Appendix

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

The Appendix contains the following sections:

- Appendix A: Bipartisan Support for Compensating Fossil Fuel Workers
- Appendix B: Contextual Information Regarding Climate Policy Categories
- Appendix C: Research Ethics
- Appendix D: Geographic Distribution and Descriptive Statistics of the US and India Samples
- Appendix E: Additional Information Regarding India Samples
- Appendix F: Choices of US and Indian Respondents in the Allocation Exercise Across All Tax Levels
- Appendix G: Regression Models of Allocation Decisions Utilizing Individual-level Covariates
- Appendix H: Results from a Separate Sampling Strategy Focusing on Climate Change Vulnerable Only Individuals
- Appendix I: Nationally Representative Data on Willingness to Pay to Support Four Policy Choices
- Appendix J: Results of Allocation Decisions when Individuals were able to Choose a Cost
- Appendix K: Analysis of Survey Respondents' Open-ended Explanations for Survey Choices
- Appendix L: Additional Analyses and Regression Models based on the Questions Regarding Community and Identity for both the US and India Samples
- Appendix M: Survey of Literature Discussing Coal Identities in the US and India

A Bipartisan Support for Compensating Fossil Fuel Workers

In the paper we suggested that there is bipartisan support for compensating fossil fuel workers in democracies such as the United States. Here we provide additional information to support this statement.

In 2017, we fielded a nationally representative survey via the AmericasBarometer project where we asked respondents the following question: "Congress could consider many important bills in the next two years. If you were in Congress would you vote FOR or AGAINST the following? Climate Adjustment Assistance: Provides education assistance and retraining to workers who have lost their jobs as a result of [policies designed to reduce / reductions in] greenhouse gas emissions." The text in brackets was randomly assigned but did not significantly affect answers. There was bipartisan support for the proposal in both of the treatment conditions above (62% Republican, 70% Independent, 85% Democrat). We observed similar bipartisan support for this question in a nationally representative survey fielded in 2016 as part of the Cooperative Congressional Election Study (65% Republican support, 78% Independent support, 94% Democratic support).

B Contextual Information Regarding Climate Policy Categories

In this section we discuss how the compensation and investment options proposed in our survey reflect actual policy choices in the US and India. For each country we provide brief background information about each actual policy mechanism and the political discussion around them.

B.1 US

B.1.1 Compensation to Coal/Oil Workers

The industrial decadence of coal and carbon-intensive activities has been intensely discussed in the public opinion dominion. It is agreed that shifting from fossil fuels to cleaner sources of energy threatens struggling communities, especially those dependent on coal. There is disagreement on how to help these communities. Historically, support to workers has been provided in other realms. For example, Congress passed legislation in 1974 that established the Trade Adjustment Assistance Program, which still operates today. Workers who can show that they have lost

jobs or wages because of increased international competition may petition the Department of Labor for benefits administered through state agencies, including cash payments, retraining, and assistance with relocation and job searches. However, some criticized this adjustment program as an ineffective "band-aid" (Fried, 2005). A most defined federal effort to help coal communities is the Partnerships for Opportunity and Workforce and Economic Revitalization (POWER) Initiative launched by the Obama administration in 2015. The discussion to implement a bold program like the Appalachian Regional Commission for more US states seems to be picking up. President Biden's American Jobs Plan prioritizes the targeting of "long-term unemployment and underemployment" in these types of communities.

B.1.2 Infrastructure for Climate Vulnerable

Government-subsidized insurance, such as the U.S. National Flood Insurance Program (adopted in 1968), is a mechanism to enhance climate resilience. It has, however, been criticized, as some believe it provides perverse incentives to develop properties in hazardous areas, thereby increasing overall risk (Burby, 2006). Resilience standards and construction were embedded in the 2009 American Recovery and Reinvestment Act, which called for an identification of economic sectors' vulnerabilities to climate change. In a similar spirit, President Biden's American Jobs Plan calls on Congress to invest an additional $17 billion in inland waterways, coastal ports, land ports of entry, and ferries to maximize the resilience of land and water resources to protect communities and the environment. Accordingly, "President Biden's plan will protect and, where necessary, restore nature-based infrastructure - our lands, forests, wetlands, watersheds, and coastal and ocean resources. Families and businesses throughout the United States rely on this infrastructure for their lives and livelihoods."[22]

B.1.3 Investments in Green Energy

Discussions about clean energy transition in the US started in the 1960s, partly due to increasing environmental awareness and partly because of the emergence of alternative and relatively low-cost sources of energy, e.g. hydroelectricity, in the late 1950s. The Obama administration favored the provision of government support and subsidies to support the transition toward renewable energy. From 2006 to 2014, US households received more than $18 billion in federal income tax credits for installing solar panels and other "clean energy" investments. The 2009 American Recovery and Reinvestment Act included more than $70 billion in direct spending and tax credits for clean energy and associated transportation programs. During the Trump administration, the government took a smaller role in major clean energy investment, but nonetheless renewables kept momentum through state government initiatives and energy sector private investments. As of 2021, many initiatives indicate high government and private sector interest in green energy investments. President Biden's $2 trillion infrastructure plan includes a 10-year extension to tax credits that have been a boon to wind, solar and other renewable energy projects (see the American Jobs Plan in footnote 23).

B.1.4 Equal Rebates to All Citizens

Rebates return the revenue of some form of tax on fossil fuels (e.g. carbon tax) to the general society. Proponents of this policy argue that equal rebates could mediate against the negative impact of increased taxation on economic growth as well as increase public support for carbon taxation. In the past few years various representatives and senators in the U.S. Congress have proposed legislation authorizing a federal carbon tax (e.g. the Energy Innovation and Carbon Dividend Act by Congressman Ted Deutch and the Climate Action Rebate Act by Senator Chris Coons). A preliminary analysis of the Deutch bill shows that carbon tax revenues would rise from $70 billion in 2020, to $400 billion in 2030, and that through a rebate mechanism nearly all revenue is used for annual dividend payments, which would increase to about $1400 for adults and $600 to children by 2030.[23] Much of the opposition to rebates in the US is linked with opposition toward a carbon tax itself, and more generally, on how progressive or regressive this tax should be.[24]

[22]The American Jobs Plan. Statement released on March 31, 2021. https://www.whitehouse.gov/briefing-room/statements-releases/2021/03/31/fact-sheet-the-american-jobs-plan/.

[23]SIPA Centre for Global Energy Policy (2021). https://www.energypolicy.columbia.edu/what-you-need-know-about-federal-carbon-tax-united-states.

[24]Diamond, John W., and Zodrow, George R. (2018). "The Effects of Carbon Tax Policies on the US Economy and the Welfare of Households." Independent Report, New York: Columbia SIPA Center on Global Energy Policy.

B.2 India

B.2.1 Compensation to Coal/Oil Workers

Indian workers in sectors most affected by climate change policies, such as the coal and fossil fuel industries, are more likely to engage in informal work and lack social protection. Therefore, to achieve just transition, the country needs to extend protection to the informal workforce (United Nations Framework Convention on Climate Change, 2020). Chandra Bhushan (2020), a prominent environment expert in India, also highlights the need for a just transition—to ensure that coal- and fossil fuel-dependent communities do not suffer financially from the closing of mines and power plants. In the poorest regions in India, the eastern states of Chhattisgarh, Jharkhand, Madhya Pradesh, Telangana, and Odisha, the livelihoods of entire communities are dependent on the production of coal (Roy, Kuruvilla and Bhardwaj, 2019). Currently, Indian labor unions have begun engaging in the question of the country's just transition. The New Trade Union Initiative, a non-partisan labor initiative founded in 2002, has advocated for broadening the social security net in the process of energy transition and insisted that the country maintain its "right to develop" while adopting more climate-friendly policies (Roy, Kuruvilla and Bhardwaj, 2019).

B.2.2 Infrastructure for Climate Vulnerable

With its monsoon climate and a long and densely populated coastline, India is home to the world's largest climate vulnerable population. In the aftermath of recent cyclones Fani, Gaja, and Hudhud as well as a number of severe floods, many coastal states in India have taken initiatives to make their infrastructure more climate-resilient (Roy, 2019). As the majority of India's urban metropoles are located along its coastline, upgrading its coastal infrastructure is critical not only for the welfare of local residents but also for the nation's economic growth. So far, federal and local governments have made significant efforts to strengthen the country's climate infrastructure, such as improving coastal protection, building cyclone shelters, and planting coastal forests and mangroves (Government of India, 2008; Roy, 2019). In 2008, the government issued the National Action Plan on Climate Change (NAPCC), which marks one of India's most significant efforts to combat climate change. The NAPCC lists out the government's plans to develop regional ocean modeling systems and establish more efficient cyclone and flood warning systems (Government of India, 2008). The government has also partnered with the World Bank on a series of infrastructure development programs that seek to enhance climate resilience. For instance, the Bihar Kosi Basin Development Project focuses on upgrading the region's flood control infrastructure and the Puducherry Coastal Disaster Risk Reduction Project aims to build resilient coastal housing, evacuation shelters, and a cyclone resilient electrical network (World Bank India, 2021). Following the outbreak of the COVID-19 pandemic, the Indian government announced a series of infrastructure projects to reboot the country's economy.

B.2.3 Investments in Green Energy

The country began its initial green energy exploration in the 1960s, constructing windmills to exploit wind energy for irrigation (Bhattacharya and Jana, 2009). In the 1970s and 80s, the Indian government launched two national solar energy programs and continued to develop the country's wind capacity (Bhattacharya and Jana, 2009). Investing in green energy is a cornerstone of the Indian government's climate strategy. In the 2008 NAPCC, the Indian government stated its ambitious goal of increasing renewable energy contribution's to 15% of the country's electricity production by 2020 and announced the establishment of the National Solar Mission, which aims to add 22 GW of solar capacity by 2022 (Government of India, 2008; India Ministry of New and Renewable Energy, 2010). During the 2014 Obama-Modi climate talks, the two countries reached major renewable energy investment deals, which included the construction of extensive solar pipelines to fulfill the Indian government's solar energy goals (Office of the Press Secretary, 2016). In 2018, the Indian government passed an amendment in tariff policy to further attract foreign investment in the renewable energy sector (Kumar J. and Majid, 2020).

B.2.4 Equal Rebates to All Citizens

As a form of "revenue recycling," rebates return carbon tax revenue to the general society (Beiser-McGrath and Bernauer, 2019). Proponents of this policy argue that equal rebates could mediate against the negative impact of increased taxation on economic growth as well as increase public support for carbon taxation (Ojha, Pohit and Ghosh, 2020). Shakti Sustainable Energy Foundation (2018), a think tank in India, published a detailed report studying developed countries' implementation of revenue recycling programs and suggests that India could adopt similar policies to compensate citizens for their increased costs of living due to a carbon tax. Opponents of the rebate program, however, point out that universal cash transfers might not work for developing countries like India

because the policy would only reach individuals with financial access but would not compensate households that are not covered by the income tax (Rathore and Bansal, 2013). In addition, they point out that carbon tax rebates might be an insufficient incentive for the poor to move away from cheaper, but less climate-friendly, sources of energy (Azad and Chakraborty, 2020).

C Research Ethics

This study was approved by the Institutional Review Board of Columbia University (Protocol IRB-AAAS2410), the Committee on use of Human Subjects of Harvard (CR17-1328-04), and the Ethical Review Board of University of Essex (21-01-19).

Voluntary informed consent was obtained by all human subjects. In the US surveys, which were conducted online, informed consent was obtained electronically and was built into the survey flow. In the India surveys, which were conducted via telephone and in person, informed consent was obtained verbally or in a signed format. Subjects were free to decline participation.

Prior to providing consent, subjects were informed about the goals of the research, foreseeable risks and benefits associated with the research, the scholarly nature of the research, compensation, and the voluntary nature of the study, and were provided relevant contact information. No deception was used in the surveys.

Survey respondents in India were not compensated monetarily for participating in the study; respondents were sampled at random from the respective population groups and asked if they were interested in participating in a survey. In the US, we worked with two survey companies (Lucid and Qualtrics) that do market research and do compensate survey takers.

Finally, for the India surveys, in order to ascertain the appropriateness of the study with respect to local laws and cultural, social, and political contexts, our research design and study was reviewed by a country expert.

D Descriptive Statistics

D.1 US Sample

Our sampling scheme is visualized in Figure A.1. Table A.1 provides descriptive statistics for the US.

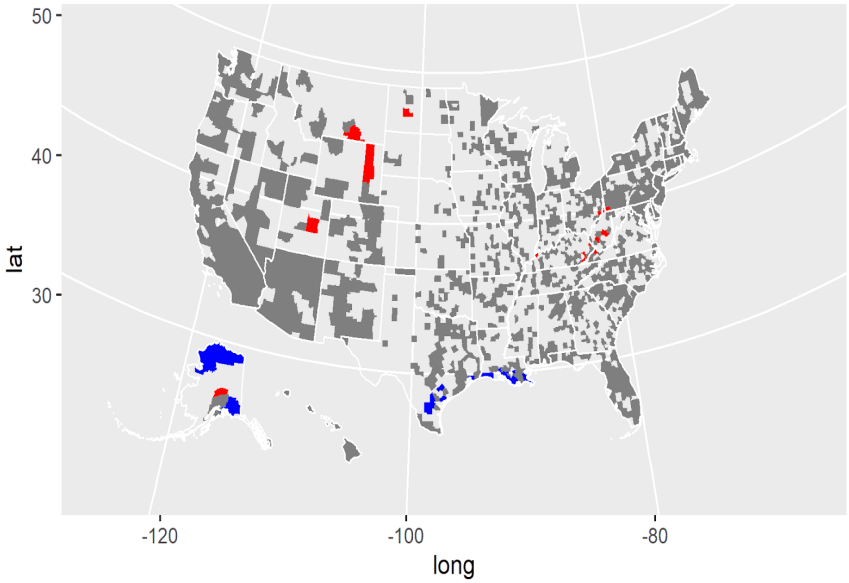

Figure A.1: This map shows the counties from which our respondents were sampled. Red denotes counties in the Coal Country sample; blue denotes counties in the Cross-Pressured sample; dark grey represents counties from our General Population sample.

	General Population	Cross-Pressured	Coal Country
Female	53%	60%	62%
Median Age	46 years	35 years	37 years
College Degree	68%	60%	58%
Employed	54%	62%	51%
Ideology: Liberals	29%	15%	18%
Ideology: Conservatives	34%	43%	39%
White	75%	65%	95%
Black/African American	13%	26%	2%
Latino/Hispanic	8%	9%	2%
Concerned by Climate Change	76%	73%	69%
N	3702	1428	516

Table A.1: Descriptive statistics of US samples. 'College Degree' includes college graduates and graduate degrees. 'Employed' refers to self-employed or paid employees.

D.2 India Sample

Our sampling scheme is graphed in Figure A.2. Table A.2 provides descriptive statistics for India.

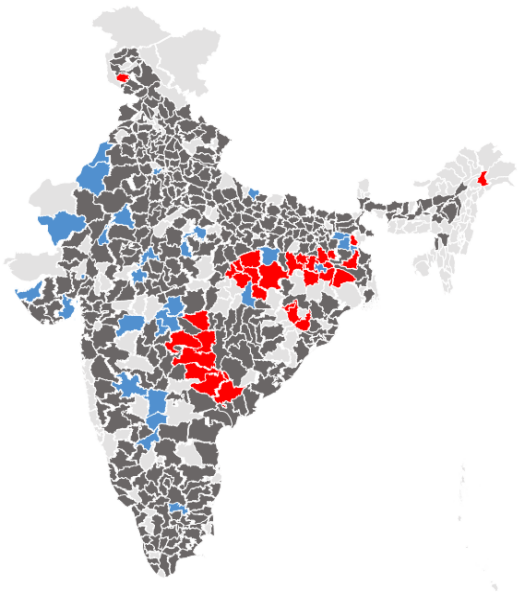

Figure A.2: This map shows the Indian districts from which our respondents were sampled. Red denotes districts in the Coal Country sample; blue denotes districts in the Cross Pressured sample; dark grey represents districts from our General Population sample.

	General Population	Cross-Pressured	Coal Country
Female	65%	59%	30%
Median Age	36 years	35 years	36 years
Attained Secondary School	48%	48%	42%
Employed	77%	78%	75%
Voted for BJP	60%	65%	48%
Below National Median Income	40%	42%	46%
Scheduled Caste/Dalits	12%	12%	22%
Scheduled Tribes	3%	5%	10%
Other Backward Classes	35%	45%	32%
Upper Caste	39%	30%	31%
Muslim	8%	6%	5%
Other Ethnicity	3%	2%	1%
Concerned by Climate Change	91%	89%	93%
N	2102	1573	1556

Table A.2: Descriptive statistics of India samples. 'Secondary School' includes individuals who have completed secondary school or higher. 'Employed' refers to self-employed or paid employees. 'Voted for BJP' refers to whether respondents voted for the Bharatiya Janata Party (BJP) in the last Lok Sabha election.

E Additional Information Regarding India Samples

Implementing our surveys in India required a more involved sampling strategy than in the US. Here we describe the decisions we took to identify the relevant samples.

E.1 General Population

The General Population sample was conducted using Computer Assisted Telephone Interviewing (CATI), drawing on all mobile phone and landline connections in India.[25] Our research firm employed an automated predictive dialer to select phone numbers from all telecom circles and digital exchanges in India. India's high telephone density rate allowed enumerators to access the vast majority of demographic groups in the country.[26] Members of low-frequency demographic groups were over-sampled to obtain a geographically and socio-economically representative sample. The sample covered the entire geography of India, excluding only some remote north-eastern states and union territories. Respondents could choose to take the survey in eleven languages: Hindi, Punjabi, Gujarati, Marathi, Kannada, Malayalam, Tamil, Telugu, Odiya, Bangla and Asamiya. The survey was conducted by the firm CVoter News Pvt. Ltd.

E.2 Coal Country

The Coal Country sample captures the parts of India that are heavily dependent on coal industry employment, and thus vulnerable to the economic threats of climate policy. This sample was constructed by combining two surveys: a representative survey of coal mining districts as well as a targeted survey of coal miners, as described below.

(a) Coal Mining Districts

First, we identified districts in India that are most heavily dependent on coal mining employment in order to capture parts of the Indian population most exposed to potential job losses from decarbonization. We identified coal mining districts using the 2015 Government of India publication, "Statistics of Mines in India: Volume I (Coal)," which

[25] Telephone surveys are advantageous since they alleviate privacy and social desirability concerns for respondents in group settings. Additionally, the medium facilitates interviews with hard-to-reach demographic groups, boosting the representativeness of the sample. Interviews were recorded and supervised in real time, augmenting the quality of responses.

[26] Because incoming calls are free of cost, we were able to access poorer citizens in our sample frame.

provides statistics on "employment, production, productivity and other associated aspects in coal mines" in India (Government of India, 2018). In association with the Mines Act (1952) and the Coal Mines Regulations (1957), India's central government provides this regular statistical report on the country's coal mines and operations. We used the report's record of average daily employment to construct a list of all districts across India with at least one coal mine in operation that actively employs workers.[27] From this list, we excluded 4 districts that also ranked high on ecological vulnerability; these districts were classified and sampled as cross-pressured districts (see below). Our final sample contains 39 districts from nine states (Assam, Chhattisgarh, Jammu and Kashmir, Jharkhand, Madhya Pradesh, Maharashtra, Orissa, Telengana, and West Bengal), and represents to our knowledge the most comprehensive sample of districts with coal mining employment in India.

(b) Coal Miners

Given India's high levels of population density, we anticipated difficulty in locating workers employed directly in coal mines through the representative sample of coal mining districts above. Therefore, to supplement our Coal Country sample, we selected three districts with high coal employment—Dhanbad, Sahdol, and West Bardhman[28]—in which we conducted in-person interviews with 850 coal industry workers. These individuals were identified and interviewed by the survey firm Morsel Research & Development. These interviews involved the same list of questions as our other samples, along with additional qualitative follow-up questions asking respondents about how they made decisions regarding allocations, community or individual transfers, and other key responses.

E.3 Cross-Pressured

Cross-Pressured districts capture parts of India's population exposed to both job losses from decarbonization policy and the ecological threat of climate change. For completeness, we distinguished between coal mine and coal plant districts, and then identified those districts that were ranked high on measures of climate vulnerability.

(a) Coal Mines Cross-Pressured

To identify the coal mines cross-pressured districts, we combined the district-level coal mines data (discussed above) with an index of climate vulnerability developed by researchers at India's Central Research Institute for Dryland Agriculture (CRIDA). The CRIDA "Atlas on Vulnerability of Indian Agriculture to Climate Change" ranks each district in India based on four indicators: exposure, sensitivity, adaptive capacity, and vulnerability (Rama Rao et al., 2013). Based on these rankings, each district is assigned one of following five vulnerability ratings: Very High, High, Medium, Low, and Very Low. From the universe of coal mining districts, we selected all districts that were ranked "Very High" in terms of overall climate vulnerability. This procedure generated a sample of four districts (Godda, Pakur, Bokaro, and Bilaspur) across two states that we deemed cross-pressured.

(b) Coal Plants Cross-Pressured

We used the Global Coal Plant Tracker database to identify the universe of coal plants that are located in India.[29] The database contains information on 1,866 coal plants in India—including those that are in operation, have been retired, have been announced, and are in development. The database also contains information on individual plant capacity and estimates of each plant's associated annual carbon dioxide emissions. The locations of coal plants in the Global Coal Plant Tracker database were webscraped and assigned latitude and longitude information.[30]

We used geo-coordinates to situate each coal plant within one of the 652 districts in present day India. We found that 423 districts in India are not associated with coal production; by contrast, 229 districts have some association

[27]Coal mining districts vary in intensity of coal employment. The largest district (Dhanbad in Jharkhand) contained 88 mines and employed 50,567 workers in 2015, while the smallest district (Narsigpur in Madhya Pradesh) contained 1 mine and employed 20 workers in 2015.

[28]These districts are in the states of Jharkhand, Madhya Pradesh, and West Bengal, respectively. We selected districts with the highest levels of coal employment that were feasible to survey. Dhanbad and West Bardhman have the country's top two levels of coal employment. Sahdol has the country's fifth highest level of coal employment. We excluded two districts in Telangana state with higher levels of coal employment than Sahdol due to local conflicts that posed a threat to enumerator safety.

[29]See https://endcoal.org/tracker/ (accessed last on October 13, 2017).

[30]For this step in the research process, we are grateful to Johannes Urpelainen, Noah Zucker, and Ricky Clark, who kindly shared with us the latitude and longitude data of existing coal mines.

with coal activity. For each district in the country, we pulled in the total population, rural population, urban population, and educational achievement indicators from the 2011 India census. We also hand-coded whether a district was located on a coast or not and whether it was neighboring a coastal district.

We then combined this district-level plant data with the climate vulnerability index developed by CRIDA (discussed above). We looked at both coal mines and coal plants because we were open to the possibility that both types of production could generate policy vulnerability. Our final sample for the Coal Plants Cross-Pressured group includes all districts that have a plant and also rank among the country's top 140 most climate vulnerable districts. In the end, 25 districts across the states of Bihar, Gujarat, Haryana, Jharkhand, Karnataka, Madhya Pradesh, Maharashtra, Rajasthan, Tamil Nadu and Uttar Pradesh were included in the sample.

F Allocations Across All Tax Levels

F.1 US Sample

In the main text, we presented the results of the compensation choices respondents made based on a policy that would raise household energy cost by $64. In Figure A.3 we further present results (i.e., average allocations) from the lower ($16) and upper ($256) cost levels presented to US participants. The main findings are as follows:

- The average respondent in the "General Population" is least interested in targeted forms of compensation such as fiscal transfers or adaptation infrastructure spending and most interested in compensatory options that benefit broad sections of society. They especially favor rebates at high tax levels.
- The average respondent in the "Coal" sample is significantly in favor of direct transfers to people whose employment stands to be threatened by climate policy, at all levels of tax.
- The average respondent in the "Cross-Pressured" (coastal/fossil fuel) sample has preferences that lie in between those of the "Coal" and the "General Population" samples.

F.2 India Sample

Figure A.4 presents the average allocations for the three policy cost levels (₹140, ₹560, and ₹2,240) presented to India participants.

The main findings are as follows:

- While the US "General Population" sample prefers green technology investments at the lower two cost levels and equal rebates to tax payers at the higher cost level, the average Indian is most interested in green technology investments at all cost levels. These investments constitute relatively diffused compensatory options that benefit broad sections of society.
- Like in the US, the average respondent in the "Coal Country" sample is significantly in favor of direct transfers to people whose employment stands to be threatened by climate policy, at all levels of tax.
- The average respondent in the "Cross-Pressured" (coal employment/high ecological vulnerability) sample has preferences that lie very close to the "General Population" sample. This is possibly driven by the high levels of concern for climate change in the general population (see Appendix D).

G Multivariate Analyses

Here we analyze each allocation using both sample indicators and a set of individual-level covariates (see Figures A.5 and A.6). We use a simple linear regression, though both tobit models as well as fitting all categories with a Dirichelet regression (Maier, 2014) produce similar results.

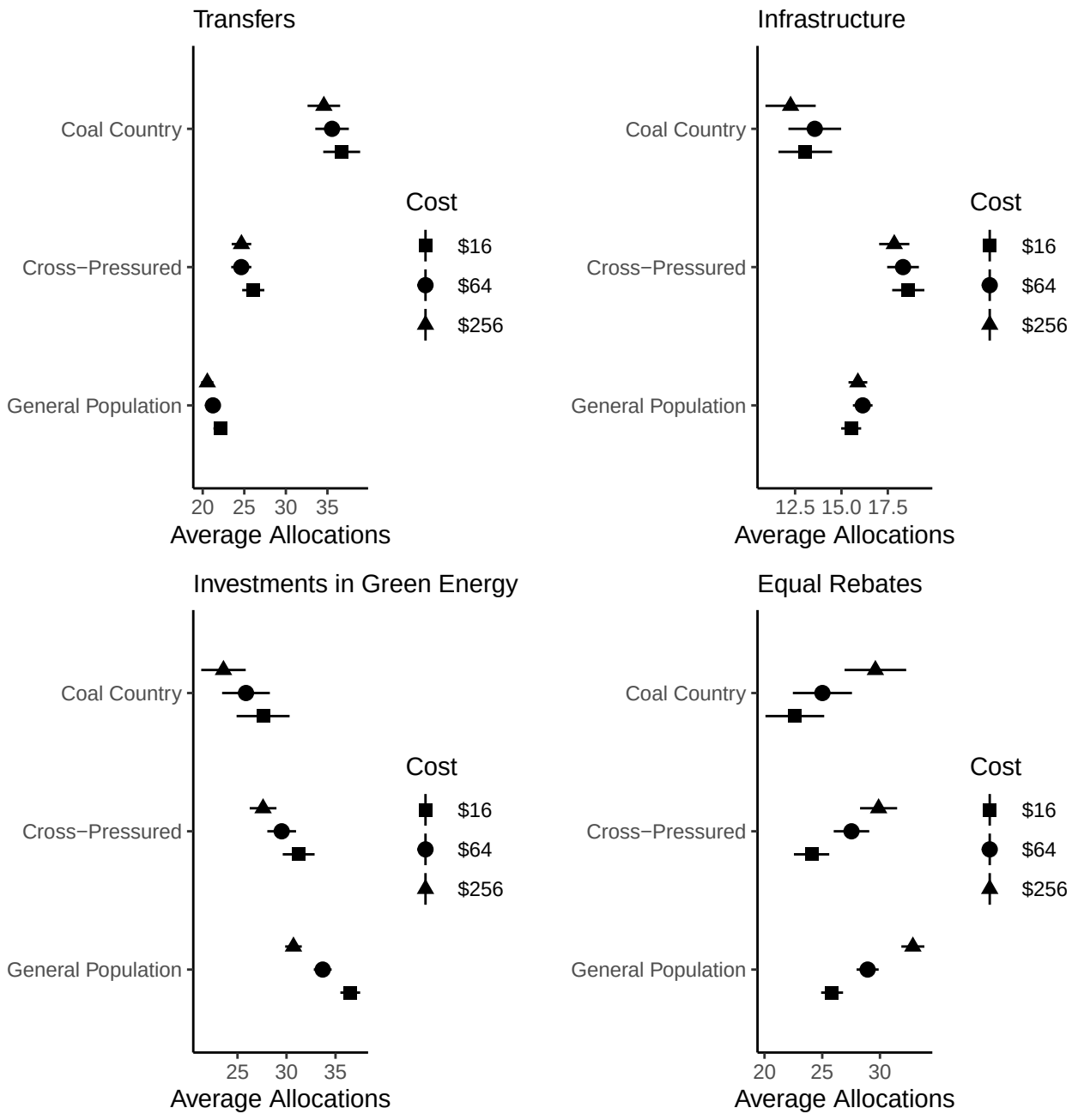

Figure A.3: *US average allocations by cost treatment*

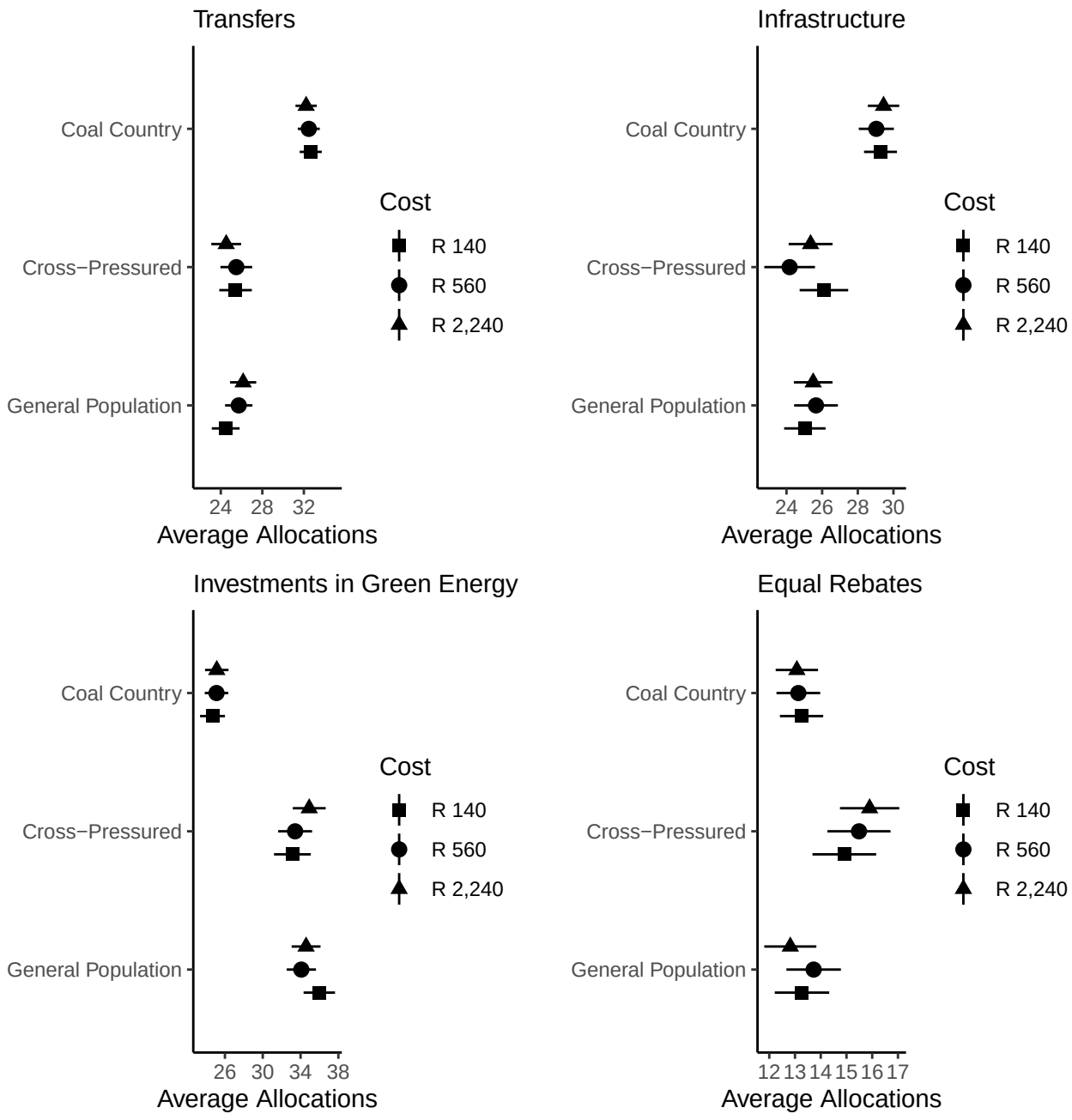

Figure A.4: *India average allocations by cost treatment*

G.1 US Results

For basic background covariates, we included self-reported income, age, binary gender, and dummy variables for conservative and moderate ideology (liberals were the excluded category; derived from a 7-point scale). We also measured whether the respondent or someone in their household was employed in the fossil fuel sector. Based on the respondent's location, we used data on climate change-induced economic damages as a percentage of county income from Hsiang et al. (2017) to include a measure for expected damages. We also included a set of covariates designed to tap climate change risk. This included a self-report on whether the respondent was personally concerned about the impacts of climate change, whether they own or want flood insurance, and whether or not they had smelled smoke from a forest fire. Finally, we estimated a model with state fixed effects. We estimated a range of models in order to explore the stability of the results: 1) base model: sample indicators and basic demographics (age, ideology, gender, income), 2) base model plus fossil fuel employment and county economic damages, 3) base model plus fossil fuel employment, flood insurance ownership/desire, and whether the respondent has smelled a forest fire, 4) base model plus fossil fuel employment and self-concern about climate change, 5) base model plus fossil fuel employment, self-concern about climate change, and state fixed effects.

After controlling for various demographics, as well as individual- and county-level variables, the influence of the sample indicators remain relatively stable. The only exception is a more muted effect once state fixed effects are included, though this does not completely wash out the effect of support for transfers from those in coal country and support for climate vulnerable infrastructure from those in the coastal fossil fuel sample. Amongst other things, controlling for these sample indicators, we also observe support for transfers by those directly employed in the fossil fuel sector. Those not personally concerned about the effects of climate change were less likely to support infrastructure spending, and those who had or wanted flood insurance wanted more infrastructure spending.

G.2 India Results

Background covariates for our India sample were designed to parallel the US study as closely as possible. We include self-reported income, age, and gender. In lieu of our US measure of ideology, we include a dummy variable for self-reported vote for the BJP in the most recent Lok Sabha election. Other vote breakdowns produce similar results. Relative to the US sample, we obtained an identical self-report of personal concern about climate change. However, our other indicators of climate change damage and risk were modified to be more applicable to the India sample. We asked participants if their region had experienced a drought in the past two years, and personal concern about heat waves in their community. Our models for India are as follows: 1) base model: sample indicators and basic demographics (age, dummy BJP vote, gender, income), 2) base model plus fossil fuel employment and drought, 3) base model plus fossil fuel employment and concern over heat waves, 4) base model plus fossil fuel employment and self-concern about climate change, 5) base model plus fossil fuel employment, self-concern about climate change, and state fixed effects.

As with the US data, the influence of sample indicators remains stable under different controls. Including state fixed effects does appear to increase the estimated effect of the Coal Country sample on the preferred share of transfers to fossil fuel workers and investments in green energy. Self-reported risk indicators seem to have limited effects. Heat wave concern appears to shift support toward investments in green energy and away from equal rebates.

H Climate Change Vulnerability Only Analysis

In 2020 we participated in a survey targeting individuals in regions with a high degree of coastal flooding vulnerability in California, Florida, Virginia, and New Jersey (see Mildenberger et al., 2021 for more details). Essentially, specific *buildings* that were in a flood plain as identified by U.S. National Oceanic and Atmosphere Administration Sea Level Rise maps were identified. Then, within the same locales, buildings that were not in a flood plain were identified. Survey invitations were sent by mail to these households and respondents filled out an online survey and received a small gift card upon completion. In addition, some respondents were randomly assigned to receive a map showing their house on a map. If the house was in a flood plain, this flood plain was shown. This creates four separate groups. In the survey, which contained questions about climate policy, our exact allocation question at the $64 level was included.

Figure A.7 reports the average allocation results for these samples. As in other samples, investments in green energy get the highest support across all groups. Relevant for our purposes, individuals in flood zones were more

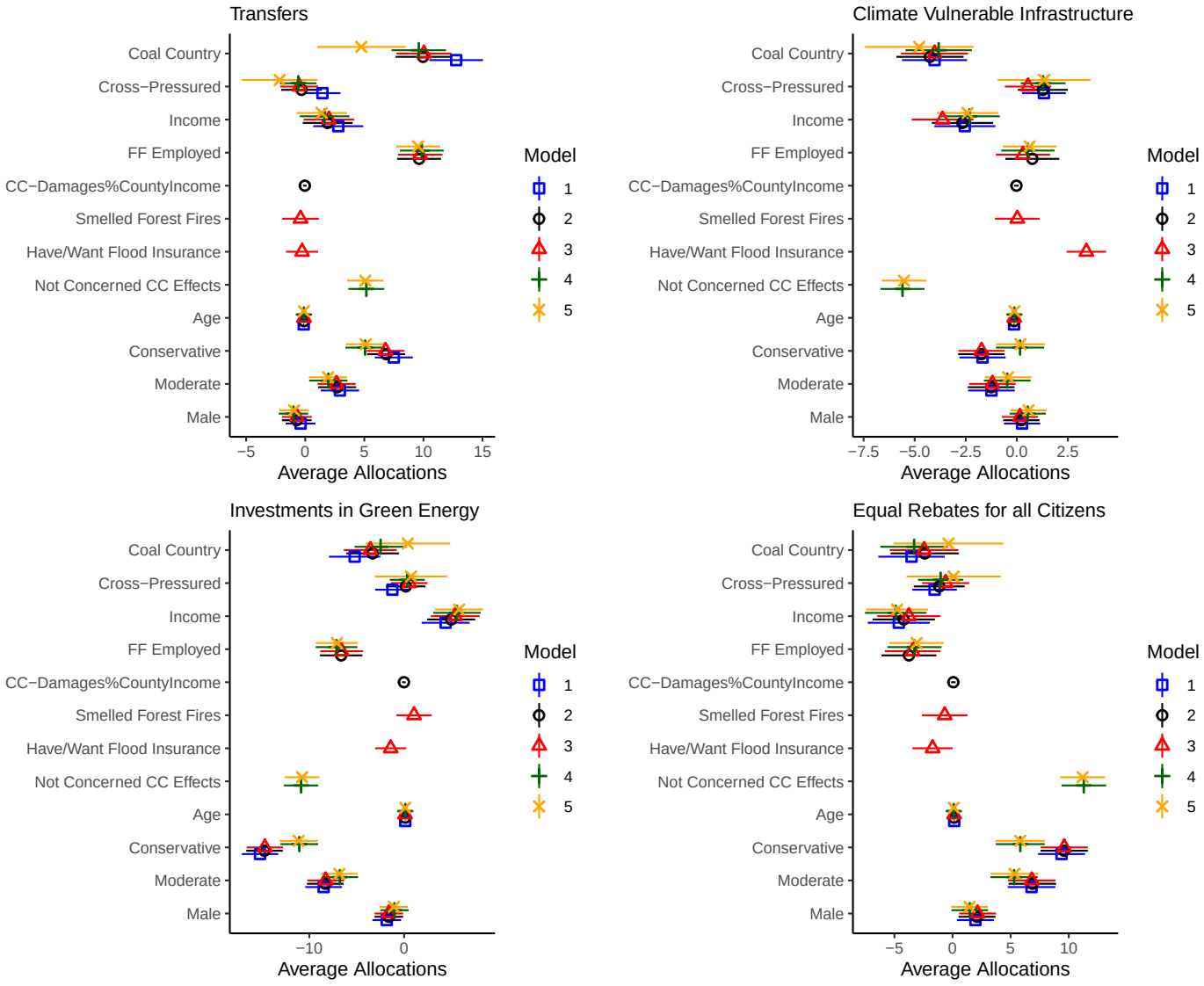

Figure A.5: *Multivariate analyses of allocations in the United States.* Separate models are color coded differently. Model with state fixed effects excludes the state estimates.

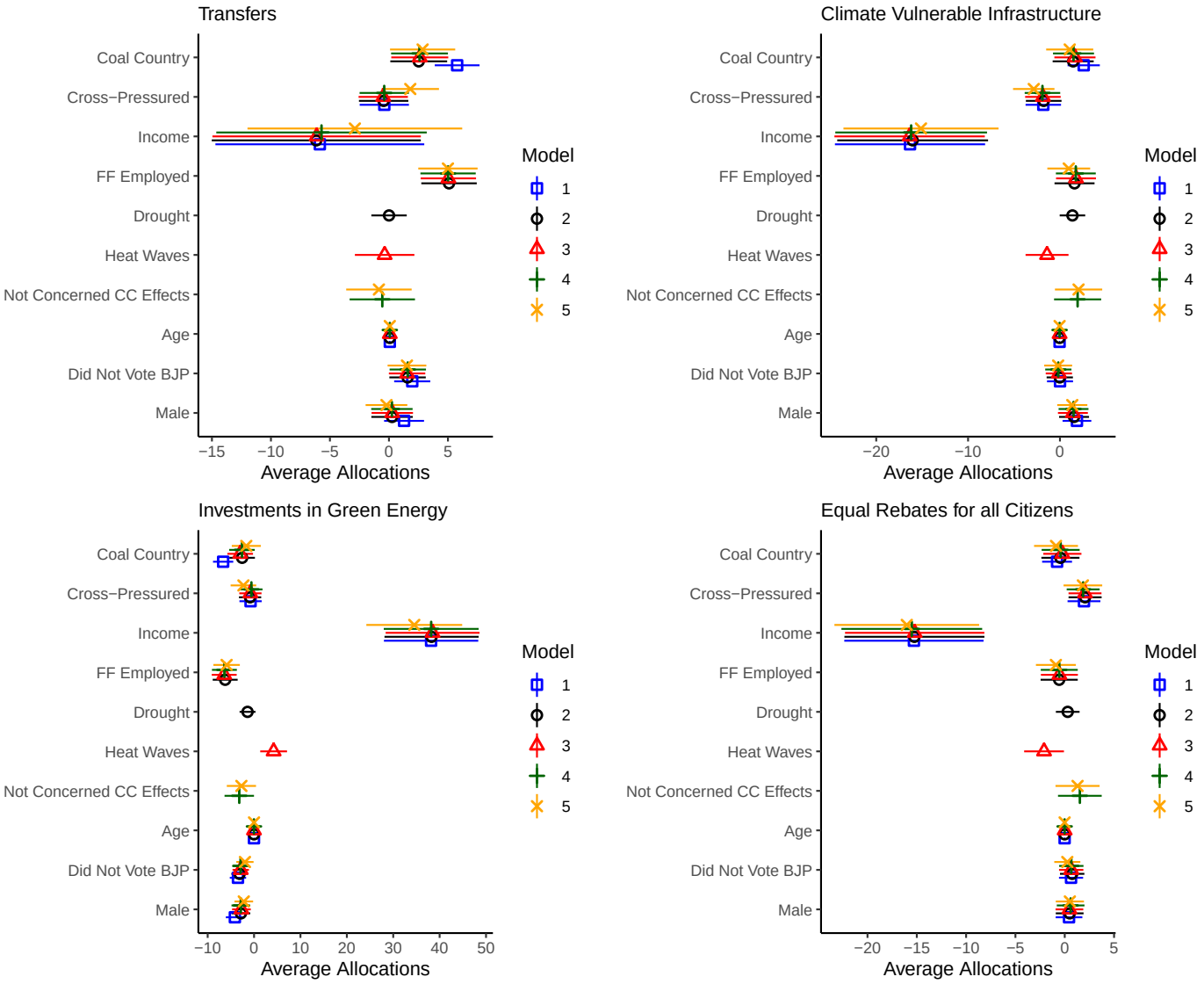

Figure A.6: *Multivariate analyses of allocations in India.* Separate models are color coded differently. Model with state fixed effects excludes the state estimates.

likely to support adaptation spending compared to individuals that lived near but not directly in a flood zone. Providing a map to respondents increased this effect. These results hold if we control for a range of covariates.

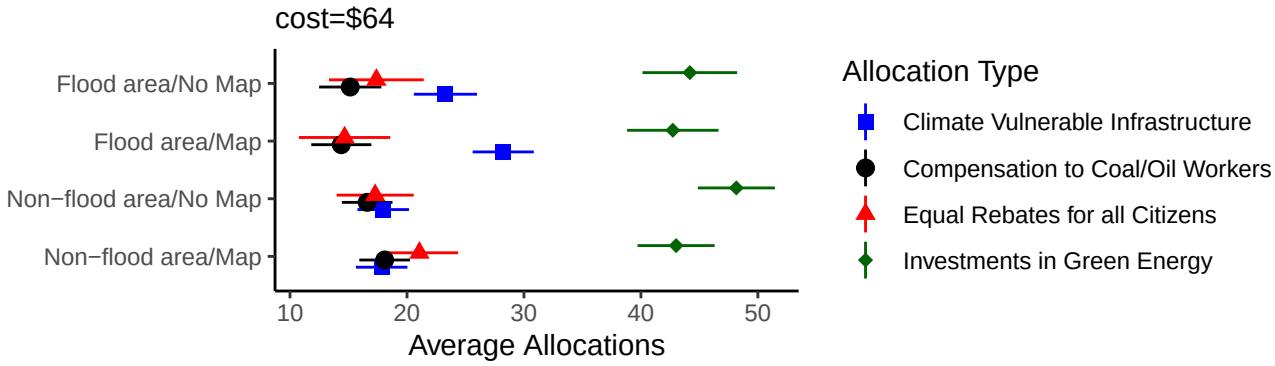

Figure A.7: *US preferences for allocation purposes of climate policy funds, by climate change vulnerability samples.* This figure denotes how respondents allocated funds raised from a policy increasing the average monthly household energy costs by $64 across four spending options. Symbols represent average allocation and lines represent 95% confidence intervals.

Figure A.8 takes the coastal flood sample that did not receive the experimental map treatment and plots it against the samples analyzed in the paper. We see that this group prefers higher levels of adaptation spending compared to all three groups.

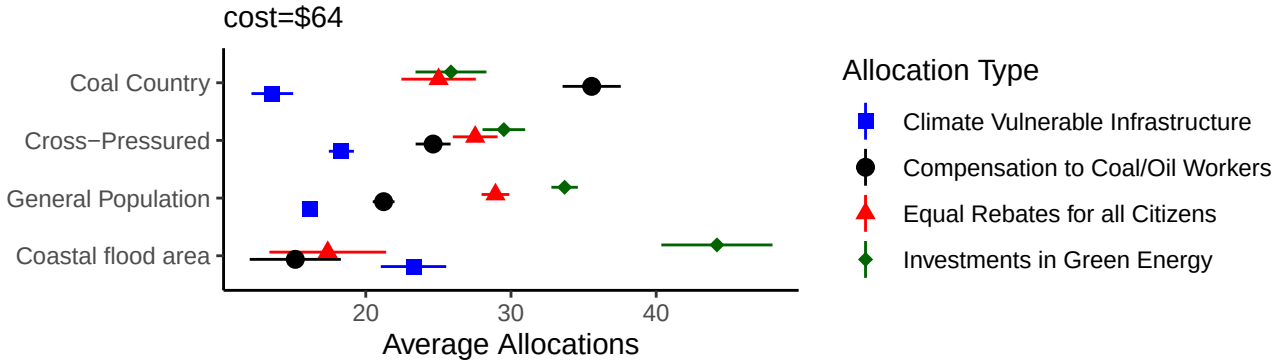

Figure A.8: *Combining main text's samples with non-map flood vulnerable/non-map condition from Figure A.7.* Symbols represent average allocation and lines represent 95% confidence intervals.

I Willingness to Pay for Four Policies

In our primary analysis, we asked respondents to "divide the dollar" and allocate spending between four policy options. In a follow-up survey experiment, conducted on a nationally representative sample of US adults via Qualtrics in Fall 2020, we fielded an alternate version of the survey question intended to adjudicate individuals' absolute preferences and willingness to personally support each of the four policy choices. Respondents were randomly presented only one of the four policy options. They were informed that the policy would raise the average cost per household by $64 per month, and were asked whether they were personally willing to pay this average monthly cost to support the policy.[31] The randomized design allows us to study absolute preferences for each policy lever.

[31]The question was worded as follows, with experimental treatments in bold:

Table A.3 presents the results of our analysis. We find that at the $64 monthly cost level, entirely in line with the rankings from our allocation exercise, green investments are the most supported policy lever (43% support), followed by equal rebates (39% support), transfers (37% support), and infrastructure investments (35% support). These findings are informative as they point to differences in absolute levels of support for the policies that mirror the allocation exercise.

At the same time, it is also important to note that each of the policies have absolute baseline levels of support; even when respondents are not forced to "divide the dollar" and allocate funds to each policy, a significant portion still supports paying taxes to support each of the policies. Following Bergquist, Mildenberger and Stokes (2020), combining several dimensions of policies could increase support even more (which is consistent with the fact that in our divide the dollar exercise, respondents rarely allocated everything to one category).

Because this survey was nationally representative, we did not get respondents from our coastal fossil fuel or coal country regions.

$64

	Transfers (n=446)	Infrastructure (496)	Green Investment (450)	Redistribute (469)
Support	37%	35%	43%	39%
Oppose	63%	65%	57%	61%

Table A.3: Willingness to Pay to Support Individual Climate Policies

J Allocations for a Chosen Price

The spending allocation tasks presented in the main text were set on three a priori household cost levels. In a separate section of our survey, we allowed the respondents to choose their own price of the government policy, in order to investigate (a) if and how many respondents would not want any cost and hence choose a price of zero, and (b) how congruent the ranking of the compensation and investment options is compared to the ranking in our main results. Just like in the main tasks, the total proportion of the policy spending had to add up to 100%.

J.1 US

Only a small fraction of the US respondents said they would rather not have any policy at any cost. Specifically:

- 99 Coal Country respondents want to pay $0 (19% of this sample); median chosen cost is $16 ($20 if we exclude the 0s)
- 191 Cross-Pressured respondents want to pay $0 (13% of this sample); median chosen cost is $25 ($35 if we exclude the 0s)
- 440 General Population respondents want to pay $0 (12% of this sample); median chosen cost is $20 ($25 if we exclude the 0s)

When individuals could allocate across the categories when they could choose the cost, did their allocations mirror their previous elections? For these individuals, the Pearson correlation between the ranking choices with a 'forced' cost ($64) and a chosen cost (above $0) are positive and strong:

"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 government is considering a policy to raise the costs of fossil fuels. This policy will affect average Americans 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. Suppose the policy implemented by the government raises the average cost per household by **$64** per month.

If money raised by this policy is used to **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**

Would you be willing to pay **$64** more on average per month in energy costs and support the policy or would you oppose the policy?"

- Compensation to vulnerable coal/oil workers: r=0.69
- Infrastructure investments to climate vulnerable: r=0.53
- Investments in green energy: r=0.74
- Equal rebates for all citizens: r=0.65

These strong correlations are not driven by one particular sample but they are strong across the samples (e.g. regarding compensation to vulnerable workers, the Pearson correlations in Coal Country, Cross-Pressured and General Population are respectively .83, .69 and .65; for infrastructure investments they are respectively .55, .51 and .53; for green energy investments, .66, .73 and .75; for equal rebates, .60, .67 and .65).

J.2 India

As with the US sample, only a small fraction of respondents in India opted for no policy at any cost. Specifically:

- 167 Coal Country respondents want to pay ₹0 (11% of this sample); median chosen cost is ₹100 (stays at ₹100 if we exclude the 0s)
- 99 Cross-Pressured respondents want to pay ₹0 (6% of this sample); median chosen cost is ₹200 (₹250 if we exclude the 0s)
- 299 General Population respondents want to pay ₹0 (14% of this sample); median chosen cost is ₹140 (₹200 if we exclude the 0s)

There is a strong, positive Pearson correlation in the India sample between 'forced' cost allocations (₹560) and chosen cost allocations. For all four categories the correlation within the India sample is slightly stronger relative to the US.

- Compensation to vulnerable coal/oil workers: r=0.72
- Infrastructure investments to climate vulnerable: r=0.59
- Investments in green energy: r=0.82
- Equal rebates for all citizens: r=0.67

The India sample similarly exhibits strong cross-sample correlation. For compensation to vulnerable workers, the Pearson correlations in Coal Country, Cross-Pressured and General Population are respectively .73, .66 and .70; for infrastructure investments they are respectively .68, .69 and .44; for green energy investments, .82, .84 and .78; for equal rebates, .66, .72 and .64.

K Open-Ended Responses

In our surveys, we invited all the respondents in our US and India samples to explain why they ranked their first policy choice in an open-ended manner. Specifically, all our respondents were asked, "*you previously told us what you think would be the most important way for the money to be spent; please take some time now to tell us why you made the choice you did.*" Respondents then provided justifications, many of which touched upon identifiable themes.

To navigate the open-ended responses and their themes in a systematic manner, we performed a manual qualitative coding of their content. A researcher read each response, and then coded in a binary fashion a number of variables. A second coder provided inter-coder reliability checks for a subset of data and independently coded the small subset of responses that were deemed difficult to classify. We first describe the binary variables that, irrespective of the favorite policy, refer to issues of community. We then move to more granular policy-specific variables.

K.1 Community Themes Analysis

The researcher recorded if, regardless of their favorite spending option, an individual defended their response by mentioning a 'community'-related theme that justified their preferred policy. For 'community' the key criteria is whether the respondent is alluding to some targeted community-based rationales (as opposed to individual-based rationales). For example, a reference to implications for families or older generations in a town/state would be coded as a 1 in this variable. A reference to themselves only or, e.g., the general labour force, would not have that connotation, and would be coded as a 0.

K.1.1 Results

Here, we report the percentage of open-ended responses that covered 'community' themes (and therefore were assigned a value of 1 in our coding of the 'community' variable) in the US and India by sample. We find that in the US, 32% of Coal Country respondents mention themes related to community issues. In India, 18% of Coal Country respondents justify their favorite policy choice with community themes. Like our quantitative results suggested, the General Population participants in both countries are the ones whose open-ended responses mention community themes the least (4% and 10% in US and India, respectively), while Cross-Pressured responses are in between (9% and 12% in US and India, respectively).

The results provide complementary strength to our argument that in Coal Country, the preferred policy choice—and thus the support for compensatory transfers to vulnerable workers in polluting sectors—is driven by a sense that this will help communities (or, vice versa, that without those policies entire communities will be vulnerable). Additionally, the qualitative responses indicate that Coal Country respondents are more likely than other respondents to present a justification based on identity among the reasons for why they chose their top-ranked policy.

K.1.2 Illustrative Quotes

To give a more vivid sense of the themes of some of the Coal Country respondents and illustrate how they refer to issues related to community and identity, we report here a number of selected quotes. Many of the US Coal Country responses relate compensatory transfers to issues related to children's education in the local community (quote #989) and poor people and working families (quote #2077):

> # 989: "In WV we have to many mountains for the solar system to work properly. The coal miners lose their jobs, they can not feed their families and they are always the lasts ones to get help. Also my husband is a disabled coal miner. Also the government doesn't care about the poor people that has to pay those increases. Most people are struggling now just to make ends meet at the end of the month. In most families both parents are working and they don't have time for their children and that's why we have so many drop outs in school. We need to educate these children that is our future generations to be able to make decisions and work with other come up with a solution to our problems that no one has to suffer in the process."

> # 2077: "I live in coal country. I see all the coal miners out of jobs due to all the regulations on coal now. There is not enough jobs in the area to sustain the men and they have no other training to do another job. Many are too old to go to college and try another career. Some are not smart enough for college and would not make the money they made in the coal mines even if they did. I see the families losing their homes, cars, and dignity when they have lost their jobs in the mines and can't find another. I support sending/spending any and all money to help them get training in another field that will pay them close to what they are used to making in the mines. It's hard to go from making great money and having it all to nothing and expected to live that way because of some big shot who sits in an office and makes more money doing pretty much nothing than those who risk their lives underground everyday"

Similarly, in India, the quotes—which are distinctively shorter than the US quotes due to the translation of the responses—indicate that Coal Country respondents chose more predominantly compensatory transfers to vulnerable

workers because "those will lose their work need to pay for their food and children's education" (frequent answer). Among coal miners, many referred to a sense of community and identity. One respondent pointed out that "due to the sudden loss, many of them might commit suicide" (interview #268 in West Bengal). Additionally, one miner said "it is important for the community to walk together" (interview #133 in West Bengal). Indian Coal Country respondents also indicate that those transfers are important "so that in future all the people might take steps keeping in mind the entire community" (interview #167 in West Bengal). According to some "the community [...] are the foundation of the industry" (interview #68 in Madhya Pradesh).

K.2 Granular Policy Specific Analyses

Additionally, we coded a number of alternative binary variables, two per each of the spending options proposed in our study. We focus here specifically on the spending options that have a more evident community theme, namely the compensatory transfers to vulnerable workers and the infrastructural investments to climate vulnerable groups.

For a respondent that preferred a particular spending option, our research assistant coded if the respondent (a) mentioned a generic reason for this choice that referred to the basic function of the policy mechanism (namely, and in order: protecting workers' jobs or protecting people's infrastructure), and/or (b) if they were motivated by community-specific concerns and a need to protect specific groups. For the 'transfers' (workers' compensation) option, an individual could have mentioned a preference for helping vaguely defined workers, or a preference for helping workers in view of the effect that unemployment would have on their specific areas (e.g. the welfare of families and the education of children). By contrast, for the 'infrastructure' (adaptation projects) option, an individual could have mentioned a preference for helping those losing property (generically) or a preference for helping vulnerable communities because, e.g., many people would have lost houses. Note that these categories are not mutually exclusive, for a respondent may have mentioned more than one reason for their policy choice in their open-ended response (which had no word limits).

Below we show the main results from this additional coding of the open-ended responses. The percentages reflect the respondents that referred to either generic themes or community-specific themes as a fraction of all the respondents that preferred one specific policy option ('transfers' or 'infrastructure').

Table A.4: US: Community-based reasoning for first ranked policy instrument

	Transfers Community Themes	*Infrastructure Community Themes*
Coal Country	46%	7%
Cross-Pressured	18%	4%
General Population	4%	2%

Table A.5: India: Community-based reasoning for first ranked policy instrument

	Transfers Community Themes	*Infrastructure Community Themes*
Coal Country	17%	26%
Cross-Pressured	27%	4%
General Population	2%	4%

Tables A.4 and A.5 show the results from the coding of the open-ended responses for each sample's participants who selected 'transfers' or 'infrastructure' as their favorite choice, respectively. For the US, we find that Coal Country presents more community-oriented justifications for the choice of either policy. Regarding the compensation of vulnerable workers, 46% of the US Coal Country participants who selected transfers as their favorite policy justified this choice with community-related themes. Comparatively, the percentages of Cross-Country and General Population respondents that mentioned community issues to justify transfers were 18% and 4%, respectively. In India the patterns are similar. Few General Population Indian responses mention community (only 2%). Notably, Cross-Pressured responses mention community themes more often (27%) than Coal Country (17%).

K.3 Additional Evidence from India Coal Miners Sample

For the coal miner sub-sample in India, enumerators gathered open-ended responses to several questions central to our analysis. Morsel, the firm coordinating this sample, translated these qualitative responses to English. In this process, they condensed each individual's response into a one or two sentence distillation focused on a main theme.

In these face-to-face interviews with coal miners, the miners were asked why they answered the way the did after they had indicated whether they preferred community over individual transfers to address job loss in the fossil fuels industry. In this sub-sample, a majority emphasized a motivation along the lines of everyone in the community being linked. At a minimum, their preference was motivated by fairness and compensation to all affected:

- "It is just not about an individual's loss but loss for the whole community [WB_90]."
- "Communities depend upon industries just as much as individuals do [JH_139]."
- "They all depend on each other economically so they all should be given some amount of money [WB_235]."
- "The entire community will fall into debt trap otherwise [WB_240]."

Some miners seem to have been motivated less by fairness and more by the communal and family bonds they experience in the mining community:

- "All the families are linked and all are poor [JH_330]."
- "Everyone need to be paid, as they live in close fellowship [WB_164]."
- "The impact of a job loss if never limited to an individual only [JH_154]."

A third notable group emphasized the role the community had played in sustaining miners in their area. For them, a reasonable compensation should take into account not just present economic impact, but the loss of generations of communal investment in the industry:

- "Without the community the individual would not have survived in the industry [MP_49]."
- "Individuals can survive if the community does [JH_136]."
- "Community should get it because they are the foundation of the industry [MP_68]."
- "Everyone has a stake in the industry [JH_9]."

Of the 474 miners who chose community over individual transfers, 312 expressed a sentiment along the lines of everyone needing help and everyone being connected. The next most common sentiment was a fear of falling into poverty. On the other hand, of the 376 miners who chose individual transfers, a near majority (180) emphasized a fear of falling into poverty over connection or communal linkage.

L Identity and Community Additional Analyses

We present additional findings based on the questions regarding community and identity. We explore whether the overall differences in support for community transfers and the protection of identities documented in the manuscript hold when we split apart the samples and control for the other relevant variables. In Tables A.6 (US) and A.7 (India) we estimate a regression model for each sample and include a dummy variable indicating whether an individual is employed in the fossil fuel industry along with the set of controls.

For the US, we find that the difference between fossil fuel workers and non-fossil fuel workers remains small for Coal Country and Cross-Pressured samples. Though as noted in Appendix K, community themes were more salient in the open-ended explanations in Coal Country. In contrast, fossil fuel workers in the General Population samples more starkly prefer direct compensation over community-based schemes. For the question on protecting identity, we also recover similar results as reported in the body of the paper. In the India regressions, we see small differences between fossil fuel workers and non-fossil fuel workers across samples, in line with the finding documented above that the major differences in India are cross-sample.

Table A.6: US Results By Sample

	Dependent variable:					
	Community Over Individual Transfers			Protecting Job Identity		
	(Coal Country)	(Cross-Pressured)	(General Population)	(Coal Country)	(Cross-Pressured)	(General Population)
Fossil Fuel Employment	−0.091	−0.091**	−0.172**	0.179**	0.085**	0.264**
	(0.048)	(0.030)	(0.033)	(0.040)	(0.027)	(0.031)
Age	−0.001	0.002*	0.001**	0.0002	−0.003**	−0.002**
	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)	(0.0005)
Gender: Male	0.004	−0.008	−0.038*	−0.109**	−0.031	0.010
	(0.047)	(0.028)	(0.017)	(0.039)	(0.025)	(0.016)
Education: High	0.011	−0.008	0.009	−0.017	−0.134**	−0.071**
	(0.048)	(0.029)	(0.018)	(0.039)	(0.026)	(0.017)
Ideology: Conservative	−0.028	−0.039	−0.089**	0.462**	0.267**	0.399**
	(0.063)	(0.040)	(0.021)	(0.052)	(0.036)	(0.019)
Ideology: Moderate	−0.049	0.024	−0.010	0.297**	0.103**	0.254**
	(0.065)	(0.041)	(0.021)	(0.053)	(0.037)	(0.019)
Constant	0.684**	0.506**	0.550**	0.378**	0.695**	0.479**
	(0.093)	(0.050)	(0.031)	(0.076)	(0.045)	(0.029)
Observations	466	1,302	3,538	466	1,302	3,540

*p<0.05; **p<0.01

Note: For the "Community Over Individual Transfers" dependent variable, community preference is coded as '1,' and individual preference is coded as '0.'

Table A.7: India Results By Sample

	Dependent variable:					
	Community Over Individual Transfers			Protecting Job Identity		
	(Coal Country)	(Cross-Pressured)	(General Population)	(Coal Country)	(Cross-Pressured)	(General Population)
Fossil Fuel Employment	−0.062*	0.070	0.018	0.039	0.029	−0.059
	(0.031)	(0.041)	(0.044)	(0.027)	(0.041)	(0.042)
Age	−0.002*	−0.002	−0.002*	0.002	0.0003	−0.0001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Gender: Male	0.055	0.010	0.012	0.095**	−0.005	−0.014
	(0.032)	(0.025)	(0.024)	(0.028)	(0.025)	(0.023)
Education: High	0.013	0.008	0.050*	−0.089**	−0.012	−0.068**
	(0.027)	(0.025)	(0.023)	(0.023)	(0.025)	(0.022)
Did Not Vote for BJP	−0.012	0.051*	0.007	0.047*	−0.027	0.006
	(0.026)	(0.026)	(0.023)	(0.023)	(0.026)	(0.022)
Constant	0.611**	0.676**	0.543**	0.494**	0.654**	0.664**
	(0.071)	(0.057)	(0.052)	(0.062)	(0.057)	(0.050)
Observations	1,522	1,523	1,989	1,537	1,531	2,027

*p<0.05; **p<0.01

Note: For the "Community Over Individual Transfers" dependent variable, community preference is coded as '1,' and individual preference is coded as '0.'

M Community and Identity Literature

Existing literature indicates strong group-based affinities in coal-producing regions in both the United States and India. Within the coal communities in both countries, coal is often equated with a sense of economic security, shared community, working-class solidarity, masculine pride, and national power (Bell, 2009; Bell and Braun, 2010; Bell and York, 2010; Lahiri-Dutt, 2014; Scott, 2010). Such popular imaginations create a strong coal identity based on perceived solidarity and a shared interest in protecting in-group status. This section provides a review of published work from interdisciplinary sources on the nature of coal identities in the two countries.

In the US, coal workers have historically maintained a strong shared identity based on their employment in the coal industry. These communities have tended to be dependent on coal mining over multiple generations, as many miners note that their grandfathers' or even great-grandfathers' generation had been employed in the mining industry (Carley, Evans and Konisky, 2018; Duncan, 1999, 31-32).[32] The influence of coal also extends beyond those immediately employed by the industry (Bell and York, 2010). As Carley, Evans, and Konisky (2018, 136) note about residents of coal country:

> The historic roots of coal not only steer individuals toward the profession but also shape the broader culture within these communities. Scholars have identified previously that a strong sense of identity to extractive industries is common, and we found significant evidence of coal culture in Appalachia. Coal was frequently framed as the common bond–or identity–that held the entire community together. This sense of identity is amplified by strong attachments to location, landscape, and personal networks, which not only makes it challenging for individuals to generate a conception of self that transcends coal, but also makes it particularly difficult psychologically for individuals that need to leave Appalachia for new employment opportunities.

Indeed, the transition away from coal triggers a "dual crisis" in coal communities—an existential threat from the loss of an industry and an onslaught on their identity and pride as coal miners. In some rural communities in Western Colorado, the coal industry has long served as the primary source of employment and tax revenue and the pillar of community pride (Mayer, Smith and Rodriguez, 2020). During his fieldwork in Shale County in Appalachia, Lewin (2019, 56) discovered that most residents in the region believed that mining offered "the only real opportunity for gainful employment in the county," and that community organizations depended on the taxation of, and donations from, coal companies. The Shale County community has historically constructed a heroic image of the miner as an embodiment of the region's cherished values: "independence, self-sufficiency, hard work, devotion to family, selflessness, and dedication to community" (Lewin, 2019, 58). The decline of the mining industry, however, has forced residents onto welfare and undermined their shared pride and solidarity.

Aside from their employment in the coal industry, coal workers' sense of perceived similarity also originates from their common ethnic and regional identities. The Appalachian region, one of the main coal-producing areas in the U.S., has been home to Scottish and Irish immigrant communities since the 18th century (Douglas and Walker, 2017). Due to its geographical isolation and lack of arable land, the region did not attract slave plantations and thus remained relatively culturally homogeneous (Douglas and Walker, 2017). Such homogeneity contributed to an image of white landscapes in rural America and a racial narrative of white settlers making a living in the empty American heartland (Holloway, 2007; Kojola, 2019; see also Trotter (2015) for how coal identities cross racial lines in parts of coal country).

Coal extraction is also deeply linked with American nationalist imaginations, as natural resources often come to embody the nation and coal-mining as a pathway towards citizenship (Kojola, 2019; Whitehead, Jones and Jones, 2007). In American popular culture, European immigrants to the rural heartland are often depicted as

[32] Duncan (1999) presents a wealth of ethnographic interview evidence from coal miners in Appalachia to buttress this claim, e.g.: "Whatever I've made had gone back into this country. I've got five kids, and they all live here. And I suspect their children will live here" (24); "Most of our key people at our operation have been with Daddy since they were young, so there is a bond there with them and their families" (29); "These coal mines, it's usually generation after generation, father to son, uncle, nephew" (31); "I think it's unique here in that you're either exposed to the mining industry, which is high skill, or nothing. Or welfare. We don't have a lot of work that's in between the two...I think it's apparent to everybody that we could use something other than coal. But I wonder if you could get five hundred people that would work for a wage lower than the miner? Maybe they would just say, "The heck with it, I'll draw welfare," and maybe get a bit less and not work...Really, coal is about all we got" (58).

hard-working individuals striving to realize their "American dream" (Leap and Thompson, 2018). Scott (2010, 143, 168) describes how coal-rich Appalachia contributes to the cultural construction of the American nation:

> The patriotic sacrifices of miners constitute the terms for Appalachia's membership in the American nation... Appalachia's marginal status as a natural resource colony ironically provides coalfield communities a way to claim a core national identity. The hardships of mining can be read as evidence of their patriotic devotion to America and their central role in the national economy.

The unionization of coal workers provides yet another anchor for their shared identity. Residents of West Virginia, for instance, have a deeply rooted identity linked to "Union People," as the union served to unite the coal workers around a collective identity, providing them economic security and a sense of respect in the broader community (Bell, 2009). The denial of these "Union People" to work for a community coal mine meant not only a loss of employment but also a loss of identity and a breakdown of the community's social fabric (Bell, 2009).

For male coal workers—the vast majority of those working in mines—coal employment is often tied to a notion of hegemonic masculinity. In the words of Maggard (1994, 30), masculinity in the coal camps has been equated with "a willingness to work in dangerous conditions." Beckwith (2001, 310) adds that the mining industry in certain regions, such as the Central Appalachian coal camps, has been so male-dominated that "miner" and "male" identities have become virtually exchangeable. Fearing the loss of social status and masculine pride, men in these coal regions have been more reluctant to speak out about the consequences of irresponsible mining practices. As an environmental activist in Central Appalachia puts it, "Men were the coal miners, so it's a little harder for them to let go of that sense of, you know, this is how I put cornbread on the table" (Bell and Braun, 2010, 806).

The collective identities of coal communities have also been exploited by the coal industry to mobilize popular opposition to environmental regulation. In West Virginia, local coal companies have supported the (faux) "grassroots" organization "Friends of Coal" in an attempt to construct an "industry ideology" that centers the West Virginian identity on coal production (Bell and York, 2010). In a similar vein, coal producers in Central Appalachia promote a narrative of shared coal heritage that portrays themselves as guardians of the region's cultural heritage (Lewin, 2019). These narratives induce local residents to "embrace - and even identify with - coal not just as a market of community identity, but as a total 'way of life"' (Lewin, 2019, 54). The industry's efforts to construct what Bell and York (2010) call a "community economic identity" explain how the coal industry, despite its diminishing economic importance, still occupies a central position in regional identities and manages to mobilize popular support for its preservation.

In addition to their resistance to environmental movements, residents of coal-producing regions have turned to populist politicians in the hope of "bringing back the mines" and the "way of life" associated with the mining industry (Kojola, 2019). Lewin (2019) argues that Appalachia's "subordinate relationship" to the rest of the country has conditioned locals to feel like they are abandoned and devalued by the federal government. Such perceptions fuel pro-industry, pro-fossil fuel views that resonate with the rhetoric of right-wing populist leaders (Lewin, 2019). At the same time, coal communities have grown increasingly suspicious of what they see as a liberal "attack" on coal and the "liberal political agenda" to replace fossil fuels with renewable energy (Olson-Hazboun, 2018).

The loss of mining triggers a keen perception of an existential threat among Indian coal miners. Two factors contribute to their greater vulnerability. First, a high percentage of Indian coal workers are employed informally and lack the social benefits of secure employment. Siddiqui and Lahiri-Dutt (2015) estimate that in 2015, more than 42%, or an estimated 1.4 million, of mining and quarrying households are "marginal," earning irregular incomes and lacking access to services and utilities. In Ramgarh, one of the top five coal-producing districts in Jharkhand state, one in four households depends economically on local coal mining, yet only 7% of households have a formal job in the industry (Bhushan, Banerjee and Agarwal, 2020, 11). Lahiri-Dutt (2003) estimates that in the coal deposits in the Raniganj coalbelt, over 500,000 people are employed in the illegal mining sector, surviving on a mixture of coal scavenging and subsistence farming.

Second, the emergence of the coal industry destroyed local environments, significantly reducing alternative employment opportunities in the agricultural sector. In the Barjora colliery area of West Bengal, participation in the agricultural sector has declined from 62% in the pre-mining period to merely 3% in the post-mining period (Banerjee and Mistri, 2019). As of 2019, up to 55% of the residents in the area were employed in the mining industry (Banerjee and Mistri, 2019). Similarly, in the Ib Valley coalfield of Western Odisha, 51% of local residents depend on mining as their primary source of income (Das and Mishra, 2015, 86). This is due to the common practice among Indian coal mining companies of acquiring farmland and and then offering mining jobs to the former landowners

(Bhushan, Banerjee and Agarwal, 2020, 95).[33] Aggarwal (2020) argues that "India is a coal-dependent economy and is home to many towns and cities whose entire economy is directly or indirectly based on coal...highlighting how deeply connected to coal, the economy of such regions is." The closure of coal mines in India, Aggarwal (2020) notes, will need to accommodate social and economic disruptions, with new forms of economic opportunities and infrastructure being made available "to support and enhance the livelihoods of those dependent on coal."

The economic vulnerability of India's coal communities is compounded by the government's lack of planning in the transition away from coal. The socio-economic consequences have been especially severe in older coal mining regions such as Jharkhand, where many mines have closed down due to unprofitability (Bhushan, Banerjee and Agarwal, 2020). As of 2020, 106 out of 203 leased mines in Jharkhand were temporarily or permanently closed and the percentage of closed mines was even higher in certain districts (Department of Mines and Geology, 2020). All five mines were closed in Jamtara as well as 16 out of the 25 mines in Bokaro (Bhushan, Banerjee and Agarwal, 2020, 44). The closure of coal pushes coal communities further into poverty. For skilled workers, alternative job opportunities in the region are limited, and for unskilled and uneducated laborers, there are few fallback employment options (Bhushan, Banerjee and Agarwal, 2020, 95). Small businesses and local retailers also suffer from mine closures, as many developed initially due to the emergence of coal mining (Bhushan, Banerjee and Agarwal, 2020, 96). Local residents also expressed concern that the economic fallout from mine closures could lead to a spike in crime and substance abuse, undermining the region's social stability (Bhushan, Banerjee and Agarwal, 2020, 96).

The tremendous vulnerability of India's coal communities has amplified a strong economic identity in the coal industry. In the words of Bhushan, Banerjee, and Agarwal (2020, 95), the "predominant perception of dependence on coal for income makes it impossible for most people in the mining areas to imagine a future without coal mining." A survey of Ramgarh residents demonstrates a "palpable sense of dependence" on coal, with 77% of locals stating that coal mining contributed to their income in "some way"; this "reflects a 'coal-centered' life that has evolved in these old mining regions over decades and the complex economic fabric it has helped create" (Bhushan, Banerjee and Agarwal, 2020, 87). Similar to American coal communities, many Indian coal workers report that older generations of their family have been employed in the coal industry and many even directly inherited their jobs from their fathers (Bhushan, Banerjee and Agarwal, 2020, 95). The district's coal-centered economic identity extends beyond individuals working directly in coal mining. Those gathering and selling coal, laborers who transport slurry, and those engaged in leveling and loading also expressed a strong economic dependence on the coal industry (Bhushan, Banerjee and Agarwal, 2020).

Coal miners in India also associate their work with feelings of nationalist pride as well as working-class solidarity. Lahiri-Dutt (2014), in her work on the Indian "coal nation," demonstrates that coal played a vital role in helping India form a post-colonial identity. While coal mining was historically associated with the colonial state, after 1947, as the newly independent state exerted control over its natural resources, the industry assumed a new role as a symbol of national independence and modernization (Lahiri-Dutt, 2014). Coal mining created a working class of migrants and indigenous laborers and subsequently gave birth to the trade union movement, which united workers against the exploitation of coal companies (Lahiri-Dutt, 2016). The nationalization of coal mining in 1971 further fostered an image of a "national coal" identity, which is seen to have played a pivotal role in the country's industrialization (Lahiri-Dutt, 2016).

Though concerns for community pride and shared identity perhaps amplified workers' demands to retain the mining industry, the main driving force behind coal communities' pro-mining activism is their perception of an existential threat from mine closures. In Naginimora, a town in the northeastern state of Nagaland, local residents have long resisted the state government's takeover of their mining rights. A Konyak landowner explains why locals rejected the state government's offers of employment in exchange for their land:

> They promise us employment and other benefits, but we have none of that. How can they take land from people who are uneducated and cannot read and write? We have to protect it, so we have all said no to the government's move. (Kikon, 2019, 120)

McDuie-Ra and Kikon (2016, 263-264) discusses how coalfield rights have remained within tribal community institutions and how members of tribal groups have resisted government coal mining bans. In the words of a female

[33] Such practices have at times triggered local resistance to coal extraction, particularly among the indigenous Adivasi people who inhabit much of the country's coal-rich jungle areas. See also: Banerjee and Mistri, 2019; Dasgupta, 2020; Lahiri-Dutt, 2003; Padel and Das, 2010; Oskarsson, 2018.

coal trader,

> I told the minister, you have come to this village for this first time and then order us to stop coal mining...you are coming to stop what is being produced from our own farm—the coal is coming out from our own land. It is not your land, it is our land and we will not allow you to ban it.

For residents of coal-rich regions, coal holds the promise of a better life and a transformation of their fortunes. Kikon (2019, 120) found that "Naga villages perceived oil and coal as resources that could radically transform their lives ... [and] people fantasized about a prosperous carbon future and potential benefits from oil exploration." For even more marginalized communities, coal might be the only source of viable income. In the Raniganj collieries, local individuals excluded from the formal mining industry have attempted to reassert their claims on the coalfields by drawing on their traditional rights and customs (Lahiri-Dutt, 2003). In Meghalaya, where the government issued a mining ban, indigenous communities invoked their special status granted by the Indian Constitution to justify their mining rights (Lahiri-Dutt, 2017; McDuie-Ra and Kikon, 2016; Stokke, 2017). A local villager defends her community's engagement in "illegal coal mining":

> Yes, we dig coal–this is our main income. But tell me, why would we not take coal from here? Was this not the land of our ancestors? The collieries came and took our lands from us. They took our lands, and gave us nothing in return. They took our forests, and now we have no land, no forests. Why is this coal not ours? It is ours. Of course I will take it! (Lahiri-Dutt, 2017, 799)

Historically, India's coal communities were ethnically concentrated with tribal and semi-tribal groups (designated as Scheduled Tribes by the Indian government), although in recent years Indian coalfields have attracted migrants from nearby regions (Das and Mishra, 2015; Gupta, 1985). This demographic composition can be explained by the history of coal mining in India. As large-scale mines were opened in forest areas, local inhabitants—often indigenous populations and low-caste peasants—were removed from their lands and incorporated into the mining economies.[34] Mining companies drew laborers from both displaced locals and migrants from neighboring districts (Gupta, 1985; Lahiri-Dutt, 2003). In the Laitrumbai region, for example, Bangladeshi migrants were willing to work for lower wages than local laborers because they would have been paid even less for doing similar jobs in their home country (Lahiri-Dutt, 2014, 93). The Rabha and Hajong minorities also seek temporary employment in the mining sector during the agricultural lean season (Lahiri-Dutt, 2014, 93). These migrant laborers are commonly seen by local residents as threats to their cultural identity and economic welfare (Lahiri-Dutt, 2014, 93). Nevertheless, even among migrant miners, who typically come from tribal and low-caste communities, there has been a "persistence of strong traditional kinship and family ties from which the miners used to draw support and succour" (Gupta, 1985, 26). Scholars underscore how local opposition to state-led bans on coal mining have been led by tribal groups, including the Movement for Indigenous Peoples' Rights and Livelihood (MIPRL), who have highlighted constitutional protections for "tribal rights over land and land use" (McDuie-Ra and Kikon, 2016, 266).

To conclude, coal identities in India appear to be driven by a sense of existential threat; such threats also define coal identities in the U.S., alongside perceptions of community heritage and solidarity. American coal communities are tied together by strong feelings of regional identity, ethnic similarity, and shared culture. In India, members of mining communities also come from tribal backgrounds and low-caste ethnic affiliations. The gradual disappearance of the industry triggers an existential crisis for coal communities in both countries, mobilizing community members' economic identities and generating widespread resistance against mine closures. For American miners, the energy transition threatens to end their traditional "way of life." Similarly in India, for those affiliated with the mining industry, mine closures pose a threat to their basic subsistence.

[34] Gupta (1985, 18) writes, "The mines in both Bengal and Bihar came to be located in remote, formerly jungle areas–inhabited by tribal and semi-tribal populations and low-caste Hindus engaged in a somewhat crude form of agriculture and also partly dependent on the gathering of forest produce. In the early years virtually the entire mining labour force was composed of tribal and low-caste peasant and artisan groups. From the earliest days of mining, labourers were drawn from villages either within the two coal bearing districts or neighbouring districts. Till 1921 the overwhelming majority of the mine labour force consisted of local people or at most short-distant migrants."

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