fall in support for equal rebates matches rising approval for investments in adaptation infrastructure, which are preferred at the same level as transfers in the General Population sample.

Respondents in India's Coal Country sample revealed policy preferences that mirror those uncovered in the US Coal Country sample. They ranked fiscal transfers to coal workers first, with an allocation (32%) that approximates the proportion estimated in the US coal sample. This parallel finding across the two countries corroborates the congruent desire for compensation to which climate policy vulnerable communities feel entitled.

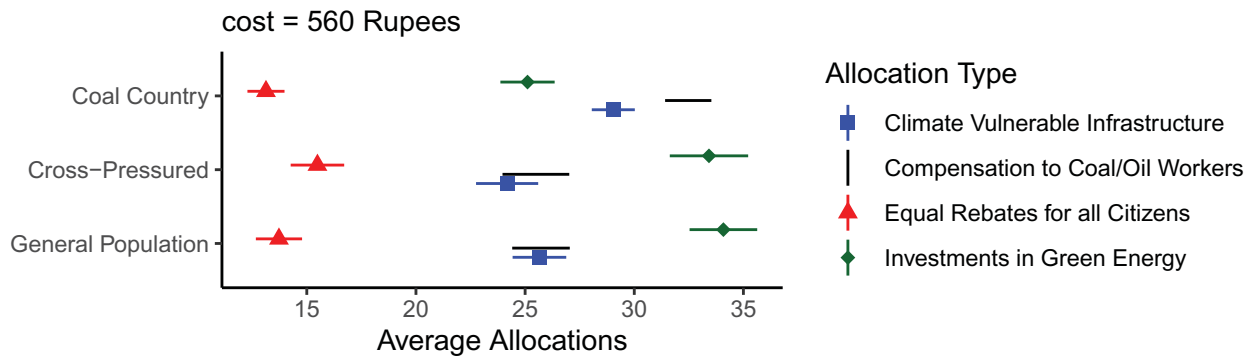
India's Cross-Pressured sample largely mirrors the General Population sample. One potential explanation for this convergence is that, in contrast to the US, the average voter in India is simply more concerned about climate vulnerability, bringing General Population preferences closer to those of the Cross-Pressured group. This could occur if among individuals who are not currently exposed to climate change, those in poorer countries are more concerned about future climate change vulnerability given their lack of access

[15] At the highest policy cost ($256), the preferred top choices flip and respondents allocate more to equal taxpayer rebates than to renewable energy investments (see Appendix F).

[16] The aversion to adaptation infrastructure spending in all US groups may reflect voters' preferences for policies in which compensation generates material gains in the short run rather than prevent material losses in the long run.

[17] Differences in cost levels have little effect; responses are even more stable in India than in the US. Because of this consistency, we present only the middle (₹560) energy cost responses; Appendix F reports results for the other cost levels.

FIGURE 3. India Preferences for Allocation Purposes of Climate Policy Funds, by Sample



Note: This figure denotes how respondents in our three samples allocated funds raised. Symbols represent average allocation, and lines represent 95% confidence intervals

to protective mechanisms. Consistent with this explanation, we find both that physical climate change vulnerability is higher in India than in the US and that the General Population and Cross-Pressured samples are less differentiated in India than in the US (see Appendix D).

Why do preferences for equal rebates and infrastructure investments reverse across India and the US? Existing research predicts that individuals in poorer countries have less individual capacity to adapt and may be less willing to sacrifice economic growth for mitigation (Greenstone and Jack 2015). This may explain why our India samples evidence high levels of support for adaptation infrastructure. The deprioritization of equal rebates in India may stem from the lower rates of tax payments among the citizenry and from lack of faith in the execution of redistribution in India.[18] We view these interpretations as suggestive, as additional socioeconomic differences across the subnational regions in the two jurisdictions could also affect observed differences across the US and India.

In both countries, the General Population and the Coal Country samples are the groups with the most divergent preferences. The average voter in both countries evidences high levels of support for broad-based compensatory mechanisms that will benefit society as a whole. By contrast, the coal samples' consistently top choices are targeted transfers to compensate workers economically harmed by decarbonization policy. At the same time, our results give credence to the claim that voters' allocation choices are motivated by factors other than self-interest. In particular, we note the considerable baseline support in the General Population surveys for transfers to vulnerable workers, in both the US (21%) and India (26%). This support is in line with theories of embedded liberalism, which predict a societal contract whereby voters agree to compensate domestic losers of redistributive international economic policies (e.g., Ruggie 1982), and with philosophical principles of equity and fairness that are central to contemporary climate-related debates on the just energy transition (e.g., Bhushan, Banerjee, and Agarwal 2020; Newell and Mulvaney 2013). This is an important finding because material self-interest would indicate sharp distributive conflict across societal groups. Our results shed light on how conflict is not the necessary outcome and how considerable space for cooperation exists across groups that have diverging economic interests.

Individual-Level Covariates

The preceding analyses exclude individual-level information about our respondents. This might be important because our samples differ somewhat along other variables that could predict allocation preferences, like ideology (see Appendix D). Do the sample contrasts within each country persist when we include these controls? Appendix G presents regression results where we include covariates like income, ideology, individual subjective concern about climate change, and fossil fuel employment. The sample differences are consistent with the preceding discussion.

Individual-level covariates produce interesting results as well. For example, individuals reporting less subjective concern for climate change report less support for climate adaptation spending. Self-reported fossil fuel employment is positively correlated with support for direct transfers to workers.

Climate-Vulnerable Only

The preceding results left out the case of individuals living in regions that are especially climate vulnerable but have less specific policy vulnerability. To probe this case, we ran an additional study in the US where we more precisely targeted individuals living in coastal

[18] India has been described as a "patronage democracy," where many aspects of government-supplied benefits including jobs, financial assistance, and public goods are distributed along ethnic lines (Chandra 2004). Thus, even if redistribution were appealing, respondents may deem the idea impractical or prone to clientelistic interference.

flood zones and compared them with those living in adjacent areas that are not in a flood zone. The results, presented in Appendix H, show that these especially vulnerable individuals rank climate adaptation spending higher than do the other three samples reported above and at greater levels compared with this additional sample's adjacent group.

Relationship to Actual Support for Climate Policy

As discussed above, some previous research has shown that the precise composition of climate policy can have an influence on support for costly climate policies (Bergquist, Mildenberger, and Stokes 2020). Our analyses only examined how voters would design climate policy; we did not examine actual climate policy support, which represents a different research question. However, to address this issue we did several things. First, we subsequently asked respondents to pick an amount they would be willing to pay in higher energy costs, and then among those reporting something greater than zero, we elicited preferences for the allocation of funds. Appendix J reports the results; the core takeaway is that the vast majority of our samples were willing to pay some amount of money and their allocation choices strongly correlated with the allocation choices that they originally reported.

Second, we ran a separate nationally representative survey in the US, where we probed respondents about their own willingness to pay $64 in average monthly household costs for one of the four randomly assigned allocation policies (see Appendix I). The main result was in line with the rankings from our allocation exercise: green investments are the most supported policy lever, followed by equal rebates, transfers, and infrastructure investments. These findings are informative, as they indicate differences in absolute levels of support for the policies that mirror the allocation exercise.

Third, focusing on the US, we retrieved the data from Bergquist, Mildenberger, and Stokes (2020) and investigated whether having a policy dimension that included funds for retraining fossil fuel workers received greater climate policy support among individuals living in states with high fossil fuel production. We found that this was true for the main coal-producing states of West Virginia, Wyoming, and Kentucky, as well as Louisiana and Alaska. We did not find this result for Texas. The results of this reanalysis are included in the replication materials uploaded to the Dataverse (Gaikwad, Genovese, and Tingley 2022).

Open-Ended Responses

Our results show clear differences among climate policy designs that deserve further analysis. In order to explore the rationales behind the policy choices highlighted above, we leverage open-ended responses that were shared by our participants to explain their preferred policy instrument. We then hand-coded and systematically explored the themes that emerged in these responses in a number of ways that are reported in Appendix K. An interesting theme, which we develop next, relates to the importance of community and shared identities.

Our coding shows that—in both the US and India—the open-ended responses are substantially more community oriented in Coal Country than in the other samples (see Appendix K.1). In the US, 32% of Coal Country respondents justified their policy choice by referencing themes that evoked prior generations, families, schools, local shops, or regional community identities. Community themes emerged in 9% of the Cross-Pressured sample responses. The General Population respondents were the least likely—at only 4% of the sample—to refer to community as an object that justified their choices. Qualitatively similar results obtain in India. Additionally, group-centered justifications for policy options in Coal Country were not exclusive to the choice of compensatory transfers: community themes also emerged among the respondents that chose adaptation infrastructure investments (see Appendix K.2).

In the words of a US respondent

> In the area I live we are coal mining country. I have seen people have to leave, lose their homes, divorce, and have horrible repercussions because of the loss of coal mining jobs left in the area. In turn, I have seen once thriving family men lose everything and become addicts to cope. We are also in the lead for the opioid epidemic. Eastern Kentucky needs help. We need more job options and training to replace the only thriving industry we once had. It was ingrained into our culture to become coal miners. Now that that option is gone people are lost.

Similar illustrative responses capture the salience of community issues among our policy-vulnerable samples. Importantly, such themes are nearly absent in the General Population sample. Does the sense of community that emerged in the unprompted responses of our policy-vulnerable samples also influence preferences regarding transfers? We turn next to explore this question systematically.

PREFERENCES FOR THE DISPOSITION OF COMPENSATION

We now narrow our focus to targeted compensation schemes that would benefit fossil-fuel-producing regions poised to be adversely affected by decarbonization. These policy mechanisms have political implications given that they are directed at identifying and mobilizing political communities. For example, in the US, transfer schemes exhibit bipartisan support among the public (see Appendix A), and countries seeking to transition away from fossil fuel production, such as Germany, are exploring transfer schemes in detail.

The broad question of "how" to deploy such transfers can be tackled from various perspectives. For example, economic analyses might focus on efficiency considerations or on how to structure retraining opportunities for workers. We focus squarely on a political dimension: the disposition of funds—namely,

whether transfers should flow to the households of individuals directly affected by the loss of fossil fuel jobs or whether transfers should flow to communities and community organizations. Scholars investigating transfer mechanisms in the context of the trade adjustment literature have argued that community-level transfers are potentially preferable to individually focused transfers (Rosen 2008; Schoepfle, Beckman, and Richardson 2000). A focus on community transfers is also justified by recent work which shows that group-level considerations influence preferences for redistribution policy more generally. This distinction matters for compensatory climate policy because governments can structure compensation in either more concentrated or diffused ways (Carley, Evans, and Konisky 2018).

We theorize that voters in coal-producing regions, as well as those who are cross-pressured, prefer more *community-oriented* compensatory mechanisms to individual transfers than the general public. This is because group identities in coal mining regions are closely linked to the carbon economy. For both economic and social reasons, individuals in these regions have shared interests. From an economic perspective, coal workers *as well as* non-coal workers in services and secondary sectors within coal-producing regions depend on the coal industry. The latter may reasonably anticipate material losses from decarbonization policy and seek redress. Materially, then, non-coal workers are predicted to support community-level transfers to those that directly compensate coal-related job losses. Coal workers, by contrast, have immediate economic interests related to coal employment. Pocketbook considerations should lead these workers to support transfers that directly target coal job losses.

Yet coal communities also exhibit strong collective social identities. Theories of social identity predict that when group affiliation is high, individuals are willing to forego material benefits to support policies that augment group welfare (Gaikwad 2022; Shayo 2009). Specifically, Shayo (2009, 147–8) argues that individuals share their identity with members of a group both when they perceive similarity with other group members (termed "distance") and when they care about the group's position (defined as "status"); it is this process of identification that in turn leads to a "willingness to sacrifice material payoffs in order to enhance group status" because "in many situations enhancing a group's status is equivalent to enhancing the welfare of other group members."

There are strong reasons to anticipate high degrees of social identification and group attachments in fossil fuel communities such as coal country. These communities are geographically concentrated and occupationally specialized (e.g., Carley, Evans, and Konisky [2018, 136] describes coal regions as historical "mono-industry economies" with coal holding "the entire community together"), racially and ethnically homogeneous (Mayer, Smith, and Rodriguez 2020; McDuie-Ra and Kikon 2016; Trotter 2015), and intergenerationally dependent on employment in coal. For example, Duncan's (1999) magisterial study presents a wealth of ethnographic evidence from coal miners in Appalachia to buttress this claim. Residents of coal communities "embrace—and even identify with—coal," both as "a marker of community identity" and "as a total 'way of life'" (Lewin 2019, 54). Bell and York (2010, 134) term this as "community economic identity," noting that the coal industry "appears to be more than a provider of jobs; it embodies all of the characteristics of the archetypal West Virginian."

In India, too, the coal industry has historically been concentrated in regions with high proportions of Scheduled Tribe and Scheduled Caste communities. McDuie-Ra and Kikon (2016, 263–4) discuss how coalfield rights have remained within tribal community institutions and how members of tribal groups have resisted government coal mining bans. Many scholars point to the role of a strong community economic identity surrounding coal in the Indian context (Kikon 2019; Lahiri-Dutt 2014). Thus, existing work points to perceptions of shared similarities—corresponding to the concept of "distance" discussed above—galvanizing social identification in coal country.

Concerns regarding group "status" are also salient in coal-producing regions. For example, sociological studies find that individuals in coal country "believed that preserving mining as a viable occupation would honor forbearers who had mangled their bodies in the mines to provide for them as children," that "miners upheld the dignity of rural life in the face of urban onslaught," and that coal job losses "wiped away the little pride [the region] had left" (Lewin 2019, 56–62). Carley, Evans, and Konisky (2018, 136) present corroboratory interview evidence from coal workers:

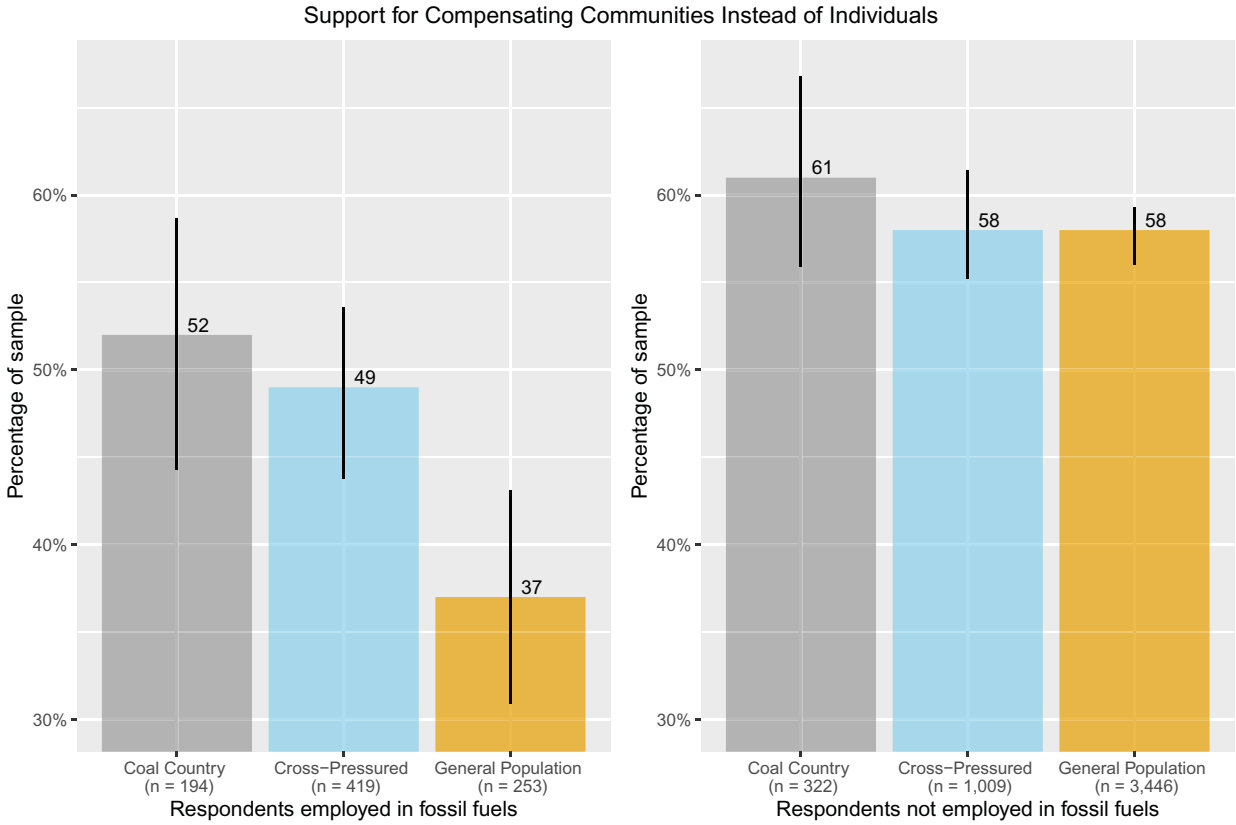
> There is also a sense of grief that comes along with it, you know, coal mining is really a part of the culture here and it's interwoven into the way people feel about themselves and their own identity and their identity as a community. And so to lose that so quickly is really, it creates a sense of grief among people about losing their way of life and a piece of their culture that is really engrained and a part of who they are.

These ethnographic accounts suggest that social identification is augmented through group status predilections in embattled mining communities in both the US and India (Glasmeier and Farrigan 2003; Kikon 2019; McDuie-Ra and Kikon 2016).

If individuals in coal country perceive a strong sense of identification with members of their community, then they would interpret policies that are beneficial to the group as helping all members of the group and therefore view compensation in a collective lens. Evidence that fossil fuel workers prefer community transfers over direct transfers to their own households would be consistent with this point of view.

By contrast, members of broad-based communities such as the general population are predicted to be less

FIGURE 4. US Preferences for Transfers at the Community (versus Individual Household) Level by Sample and Fossil Fuel Employment



Note: The *bars* report the percent preferring community transfers. The *black lines* report 95% confidence intervals.

attentive to group concerns. Individuals in large, socially and economically diverse groups are less likely to have developed a shared identity tied to geographically concentrated occupations because both "distance" and "status" concerns militate against social identification. The average voter is predicted to be less interested in allocating funds to community-oriented compensatory mechanisms than to individual transfers; this is especially the case for the small minority of individuals with fossil fuel jobs in non-fossil-fuel-producing regions. In a similar vein, the general public should be less sensitive to community concerns and less likely to associate policy support with community welfare considerations.

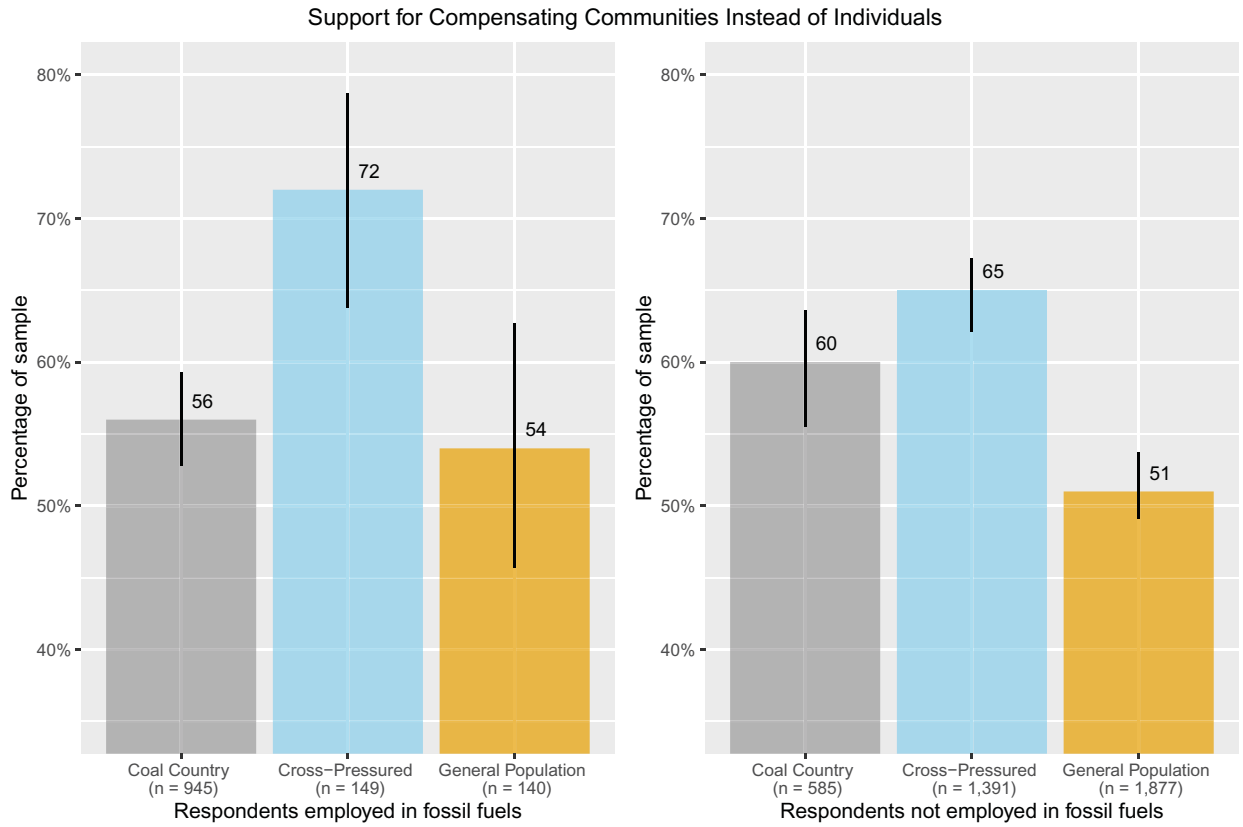
Finally, individuals facing both policy and climate change vulnerability are predicted to have more community-oriented preferences than the general population. On the one hand, these individuals share interests linked to fossil fuel jobs and face many of the community-related socioeconomic pressures that scholars have associated with carbon-intensive production sectors. At the same time, cross-pressured individuals face more climate change vulnerability than coal country residents, which might lead them to prefer a different mix of community- and individual-level resource transfers.

Preferences for Targets of Compensation Deployment

To test these conjectures, we gauged whether respondents preferred that fiscal transfers be given to individual workers or to broader communities affected by climate policy. Respondents were asked whether they prefer the government to *provide funding only to the individuals affected by* climate policy or *provide funding to entire communities* where such individuals reside.[19] We look at the descriptive frequencies of individuals preferring each type of deployment, breaking down the frequencies by whether respondents or members of their households are employed in the fossil fuel industry. Figure 4 reports the US results—namely the share of preferred transfers at the community level for the three US samples. The broad patterns in Figures 4–7 hold in multivariate

[19] Respondents were given the following prompt: "In one policy option, the government transfers funds to those who are harmed by job losses in the fossil fuels industry. Would you prefer that the government: (1) Transfers funds only to specific individuals who lose jobs as a result of the policy (for example, coal miners who lose jobs when coal mines are closed), (2) Transfers funds to entire communities that experience job losses as a result of the policy (for example, communities in coal mining regions where coal mines are closed)."

FIGURE 5. India Preferences for Transfers at the Community (versus Individual Household) Level by Sample and Fossil Fuel Employment



Note: The *bars* report the percentage preferring community transfers. The *black lines* report 95% confidence intervals.

regression analyses that control for individual-level covariates such as gender, age, and partisanship (see Appendix L).

Recall, residents of regions that are economically dependent on fossil fuel production on average allocated more to compensatory transfers. We see here that these respondents are particularly supportive of *transfers that are directed to the community*. Individuals in the Coal Country sample are proportionally more in favor of community-level compensatory transfers compared with the general population, irrespective of their employment status. These results are consistent with claims that both material and nonmaterial factors are important determinants of climate policy preferences in Coal Country. Economic self-interest may explain why individuals who are not employed in fossil fuel jobs in Coal Country prefer community transfers the most. Yet the stark divergence in the preferences of fossil-fuel-employed workers—those in Coal Country are 15 percentage points more likely to support community transfers than are those in the General Population—suggests that group affiliation and identity-related factors motivate allocation choices in Coal Country.

When comparing respondents who are or are not employed in fossil fuel jobs within each sample, we reach a similar conclusion. In the General Population sample, individual-level compensation is preferred more by those employed in fossil fuels, a pattern consistent with materialist accounts of preference formation. By contrast, there is a high degree of support for community-level compensation among those not employed in the fossil fuel sector. This suggests that the average voter seems to understand and respect issues of community identity in Coal Country. However, in both the Coal Country and the Cross-Pressured sample the gap between workers who are or are not employed in fossil fuel jobs diminishes considerably.

Figure 5 reports the results from India. There are high levels of support for community-level compensation relative to individual compensation.[20] Like in the US, the General Population sample is least in favor of community transfers; the average Indian is less likely than individuals in the other samples to weigh group considerations when considering compensation deployment, although like in the US there remains marked support for community-based

[20] This pattern may be explained by a point discussed earlier: Indians across all samples report more concern about climate change than Americans (see Appendix D for self-reported indicators of climate concerns).

concerns. At the same time, it is noteworthy that the majority of fossil fuel workers in the General Population prefer community transfers, unlike fossil fuel workers in the US General Population sample. Their de-emphasis of material self-interest may be indicative of stronger cross-sectoral empathy in India relative to the US, a proposition that future research should consider.

The Coal Country sample in India has similar preferences to its US counterpart with respect to fossil fuel workers and non-fossil-fuel workers. Interestingly, in contrast to the US, India's Cross-Pressured group registers the highest support for community-level compensation; intersecting policy and physical vulnerability is associated with heightened group-based considerations in India. Fossil fuel workers in this group are most supportive of community transfers, pointing again to the role of other-regarding preferences in shaping deployment choices. Overall, group-related considerations feature highly in India's policy and physically vulnerable regions. India's Coal Country and Cross-Pressured samples are on average significantly more likely to prefer community transfers to individual transfers than the General Population (see Appendix L). This supports our conjecture that decarbonization risks affect not only those employed specifically in fossil fuel industries but also broad sections of society in regions dependent on fossil fuel production.

Comparing the results from the US and India, our main conclusion is that community-oriented sentiments appear strong among voters in regions of both countries that face policy threats from climate change. These voters value the community fabric that has evolved from high levels of employment in the fossil fuel industry and plausibly fear the material losses that the community as a whole stands to incur from decarbonization policies. This finding is in line with evidence indicating the diffused consequences of economic retrenchment in trade-affected industries (Margalit 2011).

Role of Community Identity

We have shown that individuals in embattled coal mining regions have distinct preferences supporting community-oriented transfers. We next ask whether these regions differ by support for policies that could threaten the identities of coal workers. Protecting the identity of coal miners and their communities has been a topic of considerable political debate, surfacing repeatedly—for example, during the 2016 and 2020 US presidential campaigns and provoking sustained political mobilization in India.

Extensive qualitative research in sociology, anthropology, and history underlines a strong sense of community identity in coal communities in both the US and India. Appendix M provides a comprehensive overview of the findings of these sources, and we preview some themes here: in the US, coal is framed as the common bond that holds the community together; coal employment is often multigenerational; coal is deemed a pillar of community pride; miners are romanticized as the archetype of cherished community values and guardians of the region's cultural heritage; coal communities are relatively homogeneous; unionization has strengthened the collective identity of coal workers; increasing rhetoric against fossil fuel industries has brought communities together in defense of identities and incomes; and decarbonization is viewed as representing a threat to the region's traditional way of life.

Similar themes emerge in India: coal reduction represents an existential threat to mining communities; coal regions depend almost exclusively on the coal industry for employment; mining degraded local environments, reducing agricultural employment opportunities, and fostering a strong economic identity surrounding coal; coal is closely tied to India's postcolonial identity and ability to control its natural resources; unionization and Indian working-class identities were born through coal mining; coal mining regions disproportionately comprise indigenous Scheduled Tribe and Scheduled Caste communities as well as low-caste groups who migrated for the job opportunities coal has historically provided; employment tends to be intergenerational; local opposition to state-led bans on coal mining have been led by tribal groups.[21]

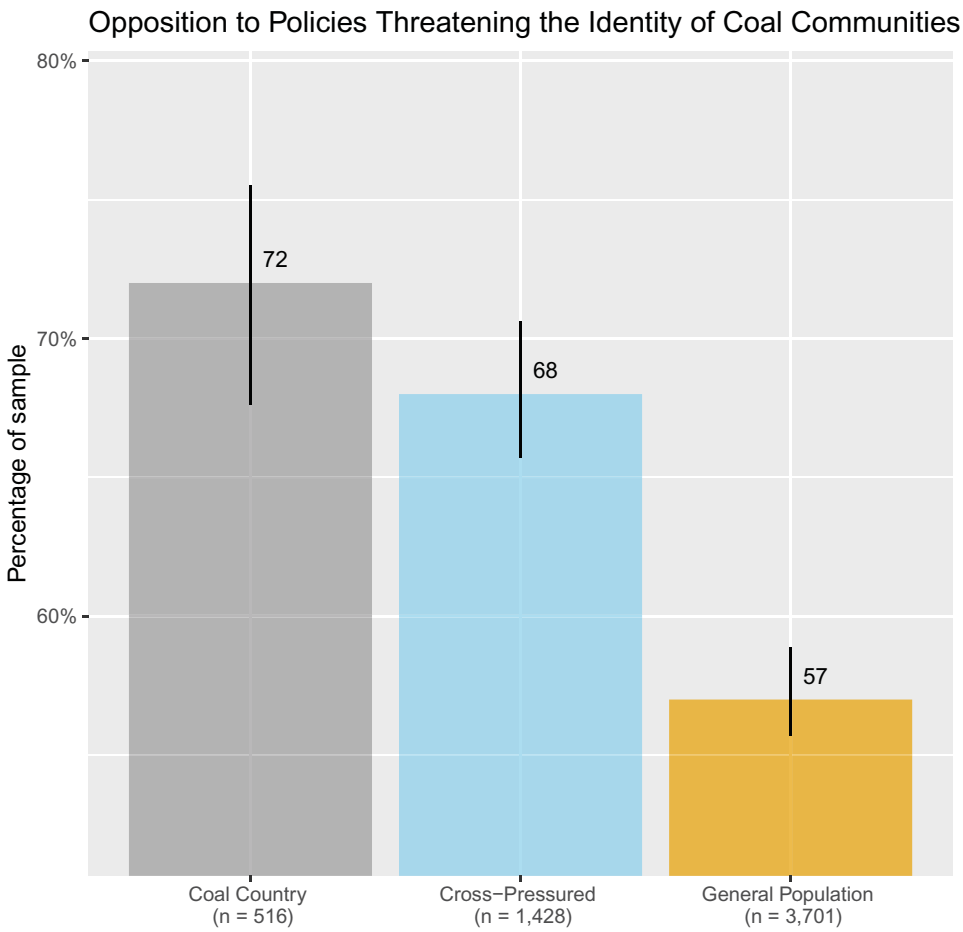
Safeguarding community identities is central to the concept of group "status" in Shayo's (2009) social identification theory discussed above. In communities featuring high degrees of group identification, individuals are predicted to prioritize policies that augment the welfare of other group members. If the strong preferences for community-oriented transfers that we uncovered in fossil fuel communities were connected to identity-related concerns, then we would expect to see evidence that members of these groups are concerned about protecting the identities and well-being of members of coal communities.

Therefore, we designed a question to probe whether identity-related considerations featured highly among members of fossil fuel communities. Although the qualitative research reviewed in Appendix M has already established identity-related themes in coal country, prior work has not tested whether there is a link between policy support and coal identities. To measure the importance that respondents attach to the identity (and therefore political salience) of coal communities, we asked the following:

> Some people say that the government should not pass policies that harm jobs in industries like the coal industry because such policies will threaten the identities of coal workers and their surrounding communities, which are closely tied to coal mining. Do you agree? [(1) strongly disagree to (4) strongly agree]

[21] Our survey data reflect some of these trends. In the US, whites are overrepresented in Coal Country, whereas minorities are overrepresented in the Cross-Pressured sample. In India, lower castes and tribes are overrepresented in Coal Country, and other backward classes are overrepresented in the Cross-Pressured sample (Appendix D).

FIGURE 6. US Preferences for Blocking Policy Measures That Threaten the Identity of the Coal Communities



Note: The *bars* report the percent of opposing respondents by sample. The *black lines* report 95% confidence intervals.

Note that our question directly links identity-related concerns to policy support for decarbonization, which we deemed to be an important avenue of inquiry based on the large body of qualitative and ethnographic scholarship that highlights the centrality of community identities in coal-producing regions. At the same time, by tying policy support to identity-related concerns, it is possible that answers also captured respondents' policy preferences, in turn increasing the proportion of individuals who reported concern about the influence of the policy on community identities. Thus, our analysis focuses on differences across our samples rather than on absolute magnitudes within samples.

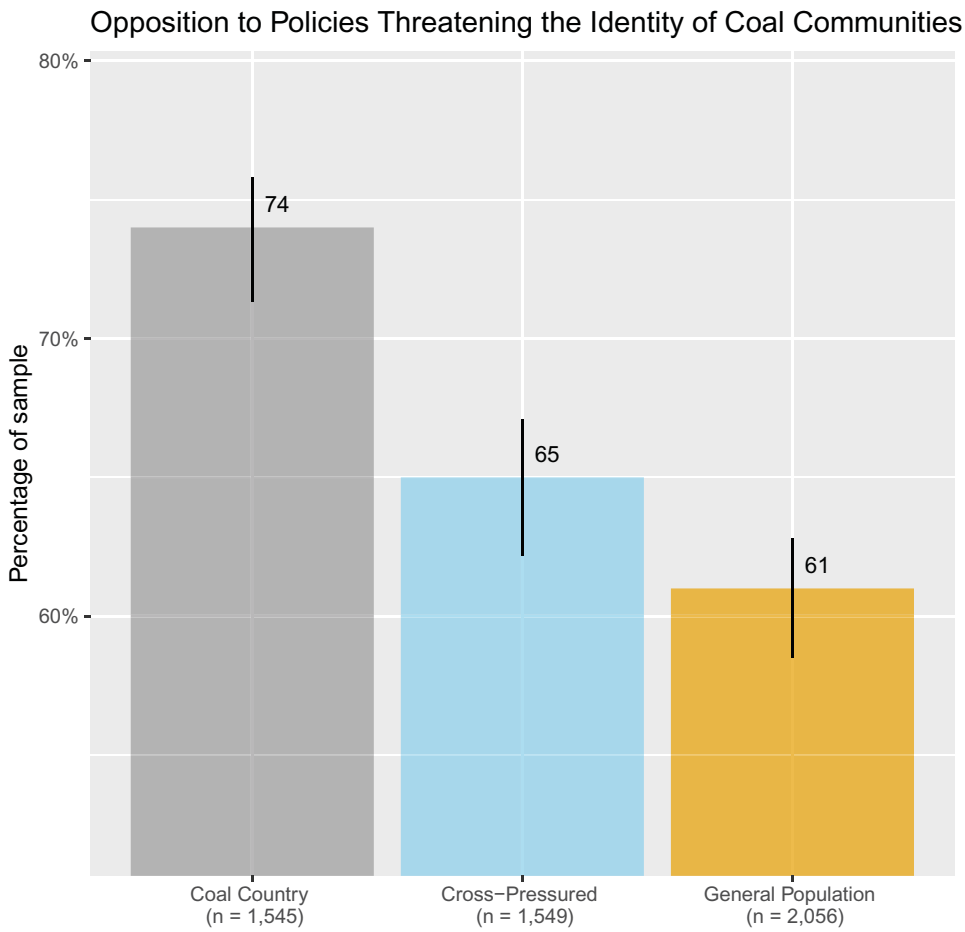
Figures 6 and 7 present the results for US and India, respectively. Concerns about protecting worker and community identities were highest in Coal Country (72% in the US and 74% in India), second highest in the Cross-Pressured sample, and lowest in the General Population sample (57% in the US and 61% in India). In Appendix L, we document that these findings are robust to the introduction of controls in multivariate analyses.

In analyses of the Coal Country sample, we find that both the majority of people directly connected to fossil fuels and those without a direct connection opposed identity-threatening policies. Overall, in both countries, respondents in Coal Country oppose identity-threatening policies at greater rates than in the General Population, with Cross-Pressured samples falling in between.

These findings can be interpreted in light of the qualitative literature on coal identities and the open-ended answers provided by our respondents. As we see in Appendix K.1–K.2, themes related to identity surfaced repeatedly in respondents' answers in Coal Country but were relatively scarce in the General Population sample. In the coal miner's survey in India, we included an additional question asking respondents why they chose community versus individual transfers. Appendix K.3 summarizes these results, noting that identity themes arose frequently in these respondents' unprompted answers.

These identity results help explain our prior finding that those residing in coal-producing regions favor

FIGURE 7. India Preferences for Blocking Policy Measures That Threaten the Identity of the Coal Communities



Note: The *bars* report the percent of opposing respondents by sample. The *black lines* report 95% confidence intervals.

community transfers most. Coal mining regions are consolidated in voicing resistance to policies threatening the identities of coal workers and their surrounding communities and in seeking transfers to compensate the community at large. The cross-sectoral basis of this support points to identity-related factors as important determinants of preference formation over the disposition of compensation policy in these regions. The general public by contrast is less interested in compensating broad-based vulnerability in fossil fuel communities. Evidently, to purchase societal buy-in from coal communities, policies will need to go beyond appeasing individual workers and instead engage communities, as demand for compensation arises from more than just the individual employees who will directly bear the costs of decarbonization.

Finally, our theory and evidence provide some scope conditions to debates about industrial decline, social identification, and political mobilization. Notably, we obtain similar findings between the oil and gas cross-pressured group in the US and the coal cross-pressured sample in India, even though coal is a historically older and relatively more unionized and labor-intensive industry. Fossil fuel communities that have developed communal economic identities tied to particular industries may thus have shared theoretical characteristics. The existential threat of a lost industry appears to be sufficient to trigger similar forms of policy support in communities reliant on emissions-intensive sectors that cannot easily be decarbonized. Parallels with other senescent industries with similar features, such as steel, warrant further analysis (see also Bell and York 2010, 118; Duncan 1999).

CONCLUSION

Just as in other policy arenas where net welfare gains accompany concentrated losses, such as trade policy, acting on climate change requires understanding the salience of policy preferences and overcoming the resistance of localized policy "losers." Against this

backdrop, we explored preferences over different forms of climate-related compensation for vulnerable communities within the US and India, the world's two largest democracies, prominent greenhouse gas emitters, and leading coal employers. Our study is one of the first to seriously engage with the design of decarbonization policies that directly confront distributional political realities (Bergquist, Mildenberger, and Stokes 2020; Kono 2020).

Our research shows that different societal coalitions prefer distinct levels, forms, and targets of compensation. The most cohesive and potentially antagonistic group standing in the way of mitigation policy consists of the communities that are currently confronted by the wage and employment consequences of climate policy but do not face significant climate change vulnerability. Appeasing these voters may be a difficult task given the political barriers to compensating targeted groups. For example, the 2016 Washington State referendum on carbon taxes (Washington Initiative 732) failed in large part due to concerns about interest groups gaining access to funds paid for by taxpayers. Low levels of trust in the redistribution process could exacerbate credibility problems inherent in longer-term promises of compensation and investment (Gazmararian and Tingley 2022). Broad-based investments in these communities, rather than solely individual-level compensation, could be more effective, credible, and popular.

Voters who are pressured by both policy and climate change vulnerabilities desire a mix of allocations for different types of compensation. If climate change continues to cause adverse weather events that increase in frequency and intensity, more communities will probably become "cross-pressured," thereby further pushing the policy agenda to divide revenues among several compensatory programs. We note that cross-cutting pressures result in mixed preferences but are largely driven by one pressure—in this case, climate vulnerability—than by the other pressure. This appears to stem from an internal calculation that weighs the probability of damage if no action is taken (climate effects on one's livelihood) against the cost of damage if action is taken (the possibility of policy-driven wage or job losses). That voters are willing to trade off the material consequences of policy in order to preclude costly government inaction on climate change has implications for policy preferences in other domains, presenting new insights into how individuals form distributive preferences.

We make two points regarding the general population surveys. First, in both countries, the average citizen prefers broad-based compensatory mechanisms like investments in green technologies. A referendum on a climate action plan containing these policy levers could potentially muster broad support (see also Bergquist, Mildenberger, and Stokes 2020). Second, we note that any system that raises revenues via taxes is bound to face opposition unless the benefits are sufficiently tangible. Nevertheless, a salutary feature of our findings is that the general public is willing to divert a nonnegligible proportion of funds collected from increased household energy costs to compensate job losses in the fossil fuel industry. This points toward a path forward for policy makers seeking to mobilize support for climate policy from different domestic constituencies. Our data show that compensation can in fact strengthen the public foundations for ambitious climate policy if laid out in targeted and credible ways.

We conclude by charting a pathway for future research. One policy lever that we did not investigate in this paper but do elsewhere is the importance of environmental remediation. This is especially germane in regions with long histories of fossil fuel extraction that have created highly polluted environments. A better understanding of the role of individual-level characteristics (e.g., trust or income) and how they relate to vulnerabilities and support for the policy instruments considered here will be important. Survey research that investigates whether particular mixes of compensation and investment policies increase citizens' willingness to pay higher carbon taxes, whether increasing climate change vulnerability shifts preferences regarding mitigation and adaptation, and whether cross-border financial transfers can muster popular support is also urgently needed.

Finally, further unraveling how identity-related concerns shape the preferences of economic communities like those in coal country can help shed light on the political preferences of voters in other regions, such as the Rust Belt, that have materially been affected by globalization; compensatory schemes like the Trade Adjustment Assistance might have underperformed because they focused on individually displaced workers at the expense of broader communities (Rickard 2020). Our research indicates that the success of embedded liberalism likely hinges on the ability of governments to understand when and how economic vulnerability sprouts across communities and not just for individuals.

SUPPLEMENTARY MATERIALS

To view supplementary material for this article, please visit http://doi.org/10.1017/S0003055422000223.

DATA AVAILABILITY STATEMENT

Research documentation and data that support the findings of this study are openly available at the American Political Science Review Dataverse: https://doi.org/10.7910/DVN/PHRNTQ.

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CONFLICT OF INTEREST

The authors declare no ethical issues or conflicts of interest in this research.

ETHICAL STANDARDS

The authors declare that the human subjects research in this article was reviewed and approved by university committees at Columbia, Essex, and Harvard, and certificate numbers are provided in the appendix. The authors affirm that this article adheres to the APSA's Principles and Guidance on Human Subject Research.

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