Climate Action from Abroad: Assessing Mass Support for Cross-Border Climate Compensation

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Abstract

Resource transfers from developed to developing countries to help prevent and adapt to climate change play a central role in international efforts. At the same time, countries are domestically grappling with how to transition, in part because key industries and their workers will be negatively impacted by policies designed to mitigate emissions. A growing literature explores the role of how various national groups can compensate and invest in domestic communities that will lose materially from decarbonization policies, but little research has focused on if and how these groups could support similar international efforts. This paper investigates public opinion regarding compensation in the context of international transfers, leveraging a novel sampling strategy that includes both general population samples and targeted samples of individuals living in heavy fossil fuel producing regions. In samples from the United States, we explore decisions to invest in compensation domestically or, at a different household cost, for workers in India. We experimentally vary the cost of such efforts, with foreign transfers reflecting a cheaper route to achieving identical emissions reductions. We observe a home country bias, but find that support for international transfers increases when voters capture larger cost savings from emissions reductions abroad. We then study public opinion in India, where respondents selected between a costly option that compensates domestic workers but requires proportional reduction in emissions versus an option that has the United States fund compensation but requires a greater than proportional reduction in emissions by India. The majority of respondents prefer the former. Our findings underline the challenges in building popular support for cross-border climate transfers, while also pointing to pathways by which such opposition may be mitigated.

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1 Introduction

Reducing fossil fuel emissions worldwide is—and will remain—a major challenge that needs to be overcome in order to limit climate change (Keohane and Victor, 2016). Many developed countries have started to implement policies or formulate goals to reduce greenhouse gas emissions. But these countries still face significant technological battles and policy implementation barriers. In addition, the international politics of climate change further complicate the matter. Developed countries have disproportionately contributed to the problem of climate change through decades of fossil fuel driven growth, but accepting historical responsibilities is a highly conflicting issue.

Developing countries face similar political problems, in addition to a host of additional obstacles. Reliance on fossil fuel for energy production is ubiquitous. Coal, for example, is used for over 70% of India's electricity (MiningTechnology, 2020). This is exacerbated by the fact that many power plants in the developing world are old and inefficient. As a result, more greenhouse gases are released per unit of power compared to more efficient plants. Additionally, in some developing nations, coal is an industry with historically deep roots. For example, in India, coal deposits and extraction of coal comprise one of the largest domestic sectors. Indeed, Coal India Limited is the largest coal mining company in the world. Therefore, moving away from coal is likely to elicit strong and complicated domestic political resistance (Tongia, Sehgal and Kamboj, 2020; Busby et al., 2021). Developed countries with large coal deposits, like the United States, face similar challenges.

Taming emissions in developing countries is important not just because of their future growth and development. Developed country emission stabilization or even declines have been facilitated by deepening trading relationships with developing countries. However, this has had the effect of simply shifting a large amount of emissions somewhere else (Peters et al., 2011). Truly global attempts at decarbonization will require substantial progress in developing countries, not just developed countries, and support for developing countries' efforts at mitigation has long been discussed by scholars and policymakers. Economic models suggest that transfers could be Pareto improving (e.g., Buchholz and Konrad, 1995). Other works discuss how to estimate the implied amount of transfers (Landis and Bernauer, 2012). Compelling philosophical notions of climate justice undergird the idea of international transfers (e.g., Mattoo and Subramanian,

2012; Page, 2008). The principles of historical responsibility, polluter-pays, and equal per capita emissions all entail financial and technological transfers from developed to developing countries. Compensation for climate change effects also requires that high-emissions developed countries compensate developing countries. Inequality and justice have been central issues at every major environmental conference since the 1972 United Nations Conference on the Human Environment (Parks and Roberts, 2008).

Investment and aid for developing countries on climate change issues has grown over time, but observers insist that much more is needed (Yeo, 2019). Most of this funding is used for transporation projects, renewable energy, and energy-efficiency (Macquarie et al., 2020). These priorities parallel domestically sourced funding. In fact, little attention has been focused on transfers that could go to support industries to withdraw from polluting activities whilst preserving the welfare of their employees. While a significant literature has prioritized the politics of international technology investments and transnational capital transfers, the study of transfers directed at industrial support for workers' compensation has been left at the margins.

In this paper, we engage with questions centered on the role of international transfers that deal with the transition of fossil fuel producing industries in developing countries (Busby et al., 2021). There are numerous angles with which to approach this subject, including how to use aid agencies and related debt financing schemes. We focus on questions related to public support for international transfers.

In particular, we concentrate on public attitudes toward using funds generated from higher energy prices to compensate displaced workers. In the United States, we isolate tradeoffs between allocating money raised from higher costs to compensate domestic workers who will lose jobs from decarbonization or transferring funds raised from lower costs to compensate workers overseas. In India, we isolate tradeoffs between compensating displaced workers using domestic funds versus foreign funds. In the latter, larger emissions reductions are required by India due to the provision of transfers. While hypothetical, these contrasts help to provide a window into how voters in developed and developing countries develop their views—and potentially diverge—on the topic of international transfers. Within each type of country, voters in particularly vulnerable regions may have different opinions on the ideal policy. On the one hand, more economically vulnerable residents exposed to the labor costs of decarbonization may have especially strong views on the fact that workers at home should be protected and compensated, and this may diverge

significantly from the average citizen's view, which may be more efficiency oriented. On the other hand, most nationals may resent outsourcing action to foreign actors or having to make concessions in exchange for transfers.

To shed light on these considerations, we focus on how respondents in different regions of both a potential donor and a potential recipient country evaluate mechanisms of redistribution that tackle compensation for workers at home or abroad. Our approach of asking respondents in both a potential donor and recipient country is novel, and also reflects recent trends to consider public opinion about aid in recipient countries (e.g., de la Cuesta et al., 2020, 2019; Jamal and Milner, 2021). Additionally, our emphasis on the views of subnational groups with political salience contributes to a growing research agenda emphasizing the need to document and account for the varying preferences of coalitions of voters regarding 'just transition' climate policies (Gaikwad, Genovese and Tingley, 2021).

We find in the United States relatively low levels of support for foreign transfers. We further observe that individuals in fossil fuel producing regions exhibited largely similar responses to general population samples. This home country bias becomes more extreme when costs are higher, suggesting a pathway forward for policymakers seeking to build support for cross-border transfers: International transfers funded by low cost payments that generate identical net reductions in emissions have the greatest likelihood of gaining mass support. Meanwhile, in India we observe majoritarian reluctance to accept foreign transfers when they came with requirements for greater emissions reductions. This held even under higher costs; Indian voters are willing to pay higher personal costs to forestall foreign transfers that come with conditions viewed as unjust. In India we also found relatively few differences across respondents from fossil fuel producing regions compared to the general population.

Our note proceeds as follows. Section 2 discusses several relevant strands of literature and delineates expectations regarding public opinion for international climate transfers in different groups in developed and developing countries. Section 3 introduces our research design, including our sampling strategy for the US and India, and presents our results. Section 4 concludes.

2 Background and Argument

Most work around international transfers related to the environment focuses on issues such as technology transfers or renewable energy financing (e.g., De Coninck, Haake and Van Der Linden, 2007; Sarkar and Singh, 2010). The money flow to technology and green energy is a crucial piece of global climate diplomacy. Unsurprisingly, it is an important part of the Paris Agreement (e.g., Articles 9-11), with many developing countries' "Nationally Determined Contributions" written in a way that is contingent on support from developed countries (Pauw et al., 2020). More generally, it is agreed that transfers may help induce broader participation in climate agreements (Barrett and Stavins, 2003), with the Paris and Kyoto agreements both highlighting this phenomenon. The case for international climate transfers tends to pick up in the news around international climate agreements, while the need and desire for such transfers is reflected in how the media talks about climate change in developing countries.[1]

Despite this scholarly and public policy interest in transnational climate exchanges, to our knowledge, there has been much less consideration of policies that deal with international transfers related to helping developing countries achieve a "just transition." This includes policies and programs that deal with the transition of individuals and communities employed in fossil fuel industries (Gaikwad, Genovese and Tingley, 2021). In part this can help to start to address domestic political obstacles. These challenges are important and large in the case of developing countries that are electoral democracies, where coalitions of voters have strong influences on policy outcomes. Recent research highlights the need to think critically and ambitiously about these domestic political obstacles (Busby et al., 2021). Pai and Zerriffi (2021) estimates that over 700,000 Indians are directly employed in coal mining, and millions more are employed in implicated sectors. Furthermore, the Indian railroad system is heavily subsidized by work done transporting coal. Accelerating the pace of a coal transition faces not simply technical obstacles but also substantial social and political challenges (Chattopadhyay et al., 2021).

Some scholarship has begun to examine the determinants of preferences for international transfers related to climate change. In pioneering work, Buntaine and Prather (2018) show that in countries like the United

[1]See, for example: "These are developing countries, where resources to mitigate the effects of climate change are sparse. Thus, they need international support in dealing with this transnational environmental phenomenon. The media portrayal of climate change has, therefore, reflected this reality"(Vu, Liu and Tran, 2019, 7).

States, domestic mitigation efforts are significantly preferred to international mitigation projects, and that nationality is an important identity conditioning support for climate policy. Importantly, their experimental analysis of United States population attitudes and behaviors suggests that average Americans do not have much of an appetite for international transfer schemes. Their experimental treatments, however, focus mainly on the political images as well as the efficiency of the location of the targeted mitigation. They do not focus on specific economic or political costs at home or abroad, nor do they zoom into vulnerable communities that may bear such specific costs.

Gampfer, Bernauer and Kachi (2014) implemented survey experiments in the United States and Germany to understand what institutional design characteristics are likely to garner more public support for climate funding. They find that climate funding receives more public support if it flows to efficient governments, funding decisions are made jointly by donor and recipient countries, funding is used both for mitigation and adaptation, and other donor countries contribute a large share. Contrary to what one might expect, climate change damage levels, income, and emissions of potential recipient countries have no significant effect on public support. These findings suggest that finance mechanisms that focus purely on compensating developing countries, without contributing to the global public good of mitigation, will find it hard to garner public support.

Other work by Svenningsen (2019) focuses on individual preferences over the international distributive outcomes of climate change. In this study participants could allocate real money across different climate programs targeted at different regions. Kline, Mahajan and Tingley (Forthcoming) leverage an incentivized laboratory experiment to examine a multistage bargaining setting where players have different capacities to pay for mitigation and different vulnerabilities. They find, inter alia, that less vulnerable players do not take advantage of more vulnerable players. In an ultimatum lab experiment, Gampfer (2014) similarly finds that vulnerable respondents reject many unfair offers. Both studies point to the willingness to help more vulnerable parties even at the expense of their own material utility.[2] However, this work is still mostly focused on domestic challenges to achieve efficient mitigation programs.[3] These studies largely ignore the subnational divisions that could make effective international mitigation politically unachievable, or vice

[2]Other domains, such as trade policy preferences, highlight similar patterns of inequity aversion (e.g., Lü, Scheve and Slaughter, 2012).

[3]Though in one interesting study Lange et al. (2010) survey climate negotiators throughout the world to understand what types of equity are important. They find that negotiators tend to prefer equity arguments that reduce their own costs.

versa – that could explain economically inefficient international transfers choices.

In our study, we focus on several themes, some of which have been partially touched on in earlier work. Like Buntaine and Prather (2018), we are interested in whether there exists a home country bias around spending associated with mitigation policies. In particular, we focus on spending that includes compensation for workers who are dislocated due to mitigation policies (Gaikwad, Genovese and Tingley, 2021). Such policies are being deployed in countries around the world as activities like coal mining, for example, are phased out. If proposals for international transfers include money for facilitating domestic political economy transitions, how will members of the public view these transfers?

This question is important to consider for countries such as the United States in light of the fact that most cost-effective mitigation programs will be in developing countries, so developed countries as a whole may be economically better off outsourcing mitigation abroad (e.g., Calvin et al., 2009; Olmstead and Stavins, 2012). And yet, just like other industrialized countries, the United States is undergoing its own transition and has regions where fossil fuel production is a salient employer and revenue generator. It is therefore unclear if economic efficiency can drive enough support for international transfers after all, or if it only drives it in communities whose existence does not depend directly on fossil fuel activities. The possible divergence of transfers opinions between the average population and more existentially concerned communities, as well as the magnitude of such divergence, is unknown.

Furthermore, little is known about how price sensitivity impacts home country bias in this context. For example, as costs born by individuals (e.g., through increased energy costs) are lower if international transfers are used, does this lead to more support for transfers overseas? If developing countries can more efficiently achieve reductions then the cost of transitions would be lower in developing countries. However, a strong home country preference could undermine such support even in a low cost case. These considerations are salient given the foundational role that transfers play under schemes like the Paris Agreement.[4]

Our question is relevant to public opinion in developing countries as well. In these countries, a major point of contention focuses on the extent of emissions cuts developing countries should make in order to receive transfers from richer countries. If poorer countries receive transfers to help transition fossil fuel

[4]Home bias has been found in public positions towards the ambitiousness of Paris Agreement pledges in other countries like the United Kingdom (Bayer and Genovese, 2020). Still, these findings do not pertain to how transfers could help domestic workers versus international workers in efforts to curb emissions.

workers to other sectors, then a greater degree of emissions cuts might be required because these cuts would lead to more job losses in the recipient country as opposed to the donor country. Alternatively, costs for transitioning workers can be entirely borne by developing countries themselves, in which case emissions cuts would be lower and fewer individuals would lose their jobs. Here, too, there stand to exist relevant sub-national divergences of opinions about international climate transfers that seek to promote mitigation.

In this paper we study support for transnational climate transfers focusing on the case of the world's two largest democracies and major emitters: the United States and India. To empirically investigate the determinants of public opinion on international transfers to compensate workers in polluting sectors, we fielded a number of original surveys. Specifically, in each country we focused on three groups: a policy vulnerable group where a high density of people exposed to the costs of passing an ambitious climate policy reside; a policy *and* climate vulnerable group where people exposed to both policy costs and costs of adaptation to climate change itself reside; and a baseline group where neither policy costs nor climate change costs are significant.

We expect these groups to have different sensitivities to mitigation policy costs, and therefore different sensitivities to home bias and the costs of transfers. It is possible that in developed countries (i.e. the United States) the policy vulnerable group may be the group that supports higher domestic mitigation costs in exchange to keep jobs at home. As for developing countries like India, the policy vulnerable group may want to protect themselves the most, i.e., may want to have fewer of them lose wages and welfare, and therefore prefer a policy that protects jobs at home. It is possible that in both the United States and India the policy vulnerable group may want to protect themselves the most: American coal workers might be most in support of policies that facilitate coal mine closures in India as opposed to the United States, while Indian coal workers are predicted to oppose cross-border transfers that induce greater job losses in India. Vice versa, we expect the other groups, and especially the general population, to be more open to international transfers especially if transfers reduce their private material costs.

3 Research Design and Results

3.1 Sampling Strategy

We implemented surveys in the United States and India using three sampling schemes (see Gaikwad, Genovese and Tingley 2021 for additional substantial detail). First, we implemented nationally representative samples ("General Population"). This sample is construed to neither be particularly exposed to disruptions due to policy that reduces the use of fossil fuels or particularly exposed to physical shocks from climate change (e.g., flooding, droughts). Second, we constructed a sample of individuals living in regions that produce coal ("Coal Country"). Third, we constructed a sample of individuals living in regions that both produce fossil fuels and are particularly exposed to physical risks from climate change ("Cross-pressured", (Sprinz and Vaahtoranta, 1994)). As a result of this sampling strategy, we had substantially higher numbers of individuals who identified as being employed directly (or a member of their immediate family) in fossil fuels. Detailed information about our sampling strategy in the United States and India are provided in Appendix A. Appendix B provides descriptive statistics of each of our samples.

3.2 United States Survey Design

We asked respondents to indicate their preference between two hypothetical responses the government could take to enact the same reduction of global emissions.

> Suppose now that in order to combat climate change, the US government can choose between two options, which would result in the same reduction of global fossil fuel emissions.
>
> Option A. The US government attempts to reduce the use of fossil fuels at home. The average household energy cost in the US is increased by $64. These funds are used to compensate American workers in the coal and oil industries who will lose jobs due to policies implemented in the US.
>
> Option B. The US government attempts to help the government of a developing country like India reduce the use of fossil fuels. The average household energy cost in the US is increased by [**$8** / **$32**]. These funds are used to compensate Indian workers in the coal and oil industries who will lose jobs due to policies implemented in India.
>
> The cost of compensation is lower in the second option because wages are lower in developing countries, making it far cheaper to compensate workers who lose jobs there than in the US.
>
> If you had to choose, which options would you pick?

Below we refer to Option A as "Higher costs, domestic compensation" and Option B as "Lower costs, foreign compensation".

3.3 United States Results

Table 1 provides the findings of our United States surveys. Column 1 indicates the proportion of each sample that indicated support for the policy option in which the United States government focuses efforts on reducing fossil fuel emissions domestically, with average household energy costs rising in the United States by $64. Column 2 outlines support for international transfers that result in the same net reduction of emissions. The upper panel of Table 1 considers an international transfers policy that would only raise average household energy costs in the United States by $8, while the lower panel compares the option with an international transfers policy that raises average household costs by $32. Appendix Figure 3 graphs these policy comparisons.

		Support for Higher Costs & Domestic Compensation	Support for Lower Costs & Foreign Compensation
$8 Higher Cost	General Population (n=936)	66%	34%
	Cross-Pressured (n=716)	68%	32%
	Coal Country (n=260)	66%	34%
$32 Higher Cost	General Population (n=926)	74%	26%
	Cross-Pressured (n=712)	73%	27%
	Coal Country (n=256)	78%	22%

Table 1: *US samples and preferences for Option A (higher costs, domestic compensation) and Option B (lower costs, foreign compensation)*

A striking pattern of results emerges from our analysis. We note, first, that across all of the samples, and across both the $8 and $64 international transfers policy choices, the majority of American respondents eschew international transfers. Prior work has established that American voters in general prefer domestic transfers to foreign transfers due to out-group aversion (Buntaine and Prather, 2018). At the same time, a wide body of scholarship underlines the personal cost sensitivity of the public to climate policies (Bechtel and Scheve, 2013). Our research design paired these theoretical concepts, probing explicitly whether American citizens prefer higher cost domestic transfers versus low-cost international transfers that achieve the same net reductions in emissions. Evidently, voters sharply disfavor foreign transfers, even if it means that they

must incur significantly higher costs to fund domestic transfers. This indicates that a referendum to fund international transfers with low cost price increases in the United States would not pass muster.

That said, our results do demonstrate cost sensitivity in each of the samples, with the most pronounced effect in Coal Country. When comparing the $64 domestic transfers cost with the $32 international transfers cost, a full 78% of Coal Country respondents chose domestic transfers. However, when presented with the $8 international transfers cost, support for domestic transfers fell precipitously, to 66%. In the General Population, support for high-cost domestic transfers falls from 74% at the $32 international transfers option to 66% at the $8 international transfers option. The Cross-Pressured group also registers a decline in support from 73% to 68%.

Table 2 analyzes formally the effect of these cost treatment effects for each of our samples; it reports the results of OLS regressions that adjust for pre-treatment covariates.[5] Each of these treatment effects is qualitatively large and statistically significant. These findings are salutary in that they point to a way forward for policymakers seeking to utilize cross-border transfers to achieve international cooperation on climate change. Table 2 shows that support for emissions reductions through international transfers can be inculcated, so long as it is done at very low costs to domestic voters.

We point, additionally, to the preferences of individuals employed in the fossil fuels sector in Table 2. In the General Population survey, those employed in fossil fuel producing jobs are 20 percentage points more opposed to the United States government sending transfers to compensate Indian workers in the coal and oil industry. This is a large effect, underlining broad sectoral opposition to international transfers in the United States. There is more muted opposition among fossil fuel workers in the Cross-Pressured sample. Interestingly, within Coal Country, we do not discern any difference between coal workers and those not employed in coal, indicating solidarity between those who are and who are not employed in coal.

A noteworthy feature of our findings is the similarity in preferences registered across the General Population, Cross-Pressured, and Coal Country samples. Prior work demonstrates that fossil fuel producing regions differ sharply in their preferences for climate policies compared to the General Population, with Cross-Pressured samples holding a middle ground (Gaikwad, Genovese and Tingley, 2021). Voters in fossil fuel producing regions prefer transfers to fossil fuel workers who stand to lose jobs from climate policies,

[5]Appendix Table 7 outlines the treatment effects in binary format, evidencing a similar set of results.

Table 2: Effect of costs on support for policy with domestic compensation

	Dependent variable:		
	Support for Higher Costs and Domestic Compensation		
	(General Population)	(Cross-Pressured)	(Coal Country)
Higher Cost	0.068***	0.052**	0.108***
	(0.022)	(0.025)	(0.041)
Fossil Fuel Employed	0.196***	0.048*	−0.017
	(0.046)	(0.028)	(0.043)
Age	0.001**	0.002*	0.001
	(0.001)	(0.001)	(0.001)
Male	0.016	−0.012	−0.080*
	(0.022)	(0.026)	(0.043)
Income: $10,000-19,999	0.005	0.050	0.216***
	(0.053)	(0.051)	(0.074)
Income: $19,999-29,999	0.058	−0.067	0.267***
	(0.051)	(0.051)	(0.074)
Income: $29,999-39,999	0.130**	0.043	0.188**
	(0.052)	(0.051)	(0.082)
Income: $39,999-49,999	0.049	0.093*	0.241***
	(0.053)	(0.054)	(0.086)
Income: $49,999-59,999	0.086	0.042	0.010
	(0.054)	(0.054)	(0.094)
Income: $59,999-69,999	0.088	0.052	0.197*
	(0.057)	(0.062)	(0.103)
Income: $69,999-79,999	0.073	0.094	0.184*
	(0.062)	(0.059)	(0.098)
Income: $79,999-89,999	0.170**	0.048	0.214*
	(0.069)	(0.072)	(0.117)
Income: $89,999-99,999	0.096	0.113*	0.203
	(0.072)	(0.068)	(0.126)
Income: $ 100,000-149,999	0.141**	0.089*	0.359***
	(0.055)	(0.053)	(0.111)
Income: $ 150,000 or more	0.044	0.175***	0.263*
	(0.072)	(0.067)	(0.143)
Ideology: Conservative	−0.039	−0.066*	−0.028
	(0.027)	(0.036)	(0.057)
Ideology: Moderate	−0.032	−0.066*	−0.025
	(0.027)	(0.037)	(0.058)
Constant	0.529***	0.622***	0.498***
	(0.053)	(0.052)	(0.096)
Observations	1,782	1,302	466
R^2	0.030	0.030	0.076
Adjusted R^2	0.021	0.017	0.041
Residual Std. Error	0.453 (df = 1764)	0.449 (df = 1284)	0.437 (df = 448)
F Statistic	3.211*** (df = 17; 1764)	2.337*** (df = 17; 1284)	2.168*** (df = 17; 448)
Note:			*p<0.1; **p<0.05; ***p<0.01

whereas the General Population is more interested in investments in green technologies and equal rebates to citizens. Our results in this analysis show that when voters in these different regions consider the case of transfers to workers that are either domestic or foreign, preferences converge.

3.4 India Survey Design

We introduced a congruent set of tradeoffs to voter coalitions in India. Here, the first option proposes an increase in monthly household energy costs in order to compensate coal workers, with a domestic reduction in India proportional to developed countries like the United States. We randomly assigned the energy cost increase to be either 140 Rupees or 2240 Rupees. The second hypothetical response would entail no cost increase; compensation for Indian coal workers who lose jobs would come from the United States, but India would be required to reduce a higher proportion of coal emissions relative to the United States, with more Indian coal workers losing jobs. The increase in India's emissions at the lower cost option parallels the structure of our United States surveys—where, recall, Americans were given the choice of lower domestic costs associated with higher decarbonization-related job losses in India.

The question was worded as follows, with randomized portions in bold:

> Suppose now that in order to combat climate change, the Indian government can choose between two options, which would result in the same reduction of global fossil fuel emissions.
>
> Option A. Indians increase their average monthly household energy costs by Rs. [**140**] / [**2240**] to compensate Indian coal workers who lose jobs. However, India will have to reduce the same proportion of coal emissions as developed countries like the US.
>
> Option B. Indians will not increase their household energy costs because the US will send money to compensate Indian coal workers who lose jobs. However, India will have to reduce a much greater proportion of coal emissions than the US and more Indian coal workers will lose jobs compared to Option A.
>
> Q. If you had to choose, which option would you pick?

Below we refer to Option A as "Increased Costs and Reduction Equity" and Option B as "Foreign Aid, No Cost Increases, Greater Reductions."

3.5 India Results

Table 3 presents the responses to this question, divided by sample and price randomization (Appendix Figure 4 visualizes these responses). Column 1 shows support for the policy in which Indians increase their

average household monthly energy costs either by Rs. 140 (upper panel) or by Rs. 2,240 (lower panel) in order to compensate domestic coal workers losing jobs, but with India reducing coal emissions in the same proportion as the United States. Column 2, meanwhile, shows support for international transfers from the United States that lead to no household energy cost increases in India.

		Support for Increased Costs and Reduction Equity	Support for Foreign Aid, No Cost Increases, Greater Reductions
140 Rupee Higher Cost	General Population (n=1005)	66%	34%
	Cross-Pressured (n=761)	70%	30%
	Coal Country (n=734)	74%	26%
2240 Rupee Higher Cost	General Population (n=1034)	62%	38%
	Cross-Pressured (n=759)	70%	30%
	Coal Country (n=790)	71%	29%

Table 3: *India samples and preferences for increased energy costs and reduction equity versus foreign aid, no energy cost increases and greater emission reductions.*

Of note, across all of the samples and both levels of cost increases for Indians, a majority of respondents chose to incur higher costs and have equitable emissions reductions across India and the United States than to receive transfers from the United States on the condition that India reduce emissions further. Previously, we documented a home-country bias in the United States, with American respondents across all samples choosing to pay higher costs over the policy option in which they paid lower costs and facilitated transfers to India. We document a symmetric phenomenon in India, wherein voters indicate more support for the policy that results in higher costs for Indians than the cost neutral policy that is contingent on an international barter with conditions with a foreign nation.

Scrutinizing preferences across our three samples, we find that there is a pronounced gap between the General Population sample and Coal Country, with respondents in the latter sample significantly more likely to reject international transfers and the associated condition of greater job losses in coal. At the Rs. 140 cost level, 74% of respondents in Coal Country oppose international transfers; the corresponding figure for the General Population is much lower (66%). The Cross-Pressured sample's preferences lies in-between, with 70% of respondents declining the lower cost international transfers option. These results are in line with expectations, as the groups that are poised to lose jobs due to transfers express the greatest degree of opposition to cross-border bargains.

Table 4: India Effect of costs on support for policy with domestic compensation

	Dependent variable:		
	Support for Increased Costs and Reduction Equity		
	(General Population)	(Cross-Pressured)	(Coal Country)
Higher Cost	−0.034	0.014	−0.012
	(0.022)	(0.025)	(0.023)
Fossil Fuel Employed	0.045	0.020	0.102***
	(0.043)	(0.041)	(0.029)
Age	0.002***	0.002*	−0.001
	(0.001)	(0.001)	(0.001)
Male	0.005	−0.026	0.054*
	(0.023)	(0.025)	(0.030)
Income: 5,000-9,999 Rupees	0.024	0.015	0.050
	(0.041)	(0.048)	(0.042)
Income: 10,000-19,999 Rupees	0.051	0.029	0.065
	(0.038)	(0.046)	(0.044)
Income: 20,000-29,999 Rupees	0.084*	0.039	0.063
	(0.043)	(0.052)	(0.051)
Income: 30,000-39,999 Rupees	0.076	0.043	0.038
	(0.049)	(0.059)	(0.051)
Income: 40,000-49,999 Rupees	0.093	−0.108	0.062
	(0.062)	(0.069)	(0.055)
Income: 50,000-59,999 Rupees	0.069	0.045	0.074
	(0.061)	(0.073)	(0.061)
Income: 60,000-69,999 Rupees	0.065	0.033	0.149*
	(0.092)	(0.094)	(0.078)
Income: 70,000-79,999 Rupees	0.030	0.171	0.005
	(0.132)	(0.122)	(0.102)
Income: 80,000-89,999 Rupees	0.264**	−0.060	0.144
	(0.132)	(0.167)	(0.143)
Income: 90,000-99,999 Rupees	−0.107	0.269	0.348
	(0.340)	(0.459)	(0.310)
Income: 100,000-149,999 Rupees	0.086	0.026	0.256**
	(0.092)	(0.091)	(0.113)
Income: 150,000 Rupees or more	−0.273	0.137	−0.084
	(0.198)	(0.191)	(0.199)
Vote Not BJP	−0.043*	−0.008	0.013
	(0.023)	(0.026)	(0.024)
Constant	0.529***	0.643***	0.546***
	(0.060)	(0.070)	(0.072)
Observations	1,913	1,396	1,470
R^2	0.014	0.011	0.030
Adjusted R^2	0.006	−0.001	0.018
Residual Std. Error	0.477 (df = 1895)	0.457 (df = 1378)	0.435 (df = 1452)
F Statistic	1.638** (df = 17; 1895)	0.912 (df = 17; 1378)	2.627*** (df = 17; 1452)

Note: *p<0.1; **p<0.05; ***p<0.01

Our samples evidence very little cost sensitivity: the relative preferences of the three samples are similar across cost levels. Table 4 presents the estimates of the treatment effects of the higher domestic cost on support for international transfers, after adjusting for pre-treatment covariates.[6] We see that there is no statistically significant effect of increasing the monthly household energy costs in any of the three samples. Interestingly, we find here that respondents employed in fossil fuel jobs are more supportive of higher costs and domestic compensation (10 percentage point increase in support) in Coal Country, but their preferences are not significantly different in the General Population and the Cross-Pressured samples.

4 Conclusion

Transfers from developed countries to developing countries are expected to play a major role in transitioning the global economy to a lower carbon future. However, we know relatively little about the determinants of support for such transfers. And some existing work suggests reluctance in developed countries to send money abroad that could be used at home.

We add to this literature studying public opinion in both a developed and developing country. We focus on a particular political challenge: support for workers in the fossil fuel sector who will be displaced in a transition away from fossil fuels. Using both general population samples and targeted samples of regions with fossil fuel workers, we show that home country biases remain strong just as they have been shown for other types of transfers (e.g., Buntaine and Prather, 2018). But we also show that opposition to international transfers wanes at lower levels of cost increases for American citizens, pointing to a pathway forward for policymakers seeking to foster mass support for cross-border climate transfers.

A range of opportunities for additional work exist. The biggest open question is what will compel individuals to favor transfers. In our study, efficiency considerations were not sufficiently compelling. In the United States, considerations like ensuring funds are effectively spent may be important. And in India, accepting foreign funds for transitioning workers may be best done alongside other policies like green financing programs. Future word should investigate just how large international transfers can be while still retaining domestic and international support. There are other larger order questions to answer. For example, Kono and Montinola (2019) study whether climate focused foreign aid has been able to induce

[6] Appendix Table 8 presents the treatment effects in specifications that do not include controls, reporting qualitatively similar results.

changes in recipient domestic policies. They find no relationship, but note that at present the required data is of poor quality. We expect work of this nature to be important moving forward.

References

Barrett, Scott and Robert Stavins. 2003. "Increasing participation and compliance in international climate change agreements." *International Environmental Agreements* 3(4):349–376.

Bayer, Patrick and Federica Genovese. 2020. "Beliefs about climate action consequences under weak global institutions: sectors, home bias, and international embeddedness." *Global Environmental Politics* 20(4):38–50.

Bechtel, Michael M and Kenneth Scheve. 2013. "Mass Support for Climate Cooperation Depends on Institutional Design." *Proceedings of the National Academy of Sciences of the United States of America (PNAS)* 110(34):13763–8.

Buchholz, Wolfgang and Kai A Konrad. 1995. "Strategic transfers and private provision of public goods." *Journal of Public Economics* 57(3):489–505.

Buntaine, Mark T and Lauren Prather. 2018. "Preferences for domestic action over international transfers in global climate policy." *Journal of Experimental Political Science* 5(02):73–87.

Busby, Joshua, Sarang Shidore, Johannes Urpelainan and Morgan Bazilian. 2021. "The case for US cooperation with India on a just transition away from coal." *Brookings Institute* .

Calvin, Katherine, Pralit Patel, Allen Fawcett, Leon Clarke, Karen Fisher-Vanden, Jae Edmonds, Son H Kim, Ron Sands and Marshall Wise. 2009. "The distribution and magnitude of emissions mitigation costs in climate stabilization under less than perfect international cooperation: SGM results." *Energy Economics* 31:S187–S197.

Chattopadhyay, Deb, Morgan D Bazilian, Brad Handler and Chandrasekhar Govindarajalu. 2021. "Accelerating the coal transition." *The Electricity Journal* 34(2):106906.

Coppock, Alexander and Oliver A McClellan. 2019. "Validating the demographic, political, psychological, and experimental results obtained from a new source of online survey respondents." *Research & Politics* 6(1).

De Coninck, Heleen, Frauke Haake and Nico Van Der Linden. 2007. "Technology transfer in the clean development mechanism." *Climate policy* 7(5):444–456.

de la Cuesta, Brandon, Helen V Milner, Daniel L Nielson and Stephen F Knack. 2019. "Oil and aid revenue produce equal demands for accountability as taxes in Ghana and Uganda." *Proceedings of the National Academy of Sciences* 116(36):17717–17722.

de la Cuesta, Brandon, Lucy Martin, Helen V Milner and Daniel L Nielson. 2020. "Foreign aid, oil revenues, and political accountability: Evidence from six experiments in Ghana and Uganda." *The Review of International Organizations* pp. 1–28.

Gaikwad, Nikhar, Federica Genovese and Dustin Tingley. 2021. "Creating Climate Coalitions: Mass Preferences for Compensating Vulnerability in the World's Two Largest Democracies.".

Gampfer, Robert. 2014. "Do individuals care about fairness in burden sharing for climate change mitigation? Evidence from a lab experiment." *Climatic change* 124(1):65–77.

Gampfer, Robert, Thomas Bernauer and Aya Kachi. 2014. "Obtaining public support for North-South climate funding: Evidence from conjoint experiments in donor countries." *Global Environmental Change* 29:118–126.

Jamal, Amaney A and Helen V Milner. 2021. "Islam and Mass Preferences Toward Foreign Direct Investment in Tunisia." *Journal of Experimental Political Science* pp. 1–12.

Keohane, Robert O and David G Victor. 2016. "Cooperation and discord in global climate policy." *Nature Climate Change* 6:570–575.

Kline, Reuben, Aseem Mahajan and Dustin Tingley. Forthcoming. "Collective Risk and Distributional Equity in Climate Change Bargaining." *Journal of Conflict Resolution* .

Kono, Daniel Yuichi and Gabriella R Montinola. 2019. "Foreign Aid and Climate Change Policy: What Can('t) the Data Tell Us?" *Politics and Governance* 7(2):68–92.

Landis, Florian and Thomas Bernauer. 2012. "Transfer payments in global climate policy." *Nature Climate Change* 2(8):628–633.

Lange, Andreas, Andreas Löschel, Carsten Vogt and Andreas Ziegler. 2010. "On the self-interested use of equity in international climate negotiations." *European Economic Review* 54(3):359–375.

Lü, Xiaobo, Kenneth Scheve and Matthew J Slaughter. 2012. "Inequity aversion and the international distribution of trade protection." *American Journal of Political Science* 56(3):638–654.

Macquarie, Rob, Baysa Naran, Paul Rosane, Matthew Solomon, Cooper Wetherbee and Barbara Buchner. 2020. "Updated View on the Global Landscape of Climate Finance 2019." *Climate Policy Initiative* .

Mattoo, Aaditya and Arvind Subramanian. 2012. "Equity in climate change: an analytical review." *World Development* 40(6):1083–1097.

MiningTechnology. 2020. "Countries with the biggest coal reserves." *Mining Technology* .

Olmstead, Sheila M and Robert N Stavins. 2012. "Three key elements of a post-2012 international climate policy architecture." *Review of Environmental Economics and Policy* 6(1):65–85.

Page, Edward A. 2008. "Distributing the burdens of climate change." *Environmental Politics* 17(4):556–575.

Pai, Sandeep and Hisham Zerriffi. 2021. "A novel dataset for analysing sub-national socioeconomic developments in the Indian coal industry." *IOP SciNotes* 2(1):014001.

Parks, Bradley C and J Timmons Roberts. 2008. "Inequality and the global climate regime: breaking the north-south impasse." *Cambridge Review of International Affairs* 21(4):621–648.

Pauw, W Pieter, Paula Castro, Jonathan Pickering and Shikha Bhasin. 2020. "Conditional nationally determined contributions in the Paris Agreement: foothold for equity or Achilles heel?" *Climate policy* 20(4):468–484.

Peters, Glen P, Jan C Minx, Christopher L Weber and Ottmar Edenhofer. 2011. "Growth in emission transfers via international trade from 1990 to 2008." *Proceedings of the national academy of sciences* 108(21):8903–8908.

Sarkar, Ashok and Jas Singh. 2010. "Financing energy efficiency in developing countriesâlessons learned and remaining challenges." *Energy Policy* 38(10):5560–5571.

Sprinz, Detlef and Tapani Vaahtoranta. 1994. "The interest-based explanation of international environmental policy." *International Organization* 48(1):77–105.

Svenningsen, Lea S. 2019. "Social preferences for distributive outcomes of climate policy." *Climatic Change* 157(2):319–336.

Tongia, Rahul, Anurag Sehgal and Puneet Kamboj. 2020. *Future of Coal in India: Smooth Transition or Bumpy Road Ahead?* Notion Press.

Vu, Hong Tien, Yuchen Liu and Duc Vinh Tran. 2019. "Nationalizing a global phenomenon: A study of how the press in 45 countries and territories portrays climate change." *Global Environmental Change* 58:101942.

Yeo, Sophie. 2019. "Where climate cash is flowing and why it's not enough." *Nature* 573(7774):328–332.

A Additional Details of Sampling Strategy

A.1 US Sampling Strategy

Our US sample included three populations: a "General Population" consisting of nationally representative average voters, "Coal Country" communities from regions highly dependent on fossil fuel employment but not vulnerable to climate consequences, and "Cross-Pressured" coastal fossil fuel communities who are both ecologically vulnerable to climate change and economically vulnerable to the energy transition.

The General Population sample (n = 3,702) was obtained by two waves of surveys conducted by the survey company Lucid (Coppock and McClellan, 2019).[7] We used Qualtrics to field the Cross-Pressured (n = 1,428) and Coal Country (n = 516) surveys, identifying the samples by using zip-code level data on fossil fuel employment from the US Bureau of Economic Analysis.[8] We identified coal-dependent communities in Alaska and along the southern coastline (mostly in Texas and Louisiana and Texas) as Cross-Pressured. The Coal Country sample came mostly from West Virginia, Virginia, Kentucky, Wyoming, and Pennsylvania.

The samples are consistent with our expectations about their vulnerability to the ecological and economic vulnerability to climate change. For example, 7% of the General Population sample report that they or their family members are employed in the fossil fuel industry.[9] This percentage rises to 30% and 65% for the Cross-Pressured and Coal Country samples, respectively. Individuals in the cross-Pressured coastal samples are also more likely/willing to buy flood insurance.

[7] We excluded respondents who responded particularly quickly.

[8] Our sample sizes are the maximum number of individuals that the survey companies could reach in each region.

[9] In 2017, the US Department of Energy found that approximately 6.4 million individuals are employed in traditional energy sectors.

A.2 India Sampling Strategy

Our Indian sample was obtained via a similar sampling strategy as the one used in the U.S. The "General Population" survey (n = 2,102) was collected through telephone interviews. To ensure national representativeness, we randomly selected interviewees from a national database of landline and mobile phones.[10]

We then collected the "Coal Country" sample (n = 1,556) to represent individuals who are economically vulnerable to the transition away from coal. This sample contains 706 residents in the 39 districts with the highest coal mining employment rates and 850 coal miners sampled from three of the nine states where the districts are located.[11] Up to 62% of the individuals in this sample report being employed to having close family members employed in the coal industry, a percentage that resembles their American counterparts in the "Coal Country" sample.

The cross-pressured sample (n = 1,573) is created by combining data from two groups. The first one is a representative sample of 735 residents in four districts with at least one coal mine and which ranked high in a national climate vulnerability index.[12] We term this sample the "Coal Mines Cross-Pressured" sample. The second group, which we call the "Coal Plants Cross-Pressured" sample, contains 838 residents of 25 districts with at least one operating coal plant and is also ranked high in climate vulnerability.[13] Among the 1,573 individuals in the cross-pressured sample, 10% report employment in the fossil fuel industry.

Aside from the coal miner sample, all other samples in this survey were proportional to their district population sizes. Our sampling strategy helped us target individuals who have yet to be reached by other surveys, creating what we believe is the most comprehensive sample of climate-vulnerable groups in India.

[10]India has very high mobile and landline phone coverage. We also offered the survey in multiple languages, including Hindi, Punjabi, Gujarati, Marathi, Kannada, Malayalam, Tamil, Telugu, Odiya, Bangla, and Asamiya, ensuring that all major ethnic groups are represented.

[11]The nine states are Assam, Chhattisgarh, Jammu and Kashmir, Jharkhand, Madhya Pradesh, Maharashtra, Orissa, Telangana, and West Bengal. We excluded four districts that had high coal mining employment rates and high climate vulnerability, classifying them instead as "cross-pressured" districts. The coal miners in the sample come from the Dhanbad district of Jharkhand, the Shahdol district of Madhya Pradesh, and the West Bardhaman district of West Bengal. We conducted in-person interviews with these miners through the survey company Morsel Research & Development, using the same questions as the other samples but also adding qualitative follow-ups regarding their responses.

[12]The coal mines were identified through the "Statistics of Mines in India" published by the Government of India in 2015. The climate vulnerability index was based on the Central Research Institute for Dryland Agriculture's "Atlas on Vulnerability of Indian Agriculture to Climate Change." The four cross-pressured districts are Godda, Pakur, Bokaro, and Bilaspur, which are located in two states.

[13]We used the Global Coal Plant Tracker database to identify the location of coal plants. The 25 districts in this sample are located in the states of Bihar, Gujarat, Haryana, Jharkhand, Karnataka, Madhya Pradesh, Maharashtra, Rajasthan, Tamil Nadu, and Uttar Pradesh. Johannes Urpelainen, Ricky Clark, and Noah Zucker provided useful assistance to this step of our research project.

B Descriptive Statistics

B.1 United States Sample

B.1.1 Geographic Distribution of Sample

Figure 1 visualizes our sampling strategy. Dark grey indicates sampled General Population counties, red Coal Country counties, and blue Cross-Pressured counties.

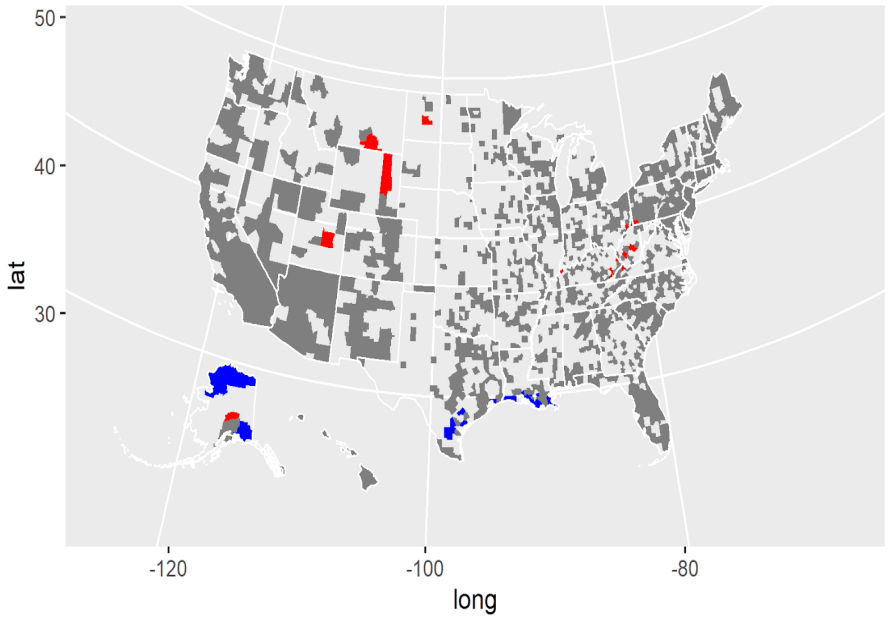

Figure 1: This map shows the counties from which our respondents were sampled. Red denotes counties in the Coal Country sample; blue denotes counties in the Cross-Pressured sample; dark grey represents counties from our General Population sample.

B.1.2 Descriptive Statistics of Sample

	General Population	Cross-Pressured	Coal Country
Female	53%	60%	62%
Median Age	46 years	35 years	37 years
College Degree	35%	33%	29%
Employed	54%	62%	51%
Ideology: Liberals	29%	15%	18%
Ideology: Conservatives	34%	43%	39%
White	75%	65%	95%
Concerned by Climate Change	76%	73%	69%
N	3702	1428	516

Table 5: Descriptive statistics of US samples. 'College Degree' includes college graduates and graduate degrees. 'Employed' refers to self-employed or paid employees.

B.2 India Sample

B.2.1 Geographic Distribution of Sample

Figure 2 graphs our samples. Dark grey indicates districts with respondents from the General Population poll, red denotes districts with Coal Country respondents, and blue points to districts with respondents in the Cross-Pressured sample.

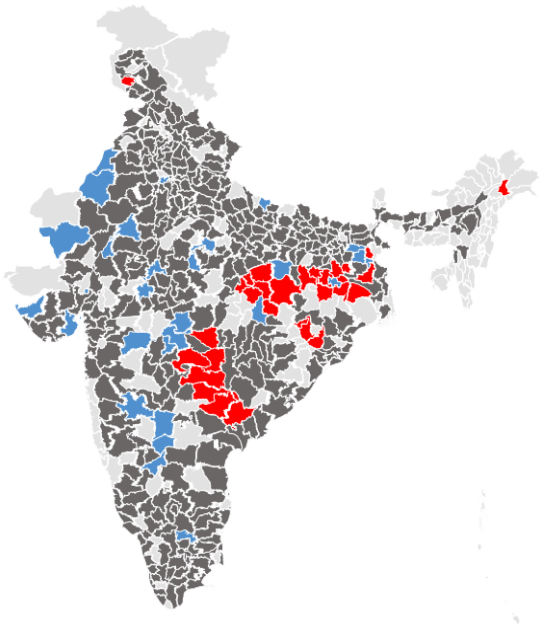

Figure 2: This map shows the Indian districts from which our respondents were sampled. Red denotes districts in the Coal Country sample; blue denotes districts in the Cross Pressured sample; dark grey represents districts from our General Population sample.

B.2.2 Demographic Distribution of India Sample

	General Population	Cross-Pressured	Coal Country
Female	65%	59%	30%
Median Age	36 years	35 years	36 years
Attained Secondary School	48%	47%	42%
Employed	77%	78%	75%
Voted for BJP	60%	65%	48%
Below National Median Income	40%	42%	45%
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%
Concerned by Climate Change	91%	89%	93%
N	2102	1573	1556

Table 6: 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.

C Additional Results

C.1 United States

C.1.1 Support for Domestic and International Transfers

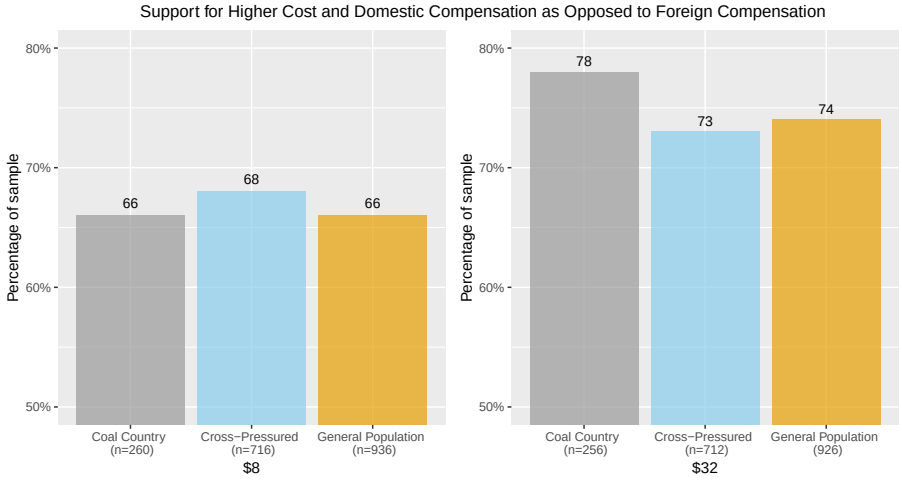

Figure 3: This figure illustrates the relationship between US samples and preferences for Option A (higher costs and domestic compensation) at different cost levels.

C.1.2 Treatment Effects

Table 7: Effect of higher cost of domestic policy with domestic compensation

	Dependent variable:		
	Support for Higher Costs and Domestic Compensation		
	(General Population)	(Cross-Pressured)	(Coal Country)
Higher Cost	0.073^{***}	0.042^{*}	0.120^{***}
	(0.021)	(0.024)	(0.039)
Constant	0.663^{***}	0.683^{***}	0.662^{***}
	(0.015)	(0.017)	(0.028)
Observations	1,862	1,428	516
R^2	0.006	0.002	0.018
Adjusted R^2	0.006	0.001	0.016
Residual Std. Error	0.457 (df = 1860)	0.456 (df = 1426)	0.445 (df = 514)
F Statistic	11.883^{***} (df = 1; 1860)	2.988^{*} (df = 1; 1426)	9.318^{***} (df = 1; 514)
Note:			*p<0.1; **p<0.05; ***p<0.01

C.2 India

C.2.1 Support for Domestic and International Transfers

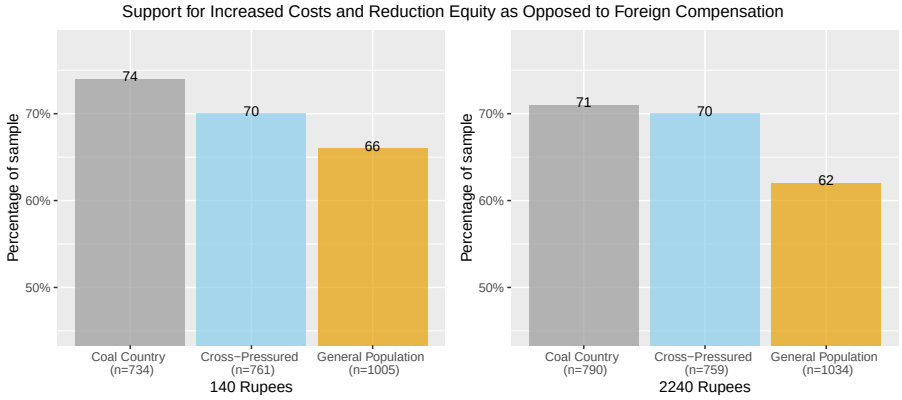

Figure 4: This figure illustrates the relationship between India samples and preferences for "increased costs and reduction equity" at different cost levels.

C.2.2 Treatment Effects

Table 8: India: Treatment effect of higher cost on support for domestic policy with domestic compensation

	Dependent variable:		
	Support for Increased Costs and Reduction Equity		
	(General Population)	(Cross-Pressured)	(Coal Country)
Higher Cost	-0.039^{*}	0.008	-0.027
	(0.021)	(0.024)	(0.023)
Constant	0.661^{***}	0.696^{***}	0.741^{***}
	(0.015)	(0.017)	(0.016)
Observations	2,039	1,520	1,524
R^2	0.002	0.0001	0.001
Adjusted R^2	0.001	-0.001	0.0003
Residual Std. Error	0.480 (df = 2037)	0.458 (df = 1518)	0.446 (df = 1522)
F Statistic	3.343^{*} (df = 1; 2037)	0.128 (df = 1; 1518)	1.420 (df = 1; 1522)
Note:			*p<0.1; **p<0.05; ***p<0.01