

# How Strong is Public Support for Unilateral Climate Policy?

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## **Abstract**

While many governments emphasize the need for reciprocal commitments in global climate policy, existing surveys indicate strong public support for unilateral climate policies. This discrepancy raises the question of whether governments could, without risking electoral punishment, afford to pursue more ambitious unilateral climate policies, or whether surveys may have overestimated support for unilateralism due to measurement problems. Based on conjoint and framing experiments embedded in representative surveys in the world's two largest democracies, India and the United States, we engage in a critical re-assessment of earlier survey results. We find surprisingly robust support for unilateral climate policy. Such support declines with increasing costs and increases with growing co-benefits and problem solving effectiveness. We also find, however, that policy conditionality and possible institutional design mechanisms against free-riding by other states play no significant role when citizens form their preferences with respect to climate policy. Neither is public support affected by whether policies focus on adaptation (which limits benefits to the investing country) or mitigation (which benefits all countries globally). Overall, these findings suggest that governments of rich and poor countries frustrated by the lack of progress in the UNFCCC negotiations could politically afford to push ahead with more ambitious unilateral climate policies.

## **Introduction**

One of the core questions regarding global environmental governance is what factors induce states to accede to international environmental agreements, and to subsequently honour commitments they have made to implement environmental policy measures. One mechanism often invoked to elicit commitment and compliance is reciprocity.<sup>1,2</sup>

Governments will enact policies if other governments are enacting similar policies, or they expect them to do so. Those actions can evolve into consecutive mutual assurances over time and thus sustain cooperation. Both game theory and experimental behavioral economics have shown that reciprocal behavior over an indefinite number of interaction rounds can ensure cooperation between self-interested agents.<sup>3-6</sup>

Standard theories of international political economy suggest that reciprocity is particularly important to sustain cooperation in governance institutions whose purpose is to maintain or provide a global public good. As the contribution of each state benefits all others regardless of their contributions, each government has a strong incentive to let other countries move ahead with ambitious policies and freeride on their efforts. As all governments are aware of this, they will be reluctant to be the first mover. Even absent complete freeriding, concerns about equitable contributions – that each state carries its “fair share” in the joint effort – are likely to prevent or slow down provision of the public good.<sup>1,7,8</sup>

Global climate governance is a prime example for this type of collective action problem. It aims to provide the global public good of protecting the atmosphere from dangerous levels of greenhouse gas (GHG) concentrations; but mitigation policies designed to achieve this are costly for those countries that enact them while benefitting the whole

world, irrespective of other countries' mitigation activities. Many statements and bargaining positions of governments demonstrate that they indeed perceive national commitments to global climate change policy as a highly reciprocal enterprise and are motivated strongly by concerns about equitable contributions and free-riding. Even countries that would have the economic capacity to enact stringent climate policies have been rather cautious with moving forward on mitigation unilaterally.<sup>9,10</sup> Two recent policy examples show this quite clearly. The United States has evaded binding emission reduction commitments for two decades, demanding that all big emitter countries including emerging economies be prepared to share in the mitigation effort before tightening their own climate policy. The Clean Power Plan put forward by the Obama administration and the EPA in June 2014 represents the most stringent domestic policy measure by far and has the potential to deliver substantial emission reductions. Yet even this innovation has failed to translate into an upfront US offer of more ambitious and binding commitments on the international level, as countries like China, Brazil, and India maintain their position that as developing countries they cannot be required to make commitments alongside industrialized nations.<sup>11</sup> The European Union, traditionally the international actor uniquely ambitious in climate policy, is likely to substantially soften its mitigation goals in the current revision of its climate strategy for 2030. This development is driven in large parts by those member countries whose economies heavily depend on fossil fuels and that in consequence fear competitive disadvantages for their industries if other major economies have less rigorous climate policies in place.<sup>12</sup> Research findings on the sub-national and individual level, however, are increasingly giving rise to the suspicion that the problem of reciprocity might have been

overemphasized by international relations scholars. On the local and subnational level, many unilateral governance schemes, often of a networked character, have sprung up that embark on ambitious climate change mitigation action. An example are the various coalitions of cities, e.g. the Local Governments for Sustainability network (ICLEI), or the C40 climate leadership group. Such networked and polycentric initiatives have been suggested by several theorists as a way to break the international collective action dilemma.<sup>13-15</sup> On the individual level, those few surveys that have tried to gauge citizens' views on unilateral versus reciprocal climate policy find high levels of support for unilateral climate policy. They show large parts of the publics in developed countries and emerging economies to be in favour of their own country reducing emissions, even if other countries do not follow suit.<sup>16-18</sup> Although public opinion is far from being the only factor influencing a country's accession to an international agreement, it is certainly an important one. For the ratification of an international treaty, and the legislation of policies to implement it, some minimum degree of voter approval is necessary at various stages in the policy process. This is especially true for environmental governance, which often affects household costs and consumption possibilities very directly (through energy costs, performance standard changes, etc.).<sup>19,20</sup>

Does the apparently high public support for unilateral climate policy and the many subnational unilateral initiatives therefore suggest that there is more room for ambitious unilateral national climate policies than most governments are currently willing to accept?<sup>21</sup> Before jumping to this conclusion, it is important to establish how robust public support for unilateral climate policy really is. Common criticisms of existing surveys are that respondents know very little about climate policy, are not aware of the cost

implications of, and free-riding problems associated with, major emission cuts, and thus provide what they consider socially desirable answers to survey questions about unilateral climate policy.<sup>22-24</sup> Regarding the first point, for example, we find in our own survey that US respondents quite massively overestimate the share of US emissions in global emissions (the median is 36%, as opposed to the real share of about 15%). The same holds true for Indian respondents, where the median value is 35%, as opposed to the real value of 5.6%. If those criticisms are valid we should observe much lower public support for unilateral climate policy when dealing effectively with these measurement problems.

We use two types of experimental approaches to expose individuals to various implications of unilateral climate policies while simultaneously assessing their demand for international reciprocity mechanisms, a conjoint design and a framing experiment. These two experiments, which produce more nuanced information about support for unilateralism than previous research, were embedded in representative surveys we implemented in India and the United States between February and May 2014. We selected these two countries because, first, they are the two largest democracies worldwide, and public opinion is bound to play a major role in shaping government choices in such political systems. Second, they are among the largest greenhouse gas emitters. Third, their governments have taken particularly strong positions with respect to the need for reciprocal commitments in global climate policy. Finally, they differ hugely in terms of income levels and vulnerability to climatic changes.

## **Materials and Methods**

Conjoint designs are used to estimate effects of changes in distinct policy characteristics on support for multi-dimensional policy proposals.<sup>25-27</sup> The design enables us to estimate the relative importance participants attach to policy features concerning reciprocity from other countries compared to other design elements likely to affect public support.

Furthermore, the design allows us to establish if reciprocity elements differ in their influence on public support given different configurations of other design features.

Respondents were confronted with pairs of unilateral policy proposals that differed with respect to six attributes. Table 1 shows these policy design features and their possible realizations in our experiments. The order of these six attributes and the particular values within each attribute were randomly assigned. Each respondent was asked to compare five pairs of unilateral climate policy proposals and select the proposal she preferred, as well as to rate each proposal individually on a 1-7 scale (Fig. 1 provides a graphical explanation). Each policy proposal thus constitutes one observation in our dataset ( $N=1200 \times 2 \times 5=12'000$  for the United States and 12'150 for India).

*Figure 1 about here*

In contrast to the common method of estimating effects from conjoint data with a random utility model,<sup>27</sup> full randomization of attribute levels in our design enables nonparametric estimation of the average marginal effect of a given attribute value on agreement support.<sup>28</sup> Randomization ensures that individual respondent characteristics, attribute order, and other potentially confounding factors are approximately uniformly distributed

across treatment conditions (i.e. choice tasks), thus allowing for a causal interpretation of the estimated effect. An additional advantage is that no untestable assumptions on the underlying utility model's functional form have to be made.<sup>26</sup>

Following the terminology established by Hainmueller et al.,<sup>28</sup> we call our estimated quantity of interest the *average marginal component effect* (AMCE). With full randomization the AMCE can be estimated without bias by a difference-in-means estimator, obtained by regressing the dependent variable (selection of proposal), on dummy variables for each attribute value, excluding one value per attribute as reference category. The regression coefficients represent point estimates of an attribute value's AMCE compared to the reference category of the attribute.<sup>28</sup> Using the approach suggested by these authors we correct the coefficients of the income and emission attributes to reflect the fact that not all theoretically possible value combinations are allowed between these attributes (see "Conjoint attributes and values"). To account for the fact that each respondent carried out six choice tasks standard errors are clustered on the individual respondent.

*Table 1 about here*

The two attributes capturing reciprocity elements are the government's reaction if other countries do not follow up with a similarly ambitious climate policy, and how the continuation of the policy depends on other countries' policy actions. If respondents favour reciprocity in their country's international commitments, we expect them to stronger support a policy that foresees a strong reaction if other countries do not follow

up, like carbon border adjustments or import regulations for products from high-emitter countries. In the same way, if respondents think reciprocity is an important element of international climate cooperation, we expect them to support a policy proposal that will only be continued if other industrialized countries and emerging economies enact similarly strong climate policies.

The remaining design features include, first, increase of household expenses for energy entailed by the policy proposal. The costlier the policy is, the more should individuals care about whether reciprocal behavior from other countries is taken into account in policy design.<sup>26,29</sup> The second attribute reflects economic co-benefits of climate policies in the form of new jobs in the green economy sector. High co-benefits might make a unilateral policy more palatable even if other countries do not reciprocate, especially as they offset costs at least partially.<sup>30</sup> Third, the policy's expected effectiveness in curbing climate change could affect reciprocity preferences in the sense that if the country's chances to solve the governance problem on its own are high, contributions of other countries to the effort might be perceived as more negligible.<sup>7</sup> Lastly, respondents should care less about reciprocity when policies focus predominantly on adaptation, as this effort will mostly benefit their own country and does not have the pure nature of a global public good like mitigation.<sup>31</sup>

The second experiment uses a somewhat simpler approach. It draws on a well-established survey item to gauge public support for unilateral climate policy and then adds treatment conditions to this item.<sup>17,32</sup> Specifically, respondents were asked whether they thought the US/India should reduce its carbon dioxide emissions regardless of what other countries do, only if industrialized countries also reduced their emissions, or only if industrialized



and developing countries reduced their emissions as well. No reduction at all was also an option. We randomly assigned particular pieces of additional information to prime respondents to think about particular implications of unilateral climate policy when responding to the item.<sup>33</sup> Priming here pertains to costs, technological innovation and green jobs, leading by example, free-riding, and necessity of global cooperation. To construct the treatment conditions we inserted one of the following phrases into the response item in the survey, and assigned respondents randomly to either the control or one of the five treatment conditions (wording for US survey):

- Many experts argue, however, that emission reductions by the United States would be very costly and would hurt the U.S. economy.
- Many experts argue, however, that emission reductions by the United States could also contribute to technological innovation and more jobs in the United States.
- Many experts argue, however, that emission reductions by the United States would motivate other countries to follow the U.S. example and reduce their emissions as well.
- Many experts argue, however, that emission reductions by the United States are required to show America's global leadership.
- Many experts argue, however, that the United States is responsible for only around 20 percent of total carbon dioxide emissions worldwide. Hence they argue that the global warming problem cannot be solved if only the U.S. reduces its emissions, but other countries do not.

With a view to the importance of North-South financial transfers in global climate policy, we added an additional treatment condition in the India survey: "At recent international

climate conferences, the political leaders of industrialized countries agreed to provide large-scale funding and technology to facilitate emission reductions in developing countries, such as India.”<sup>34</sup>

The two experiments were embedded in representative surveys implemented in the United States (N=1200) and India (N=1216) between February 21 and March 6, and 11 April and 30 May 2014, respectively. YouGov carried out the US survey. A random sample was drawn from YouGov’s panel. YouGov then uses a propensity score matching technique to adjust the sample to reflect the characteristics of the respective national population. Empirical evidence shows that samples obtained in this way are comparable to traditional pure random samples regarding representativeness of the general population and predictions of voting outcomes<sup>35</sup>.

The India survey was implemented by TNS. The sample was restricted to cover the cities of Delhi, Mumbai, Kolkata, Bangalore (200 respondents each), Chennai, Ludhiana, Patna, and Ahmedabad (100 respondents each) to keep logistical challenges manageable. This strategy ensures a sample sufficiently representative for India’s urban population. Households were selected by geographical sampling techniques and surveys were carried out face-to-face, with data entered on the spot using netbooks.

We pre-tested the survey using the Qualtrics survey platform ([www.qualtrics.com](http://www.qualtrics.com)) and a convenience sample on Amazon Mechanical Turk (<http://aws.amazon.com/mturk/>).

## **Results and discussion**

The results of this experiment show that costs, co-benefits, and expected effectiveness of unilateral climate policies matter most (Fig. 2). While increasing costs of unilateral

climate policy have a strong negative effect on public support and co-benefits (“green jobs”) have a moderate positive effect in the US sample, the two types of effects are somewhat weaker but more even in size in the India sample. Most interestingly, however, mechanisms of reciprocity or conditionality do not play a significant role in citizens’ evaluations of climate policy. Mechanisms for exerting pressure on other countries, if they do not follow-up on the US / Indian unilateral climate policy, do not significantly affect public support. This includes, for instance, carbon border adjustment tariffs and stricter import requirements for carbon intensive goods. Making continuation of the unilateral policy contingent on whether other countries follow up – and stopping the policy if others do not follow up – does not play a significant role either. Yet another interesting finding is that, contrary to conventional wisdom, there are no differences between support for mitigation and adaptation.<sup>31,36</sup> Climate change adaptation measures benefit primarily the investing country due to their more localized nature, and unilateral approaches thus intuitively make sense. Mitigation, however, benefits all countries globally and we thus expected individuals to prefer contingent policy commitments to mitigation, as they worry about potential free-rider countries.

*Figure 2 about here*

How much does variation in key attributes of unilateral climate policy, overall, influence public support, and what role, overall, do reciprocity mechanisms play? To begin with, the overall design of unilateral measures matters quite strongly. In the US sample, the most popular combination of policy design features results in an average support level of

56.8 percent, and the least popular combination in 31.3 percent. In India, the corresponding support levels are 80 percent and 64.3 percent. These findings also show that public support for unilateral climate policy is much stronger in India than in the United States. When we compare different combinations of specific unilateral climate policy design features, we also obtain a more precise picture of how relevant reciprocity mechanisms are (Fig. 3). The differences in support levels between a very unilateralist approach and a strictly reciprocal approach is only about 3.8 percentages in the US sample and about 2.1 percent in the India sample. For instance, we expected that policies that are costly, have few co-benefits, are unlikely to be effective, and focus on mitigation could become at least somewhat more popular if they include reciprocity mechanisms.<sup>9,23,26</sup> Our results do not support this presumption.

As estimated policy design effects could be moderated by respondent characteristics, we conducted robustness tests by estimating conditional marginal component effects. In this way we controlled for political party identification, education level, awareness that CO<sub>2</sub> is causing climate change and that there is a global cooperation problem, and interest in climate change issues. We estimated average marginal component effects for the reciprocity attributes (reaction towards other countries, continuance of policy) controlling for formal education level, as a rough proxy for knowledge and awareness of political and climate-related issues. Reciprocity attributes are insignificant for low and high levels of education both in India and the US. The only difference between education levels is that “green jobs” prospects have a somewhat higher positive effects for low-educated participants. This could be because they perceive a higher threat on average to become unemployed.

Similarly, controlling for more direct measures of climate knowledge does not change the results for reciprocity attributes. These measures include self-reported interest in climate-related media coverage; awareness that for effective mitigation, ambitious efforts by more countries than only the US/India are needed; and belief that human GHG emissions are the major cause for climate change. In particular, reciprocity attribute effects are not larger (and remain insignificant) in “climate skeptic” subsamples.

As climate politics has often been a partisan issue in the US,<sup>37</sup> we also control for Republican and Democrat party identification in the US sample. Whereas Republican supporters seem to be more skeptical about economic co-benefits, they do not appear to demand stronger reciprocity in US climate policies.

Finally, we estimated average marginal component effects of the reciprocity attributes conditional on each possible value of household energy expense increases. Reciprocity features in climate policies do not become more important to participants as cost increases rise. For the lowest cost increase level, the “continuance of policy” attribute actually has a *negative* significant effect in the US sample. A possible interpretation is that American citizens prefer climate policies that are cheap to be maintained, even if other countries fail to follow up with similar policies. Our results demonstrate that citizens, even when induced to take into account costs, benefits, effectiveness, and reciprocity, evaluate climate policy options primarily in a unilateralist mode.

*Figure 3 about here*

The main results of the second experiment (Fig. 4) are that support for unilateral climate policy in the US sample declines significantly when respondents are primed to think about high costs this may involve, and about free-riding of other countries and the policy's low global effectiveness this would engender (rank-sum tests:  $z=.0043$  and  $.0294$ , respectively). The other frames have no significant effect. In the India sample, a somewhat lower share of respondents supports purely unilateral climate policies. This finding stands in some contrast to the results of the first experiment, where we find more support for unilateral measures in the India sample. However, the share of respondents who do not prefer any GHG reductions at all is much higher in the US than in the India sample, whereas in the India sample a considerable share of the respondents wishes to make reductions contingent on industrialized countries reducing their emissions too. In the India sample, there are no significant differences between the control group and the groups in which participants were primed.

*Figure 4 about here*

Overall, these results indicate that there is robust public support for unilateral climate policies. They suggest that policy-makers both in rich and poor countries have not yet fully exploited their political room of manoeuvre in pursuing unilateral measures while global policy-making efforts are making little progress. While these findings constitute positive news for those campaigning for more ambitious unilateral climate policies, they cannot tell us why exactly citizens are less reciprocalist than most government leaders appear to be. One candidate explanation, which could be explored in further research, is

that individuals – when confronted with a highly complex issue on which they have limited knowledge – are resorting to cues derived from more general attitudes with respect to society, politics, and the environment.

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**Table 1:** Attributes and attribute values (US version). The version for India was analogous except the first two attributes, where values plausible for the Indian economy were given.

<b>Increase of expenses of the average American household for electricity, fuel, and heating</b>	<ul style="list-style-type: none"> <li>• \$30 per month</li> <li>• \$100 per month</li> <li>• \$150 per month</li> <li>• \$200 per month</li> <li>• \$250 per month</li> <li>• \$300 per month</li> </ul>
<b>New jobs in the renewable energy sector (e.g., solar, wind, geothermal, hydropower) in the United States</b>	<ul style="list-style-type: none"> <li>• 100'000 new jobs</li> <li>• 200'000 new jobs</li> <li>• 300'000 new jobs</li> <li>• 400'000 new jobs</li> <li>• 500'000 new jobs</li> </ul>
<b>U.S. reaction towards other countries if they do not adopt a similar policy</b>	<p>If other countries do <i>not</i> adopt a similar policy, the U.S. government will...</p> <ul style="list-style-type: none"> <li>• Express its regret</li> <li>• Send a formal letter, signed by the U.S. President, to those countries, urging them to adopt the same policy as the U.S.</li> <li>• Encourage U.S. citizens to stop buying goods from those countries</li> <li>• Impose a special tariff (import tax) on goods from those countries</li> <li>• Pass a law that requires foreign firms to comply with the new U.S. policy in their production facilities if they want to export goods to the U.S.</li> </ul>
<b>Likelihood of avoiding dangerous levels of global warming</b>	<ul style="list-style-type: none"> <li>• Very high</li> <li>• High</li> <li>• Modest</li> <li>• Low</li> <li>• Very low</li> </ul>
<b>Continuance of new U.S. policy, depending on what other countries do</b>	<ul style="list-style-type: none"> <li>• The new U.S. policy will be...</li> <li>• continued, irrespective of what other countries do</li> <li>• continued only if other rich industrialized countries (e.g. European countries, Japan) adopt a similar policy</li> <li>• continued only if large developing countries (e.g. China, India, Brazil) adopt a similar</li> </ul>

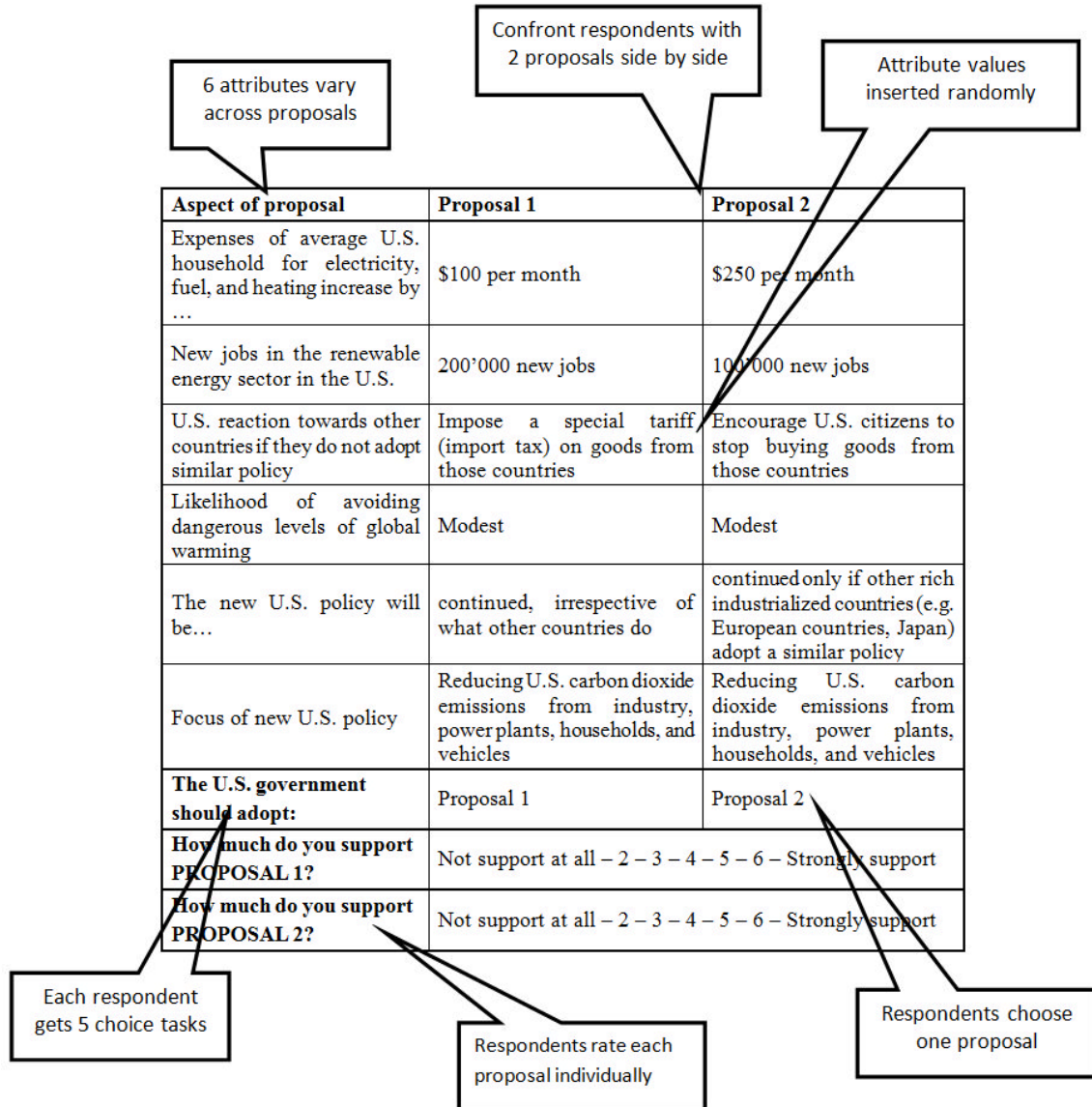
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	policy
	<ul style="list-style-type: none"><li>• continued only if other rich industrialized countries (e.g. European countries, Japan) as well as large developing countries (e.g. China, India, Brazil) adopt a similar policy</li></ul>
<b>Focus of the new U.S. policy</b>	<ul style="list-style-type: none"><li>• Reducing U.S. carbon dioxide emissions from industry, power plants, households, and vehicles</li><li>• Protecting people and the environment in the U.S. against the consequences of global warming, for example, storms, floods, heat-waves, and droughts</li></ul>

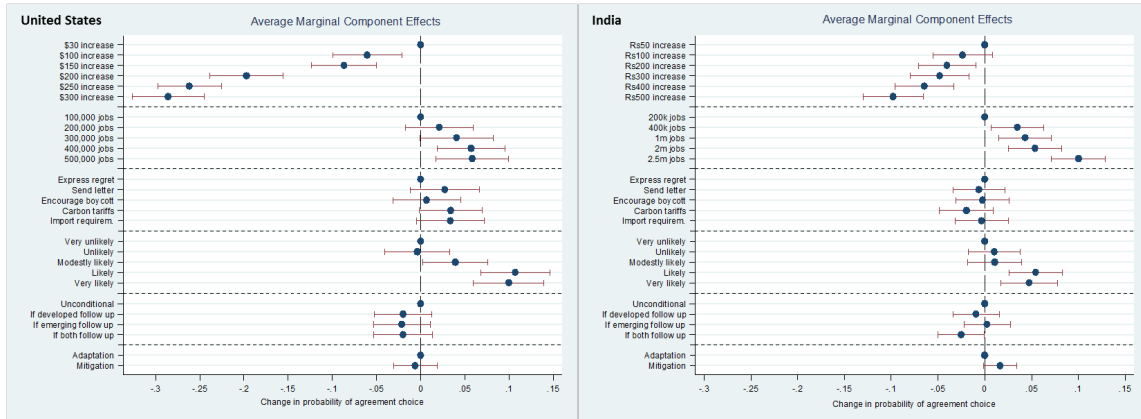
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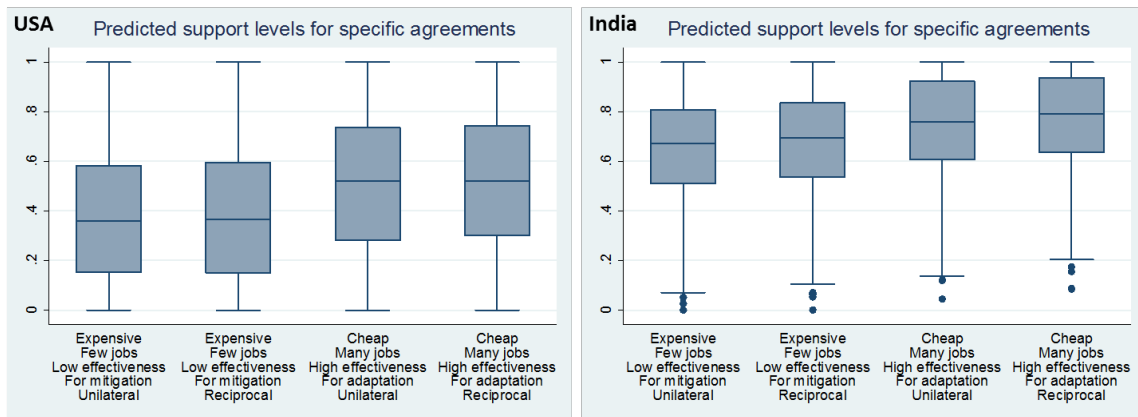
**Fig. 1:** Explanation of conjoint design



**Fig. 2:** Effects of design attributes on support for unilateral climate policy. Dots indicate point estimates, whiskers 95% confidence intervals. Effects are relative to the reference category (represented by dots on vertical zero-line)



**Fig. 3:** Predicted levels of support for specific policies with different reciprocity mechanism



**Fig. 4:** Results of framing experiment: preferences for unilateralism, reciprocity, or no emission reductions by frame

