

How much room for European unilateralism in global climate policy?

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Abstract

Unilateral climate policy initiatives by the European Union should, ideally, motivate other countries to follow suit and thus help in overcoming the stalemate in global climate politics. Whether this will happen depends critically on how such initiatives affect public opinion outside Europe. We examine the effect of a major unilateral EU climate policy initiative, which regulates emissions from aircraft, on public opinion in the two largest democracies outside the EU, India and the USA. Based on survey experiments, we study the effects of cost and sovereignty considerations on people's evaluation of the EU's new policy. The results show that, despite much government rhetoric about costs and sovereignty violation, both types of concern have a modest impact. They suggest that there remains some room for the EU in pursuing even such unilateral climate policies that involuntarily enlist other countries in sharing the global mitigation burden.

Keywords

Climate change, governance, airlines, environment, Europe, United States, India, emission trading, survey experiment

Introduction

One key obstacle to solving the global climate change problem is that some countries are more willing than others to reduce their greenhouse gas (GHG) emissions (Landis and Bernauer, 2012; Bernauer, Forthcoming). In view of stalemate in global climate politics we need to understand whether unilateral climate policy initiatives, particularly those by the only large frontrunner in global climate policy at present, the European Union could motivate other major emitters to follow suit, or at least avoid them undermining such initiatives (European Environment Agency, 2012; World Resources Institute, 2012).

Recent public opinion and policy research suggests that people in many countries are quite willing to see their own countries adopt stricter climate policies even if other countries do not follow up (Krosnick and MacInnis, 2012; World Bank, 2010; Tingley and Tomz, 2012; Schaffer, 2011; Krause, 2010; Urpelainen, 2009; Victor, 2011; Schreurs and Tiberghien, 2007; Ward and Cao, 2012). Table 1 shows data from World Bank surveys that support this conclusion. The standard account of global climate policy in terms of a public goods and free-rider problem also suggest, however, that there are limits to unilateralism (Barrett, 2006; Sandler, 2004). The expectation of governments and publics in frontrunner countries is that their unilateral steps will motivate publics and governments in laggard countries to follow suit. Conversely, opposition from other countries could undermine the frontrunner policy.

[Table 1 about here]

Climate policies that have direct implications for third countries are ideal candidates for exploring the limits of unilateralism. The most widely discussed such policy focuses on

consumption based measures (Peters et al., 2011), and border carbon adjustments in particular; that is, special taxes on imports of carbon intensive goods. Such measures are very controversial because of their implications for the international trading system and have thus far not been implemented by any major economy.

Yet, the EU has recently installed a policy that has wide-ranging effects of a similar nature. It has subjected all airlines operating flights between, from and to member countries of the EU to its cap-and-trade Emissions Trading System (ETS), no matter whether based in the EU or not. This means that the EU is now unilaterally applying its rules for aircraft emissions not only within, but also beyond EU borders. Greenhouse gas (GHG) emissions from aircraft have grown strongly in past decades (Intergovernmental Panel on Climate Change, 1999; Leggett et al., 2012). Climate scientists agree that there is an urgent need to reverse this trend.

The relevant EU laws entered into force in 2009. All airlines that take off and land in the EU+3-countries (EU-27 plus Iceland, Liechtenstein und Norway) are allocated a cap (i.e. a total emissions budget), independently of their home country (which may be located outside the EU+3). This total emissions budget is allocated to individual airlines in the form of emission permits. If an airline does not use up its permits (because it uses more fuel-efficient airplanes or operates less flights in, to or from Europe) it can sell them to other airlines. If it exceeds its emissions budget, it can purchase additional emission permits in the ETS. At the end of a given budgeting period each airline must be able to present enough permits for its de facto emissions. In case of a deficit it faces a fine in the order of €100 per ton of excess CO₂, which is far above the current carbon price in the ETS.

The total emissions budget for 2012 for all airlines operating flights in, to or from the EU+3 was fixed at 97% of a historical average of around 220 million tons of CO₂. This cap will be progressively reduced to 95% until 2020. At the same time, the share of emissions permits that are allocated for free will be reduced as well. In 2012, 85% of the permits are allocated for free, based on historical emissions, 15% are auctioned. Those permits that are allocated for free are not allocated according to the so-called grandfathering principle (historical emissions), but according to a best available technology principle. This principle favors airlines already using fuel-efficient airplanes.

The EU Commission allocates emission rights to individual airline companies and monitors compliance and sanctions violations. Enforcement of the first emissions budgeting period will start in April 2013.

In late 2012, partly due to strong opposition from China, India, the United States, and a few other countries the EU signaled its willingness to re-open previously failed discussions on the issue in the International Civil Aviation Organization (ICAO). It also stated that it might be willing to consider temporary exemptions for non-EU airlines in 2013.

Will the new EU policy motivate other countries to adopt similar policies? Or will it result in negative responses, for instance retaliatory policies by non-EU countries, that could eventually undermine the EU initiative? Assuming that public opinion matters (Tjernström and Tietenberg, 2008; Scruggs and Benegal, 2012) for the adoption of climate policies, particularly but not exclusively in democracies, we should be interested in how the new EU policy regulating GHG emissions of aircraft affects public opinion in non-EU countries that are directly affected by this policy.

In the following section, we argue that the impact of the new EU policy on public opinion in third countries is most likely to materialize via two mechanisms: concerns over cost implications, and concerns over infringements on sovereignty. We then describe the empirical approach for evaluating these arguments, present the results, and discuss their implications.

Economic and political costs of the new EU policy to other countries

The analysis in this paper focuses on two mechanisms through which the EU's new policy could affect public opinion in other countries: economic and political costs. Both mechanisms are straightforward. The new EU policy amounts to an additional operational cost that airlines are likely to pass on to consumers. Current estimates are in the range of 5-10 Euros for a flight within Europe, and 20-90 Euros for long-distance flights. Hence the new EU policy imposes an economic burden on other countries' citizens flying to Europe. Political costs imposed on other countries can manifest themselves in the form of a perceived infringement on those countries' sovereignty. This perception could arise not only because the EU policy regulates emissions by airlines from any (not only EU) country. The regulation also subjects emissions during the entire flight to the EU ETS, i.e. also those emissions occurring in the airspace of the airlines' home country.

Both economic and political cost implications are very visible in statements by policy-makers and airline executives. To name only a few¹, the president of Airlines for America (A4A), an association of the leading US airlines, Nicholas E. Calio stated:

"Congress has spoken - US airlines should not be subjected to this illegal scheme that amounts to little more than a cash grab for the EU as none of the funds collected are required to be used for environmental purposes." He also stated that the EU ETS is "a breach of US sovereignty that actually limits our ability to build on our strong environmental record by investing in new and more fuel-efficient aircraft."

In a letter sent by nineteen US-based aviation industry groups to US President Obama in September 2012, the industry voiced its concerns as follows:

"[i]f this EU breach of U.S. sovereignty ... over our airspace and international waters – goes unanswered, it almost certainly will result in other such schemes affecting a variety of sectors of the U.S. economy."

Stakeholders from other countries have made similar statements that touch both on economic and political implications of the EU's new policy. Thai Airways president Piyasvasti Amranand said;

"[i]f nothing changes, this will cost us THB200 million - THB300 million baht (USD\$6.5 million - USD\$9.75 million) a year starting 2013."

¹ See more related quotes in the "Additional quotes from policy makers and airline executives on the potential economic and political costs of the new EU policy" section in Supplementary Information.

He also stated:

"I do agree with the idea of reducing carbon emissions but the way EU has come up with the calculation for making airlines pay is something we feel is unfair."

India's aviation minister argued

"We would request the delegates to oppose any unilateral environment measures imposed by a state or group like the EU ETS and work with ICAO (International Civil Aviation Organisation) to evolve global environment protection on the basis of equity and consensus"

In view of these arguments we expect more negative responses in non-EU countries when economic costs imposed by the EU policy on these countries are high. As to political costs, we expect negative responses when unilateral policies are viewed as a violation of sovereignty; i.e. interference with a country's right to decide on its own which policies to enact in its jurisdiction. The two mechanisms are distinct: EU regulation applied to GHG emitters based in non-EU countries may, as a matter of principle, be regarded by the latter countries as a violation of their sovereignty even if the economic implications as such are minor.

Survey experiments: effects of economic and political costs on public support

Several survey embedded experiments were fielded in India and the United States between October 1st and November 20th 2012. We opted for survey experiments, rather than standard surveys, because the former are more appropriate for identifying causal

effects, rather than only correlations (Scruggs and Benegal, 2012; Druckman et al., 2011; Mutz, 2011). Participants were recruited on the crowd-sourcing platform Amazon Mechanical Turk (AMT) whose socio-demographics are well identified (Amazon Mechanical Turk, 2012; Ross et al., 2010; Mason and Suri, 2012; Berinsky et al., 2012). After recruitment through AMT, the online survey was implemented using a survey platform called Unipark (Unipark, 2012).² Treatments containing varying information on cost and sovereignty implications of the EU policy were randomly assigned to participants. We then evaluated statistically whether and how much these treatments affect support for and opposition against the new EU policy, relative to control groups that received no treatment.

In the experiments, samples of 1766 (India) and 2320 (USA) participants were randomly assigned to one of the eight information treatments concerning cost implications and sovereignty, after an introduction to the topic, which described the new EU policy without any information on costs and geographic scope.

Table 2 describes the eight treatments. The ticket price increase in the high and low cost stimuli, which varies between 30 to 200 USD for the U.S. and between 500 to 2,500 INR for India, is based on expert estimates of cost implications for airlines and

² For more detailed information, see the “Participation recruitment” section of Supplementary Information.

passengers.³ The information on implications for sovereignty is along the lines voiced by policy-makers and airline executives, some of which we mentioned earlier. The control group received no information treatment.

[Table 2 about here]

The outcome (response) variable of our interest is public support for the new EU policy; however, public support is a rather broad concept that is hard to measure directly. We used 17 distinct survey items to construct four aggregated latent concepts of public support, measuring attitudinal and behavioral support for the EU policy and, conversely, support for diffuse and specific retaliation against the EU policy. Table 3 summarizes the four latent constructs of public support in the first column, and the survey items used for each construct in the second column. We conducted confirmatory factor analyses (CFA) in order to assess statistically whether the survey items appropriately measure the four latent concepts of public support as we theorized. The result of the CFAs supports our four composite measures of public support.⁴

[Table 3 about here]

We expect that treatments 1, 2, 3 and 8 (in Table 2) affect support for the EU's policy negatively and increase support for retaliation, relative to the control group (no treatment). For treatment 8 we used a slightly different control group, where the introduction did not mention the EU at all – the intention was to make the sovereignty treatment as extreme as possible and

³ See the “Price-increase estimates” section and Table S1 in Supplementary Information for the expert estimates on the ticket price increases.

⁴ See the “Measurement of responses” section and Tables S2-S3 in Supplementary Information for the results of the confirmatory factor analysis.

avoid a priming for sovereignty of the control group. The effects of treatments 4, 5, 6, and 7 are expected to be negative as well, but smaller relative to the effects of treatment 3.⁵

Results

In the survey experiments with participants from India, we find that high costs (i.e. high ticket-price increases) imposed by the EU's restrictions on aircraft emissions induce lower levels of support for the new policy among participants from India. (See Figure 1.) Conversely, they increase support for retaliatory measures that are specific to the aviation sector (e.g. imposing higher landing fees on EU airlines), but do not significantly affect support for diffuse (non-sector specific) retaliation.

Associating high costs with framings that might mitigate the negative effect on policy support (treatment 5, 6, and 7), for the most part, did not have the expected effect. We find that combining high costs with a “polluter pays”, a “climate risk reduction” or an “economic co-benefits” frame still leaves us with a negative effect of high costs on support for the new EU policy – only the effect on support for specific retaliation turns insignificant with two of the three frames.

Interestingly, in contrast to the sovereignty rhetoric of policy-makers and airline executives opposing the new EU rules, two of the three treatments that emphasized sovereignty violations (treatment 1 and 2) do not have a significant effect on support and opposition (retaliation). Only the third sovereignty treatment (treatment 8), which is very strong and

⁵ For further details of our experimental procedure and the survey questionnaire, see the “Design of the survey experiment” section of Supplementary Information.

explicit, causes a significant decrease in support for the EU policy and an increase in support for retaliation.

[Figure 1 about here]

The main finding from the survey experiments with U.S. participants (Figure 2) is that reactions of U.S. participants are similar to those of participants from India. High costs induce less attitudinal and behavioral support for the EU policy. Polluter pays, climate risk reduction and economic co-benefits framings of high costs do not change these negative effects.

Compared to participants from India, U.S. participants are more supportive of sector specific retaliation: all framed and unframed cost treatments increase support for specific retaliation.

Very similar to our findings for participants from India, support for diffuse retaliation is low and is not significantly affected by the cost treatments. Again, only the most extreme and explicit sovereignty treatment has a significant effect – this effect is somewhat stronger for U.S. participants than participants from India, notably because it significantly increases support for diffuse retaliation.

[Figure 2 about here]

Robustness checks

As explained in the previous section, participants in our survey experiments were recruited on the crowd-sourcing platform Amazon Mechanical Turk (AMT). The socio-demographics of our samples are quite similar to national distributions with respect to age, gender, and highest education level, but are biased in terms of education levels, political

ideology (in the U.S. case - approximately 75% Democrat in our sample), and income (the India sample is richer than the national average).⁶

The overrepresentation of some parts of society would affect the external validity of our findings if we attempted to make statistical inferences for the entire population of India and the U.S., *and* the average treatment effects were contingent on those variables on which the sample bias is occurring (relative to the said population) (Druckman and Kam, 2011):53). In our study, however, we are interested in sample average treatment effects, not in a representative picture of public opinion in India or the United States per se. We believe that large and heterogeneous convenience samples from these countries obtained through AMT are thus appropriate.

Nevertheless, as robustness checks, we carried out an additional set of treatment-effect estimations after splitting the samples along several covariates in which we see discrepancies between the population and sample profiles. From these robustness checks, we found that both the statistical significance and the direction of sample average treatment effects remain the same after splitting the samples; i.e., there is no heterogeneity in treatment effects along these dimensions.⁷ However, we should still remain cautious not only with regard to “from what” we are generalizing, but also “to what” we are generalizing. In this regard, we submit that our results are particularly strong in telling us how individuals represented by our samples are responding to the context of including the airline emissions in the EU ETS.

⁶ See the “Survey demographics” section as well as Tables S4-S5 for the summary of socio-demographic characteristics of our samples in India and the United States.

⁷ See the “Robustness checks” section and Tables S6-S7 in Supplementary Information for the results of these additional difference-in-means tests.

Conclusion

These findings imply mixed news for frontrunners in climate policy, particularly in areas where unilateral policies affect other countries. High costs imposed on (individuals in) other countries reduce public support for the EU's policy there, and they increase support for sector specific retaliation. Framing those costs with the polluter pays principle, climate risk reduction or economic co-benefits does not mitigate the negative effect of a high cost increase. Improved framing of the EU policy is, therefore, unlikely to reduce opposition by non-EU countries. These effects are clearly undesirable from the viewpoint of those hoping the EU's unilateral move would motivate – via positive effects on public opinion in other countries – other governments to follow up with similar policies.

The more positive news is that our high cost treatments are at the extreme end of current expert estimates of cost implications for airlines and passengers from non-EU countries (see Table S1); and only the most extreme and explicit sovereignty treatment induces negative reactions. In addition, we observe very little support for non-sector specific retaliation, which could impose higher costs on Europe if it escalated into a trade war. This means that in what we think is a more realistic scenario, with moderate cost and sovereignty implications, publics in non-EU countries are unlikely to push their respective governments towards aggressive responses that undermine the EU effort.

To the extent this interpretation is valid, the signing of a law by the U.S. President in November 2012, which bars US-based airlines from complying with the EU's policy and severely challenges the latter, appears to respond more to lobbying by airlines than to public

opinion. Our findings also suggest that the EU should not cave in to pressure from other governments, as it appeared to do recently, but should stick to its policy. Overall, the research presented here suggests that, in view of stalemate in global climate policy, ambitious unilateral initiatives by frontrunners are feasible, albeit constrained by reactions of other countries.

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Tables

Table 1 A World Bank survey of public opinion on climate change policies

	<i>Q10. Other countries would then be more willing to act (%)</i>	<i>Q11. Should be willing to commit to limiting its GHG emissions (%)</i>	<i>Q12. Would have a responsibility to take steps against climate change (%)</i>
USA	52	82	73
France	63	97	87
Japan	54	89	83
Mexico	73	93	96
Russia	47	70	49
Turkey	53	71	82
Brazil	60	77	72
Iran	73	87	78
China	73	96	95
Indonesia	80	89	91
Egypt	66	92	88
India	61	71	70
Senegal	79	93	86
Vietnam	85	98	93
Kenya	80	92	89
Bangladesh	87	98	95
Average	68	87	83

Note: the original survey asked the following questions (World Bank, 2010). *Q10. Do you think that if our country takes steps to deal with the problem of climate change, other countries would then be more willing to act, or do you think it wouldn't make much difference? Q11. As you may know, [country] and other countries from around the world will be meeting in December in Copenhagen to develop a new agreement to take steps against climate change by limiting greenhouse gas emissions. If the other countries come to an agreement, do you think [country] should or should not be willing to commit to limiting its greenhouse gas emissions as part of such an agreement? Q12. Imagine that at the meeting, the other countries do NOT come to a global agreement on taking steps against climate change. If this happens, do you think our country would have a responsibility to take steps against climate change, or would it not have a responsibility?*

Table 2 Treatments

<i>Treatment</i>	<i>Description</i>
1. Sovereignty priming with national flag (“sovereignty+flag”)	Statement that new EU policy also regulates emissions outside the EU, including emissions occurring over the territory of the Unites States / India; combined with display of the national flag
2. Sovereignty priming with world map illustrating the new EU policy (“sovereignty+map”)	Statement that new EU policy also regulates emissions outside the EU, including emissions occurring over the territory of the Unites States / India; combined with a graphical illustration of the extraterritorial nature
3. High cost (“high cost”)	New policy results in a strong increase in cost of a round-trip ticket
4. Low cost (“low cost”)	New policy results in a modest increase in cost of a round-trip ticket
5. High cost with polluter pays principle (PPP) framing (“high cost+PPP”)	New policy results in a strong increase in cost of a round-trip ticket; combined with statement that new policy affects only those who fly and thus cause global warming, and that the policy affects all airline passengers irrespective of nationality
6. High cost with risk reduction framing (“high cost+risk reduction”)	New policy results in a strong increase in cost of a round-trip ticket; combined with statement emphasizing the contribution of the new EU policy to reducing global warming and its consequences for society
7. High cost with co-benefits framing (“high cost+co-benefits”)	New policy results in a strong increase in cost of a round-trip ticket; combined with statement emphasizing co-benefits of EU policy in terms of new scientific breakthroughs and new industries, new jobs and more economic development in United States / India
8. Strong sovereignty treatment (“strong sov”)	Very explicit mentioning that US / India sovereignty is violated by EU policy; combined with a graphical illustration of the extraterritorial nature

Table 3 Response items (Contents in Table 3 are worded for the US)

Four types of public support	Survey items	
Support <i>Attitudinal</i>	The government of the United States should respond to the European policy by (fully agree ... fully disagree):	<ul style="list-style-type: none"> • Protesting against the European policy. • Welcome and support the European policy. • Ask European countries to not apply the policy to airlines based in the United States • Adopt the same policy as Europe and control pollution from airplanes flying to and from the United States
	Please think again about the information on the European policy that regulates pollution from airplanes, which you read a few minutes ago. With this information in mind, how likely are you to engage in the following activities in the next twelve months?	<ul style="list-style-type: none"> • Sign a petition that asks the government of the United States to support the European policy? • Sign a petition that asks the government of the United States to introduce the same policy in the United States? • Join or renew membership of a non-governmental group (NGO) in the United States that supports the European policy? • Write a letter to the largest airlines based in the United States asking these airlines to support the European policy? • If a local, state or Federal election was called, vote for a candidate at least in part because he or she supports the European policy? • Give money to a non-governmental group (NGO) in the United States that supports the European policy?
Opposition <i>Diffuse Retaliation</i>	The United States should respond to the European policy by:	<ul style="list-style-type: none"> • Asking people in the United States to buy fewer products made in Europe • Introducing a new customs tax on European products that makes it more difficult for companies from Europe to sell their products in the United States • Asking airlines based in the United States not to buy airplanes made in Europe
	The government of the United States should respond to the European policy by (fully agree ... fully disagree):	<ul style="list-style-type: none"> • Reducing the number of flights European airlines are allowed to operate to and from the United States • Charging higher fees from European airlines when they land or take off in the United States • Imposing a new tax on European airline passengers who fly to and from the United States • Introduce a new law saying that airlines based in the United States are not allowed to accept and participate in the European policy

Figures

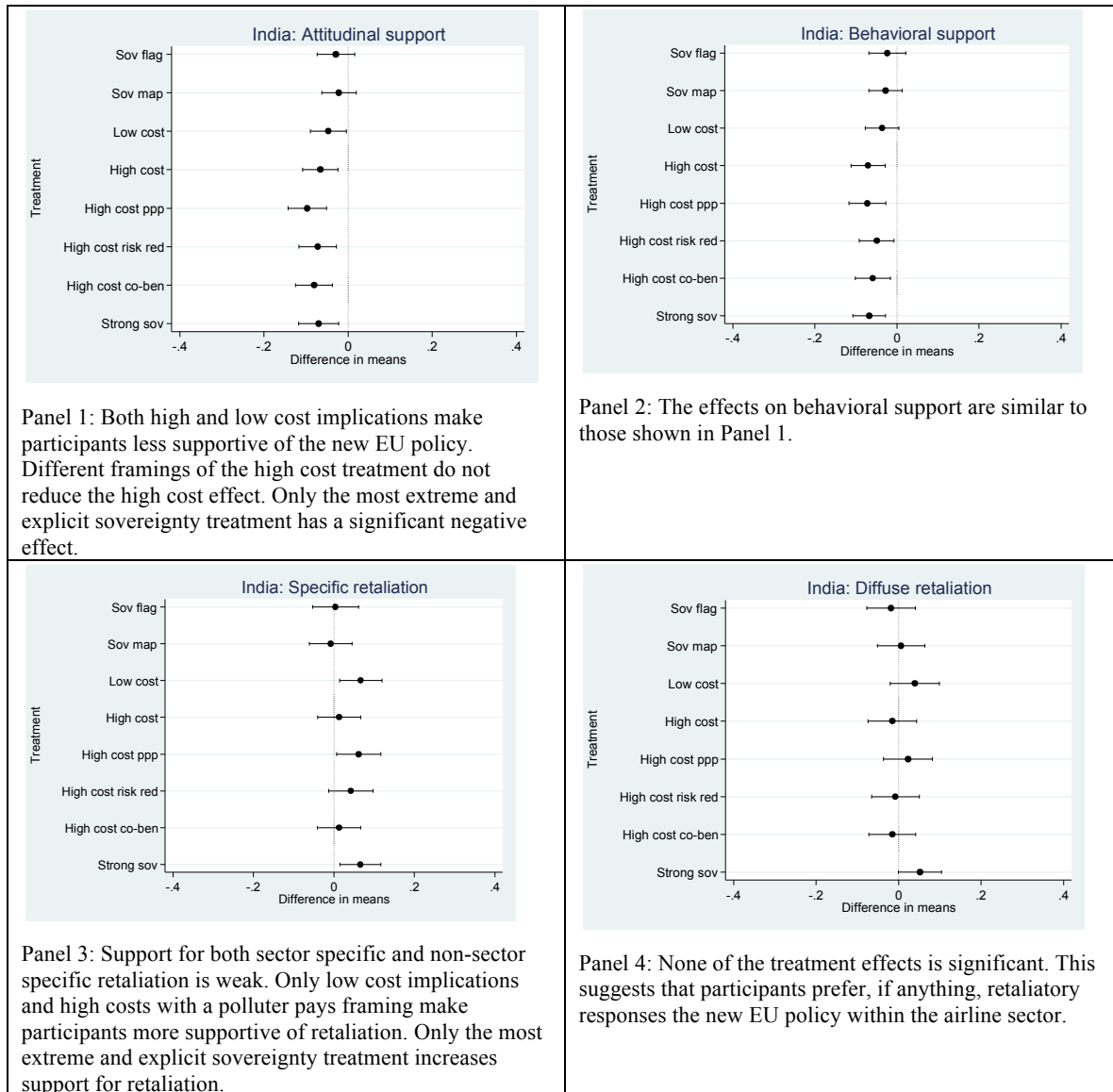
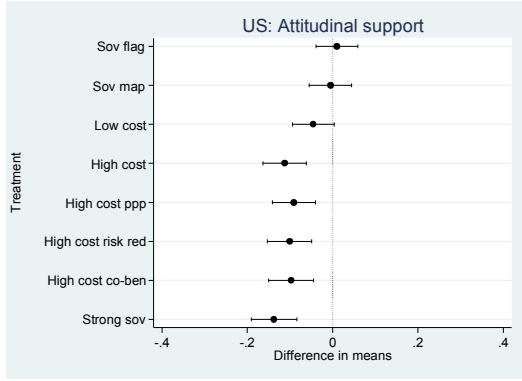
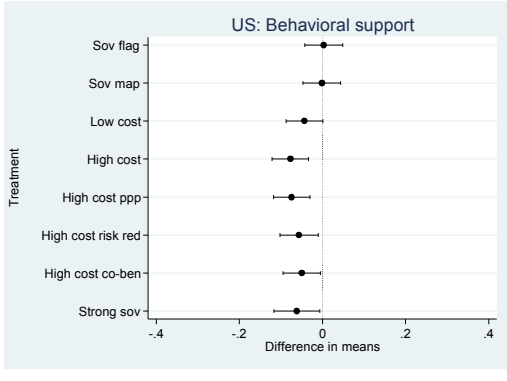


Figure 1 Effects of cost and sovereignty considerations on individual support for / opposition to EU regulation of aircraft emissions among participants from India (Study 1) The treatments (vertical axis) are described in detail in Methods and Supplementary Methods. The first two estimates (based on t-tests, 95% confidence intervals shown by whiskers) from the top of each graph indicate average effects of sovereignty violation

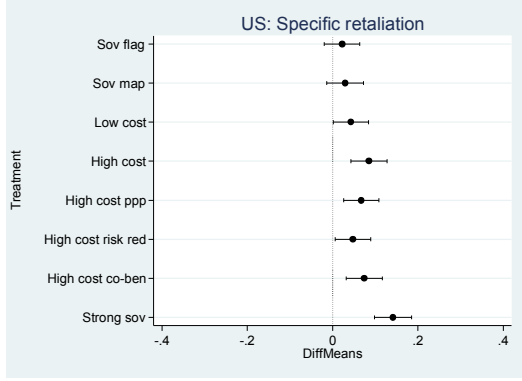
treatments; the estimate displayed at the bottom is for the most extreme and explicit sovereignty treatment. (See Supplementary Note and Methods for the complete description of the explicit sovereignty treatment.) The third and fourth estimate from the top are for low and high cost implications, the fifth to seventh estimate for high costs combined with a polluter pays, a climate risk reduction, and an economic co-benefits framing. Where whiskers cross the 0-line the estimated treatment effect is not statistically significant at the 5% level. Treatment effects on four response items are measured: attitudinal and behavioral support for the EU policy, support for sector-specific and non-sector specific (diffuse) retaliation (i.e. opposition). All panels indicate differences in means between treatment and control groups. All response items are scaled from 0 to 1, so that differences in means can be read as percentage changes in support/opposition.



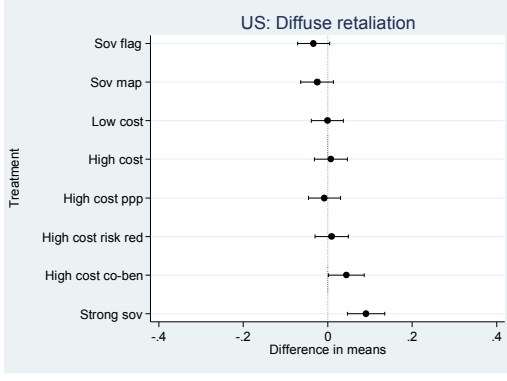
Panel 1: High cost implications have a negative effect on support for the new EU policy. Different framings of the high cost treatment do not reduce this effect. Only the most extreme and explicit sovereignty treatment reduces support.



Panel 2: The results are very similar to those shown in Panel 1.



Panel 3: Both framed and unframed high cost implications induce stronger support for sector specific retaliation. Only the most extreme and explicit sovereignty treatment increases support for retaliation.



Panel 4: There is less support for non-sector specific than for sector specific retaliation, and most treatment effects are insignificant. Again, only the most extreme and explicit sovereignty treatment increases support for retaliation.

Figure 2 Effects of cost and sovereignty considerations on individual support / opposition to EU policy among US-participants (Study 2). See caption for Figure 1 on how to read Figure 2.