

# **Institutional Design and Public Support for Global Climate Cooperation**



**Prof. Michael Bechtel**

*Université de St. Gall*

# Institutional Design and Public Support for Global Climate Cooperation<sup>\*</sup>

Michael M. Bechtel<sup>†</sup>

*Université de  
St. Gall*

## Summary

Addressing the global challenges arising from climate change requires international environmental cooperation. Although in democratic systems domestic support for international cooperation eventually determines its long-term prospects, we know very little about how the design of international agreements affects individual support for establishing and joining such institutions. This study contributes to answering these questions. We explore how the three key dimensions of international environmental cooperation – participation, the distribution of costs arising from climate change mitigation efforts, and enforcement mechanisms – affect mass support for these institutions among publics in France, Germany, the United Kingdom, and the United States. We embedded an experimental conjoint analysis in large-scale, representative surveys in these four countries. We find that costs and distribution, participation, and enforcement affect individuals' willingness to support these international efforts. Our results suggest that support is higher for global climate agreements that involve lower costs, distribute costs according to prominent fairness principles, encompass more countries, and include a small sanction if a country fails to meet its emissions reduction targets. Moreover, the features of climate agreements have very similar effects on public support across countries. The effects of design features may mirror underlying norms of reciprocity and individual expectations about the probability of realizing an effective agreement. These results provide policymakers with novel, important and detailed knowledge about which types of international environmental cooperation are likely to have long-term prospects in democracies and which will not.

---

<sup>\*</sup> This text is based on joint work with Kenneth F. Scheve that was published in Bechtel and Scheve (2013). This research has received financial support from the Swiss Network for International Studies, Yale University's MacMillan Center for International and Area Studies, and Yale University's Institution for Social and Policy Studies.

<sup>†</sup> University of St.Gallen, Department of Political Science, Rosenbergstr. 51, CH-9000 St.Gallen, mbechtel.mail@gmail.com.

# 1. Introduction

Many citizens, experts, and an increasing number of policymakers around the globe perceive global warming as a particularly important challenge that necessitates global cooperation to be addressed successfully (Stern 2007; Bank 2010; Worldpublicopinion.org 2009). While the scientific community emphasizes that industrialized countries, like Germany, France, the United States, or the United Kingdom, will have to play a key role in building a global climate policy architecture (Olmstead and Stavins 2010; Bosetti and Frankel 2009; Frankel 2008; Bodansky, Chou and Jorge-Tresolini 2004), we know virtually nothing about which types of international climate policies citizens support in these democratic systems. Improving our knowledge about which types of international agreements individuals prefer over others and why appears crucial since all global efforts aimed at curbing greenhouse gas emissions ultimately rely on individuals changing their consumption patterns and supporting policymakers' international climate policy choices electorally. Therefore, the effectiveness and sustainability of any international climate policy ultimately depends on individual support. Despite informative survey evidence on individuals' general environmental and beliefs (Daniels, Krosnick, Tichy and Tompson 2012; Tingley and Tomz 2012; Diekmann and Franzen 1999; Czap and Czap 2010; Yeager, Larson, Krosnick and Tompson 2011), our study provides novel and policy-relevant insights as it focuses on how and why the most salient features of global environmental agreements influence public support for these cooperative efforts.

## 2. Climate Policy Design and Public Support

We are interested in how public support for international environmental cooperation depends on the specific features of the policy in question. To this end, we develop three theoretical accounts of the effects of climate agreement features on individual preferences. Although this question has not yet been addressed by previous research, our theory can draw on the available literature in international political economy (Keohane and Victor 2011; Thompson 2010; Bechtel and Tosun 2009; Victor 2006; Finus and Tjøtta 2003; Mitchell and Keilbach 2001; Downs 2000; Barrett 1997), and climate policy research (Victor 2011; Olmstead and Stavins 2010; Bosetti and Frankel 2009; Frankel 2008). We focus on three core dimensions of international environmental cooperation: Costs and distribution, participation, and enforcement.

### Costs and Distribution

The costs arising from international climate policy and their distribution plays a key role in the public debate and continues to figure prominently in international negotiations about a global climate policy architecture (Keohane and Victor 2011; Thompson 2010; Mitchell and Keilbach 2001). Some even argue that the questions of distributive justice will eventually determine success or failure of international climate policy efforts (Bodansky et al. 2004; Frankel 2008). International climate policy efforts immediately provoke questions of distributive justice because the costs arising from these efforts have to be distributed and there exists disagreement about which principles should guide the allocation of these costs (Page 2007; Ringius, Torvanger and Underdal 2002). Therefore, as regards the role of costs and distribution, our research asks two key questions: First, to what extent are individuals willing to accept costs arising from international climate policies? Second, do citizens prefer a certain type of allocation principle that should guide the distribution of costs between countries?

Although some suggest that the costs of environmental protection do not play a significant role for support for environmental policy (Daniels et al. 2012), theories of economic voting predict that individuals generally prefer policies that, all else equal, provide them with the largest benefits or, in the case of costly regulatory choices, the policy that is associated with the lowest costs. This suggests that individuals' willingness to support international climate policy depends negatively on the specific costs arising from global climate cooperation. Thus, support for a climate agreement should decrease as the expected costs of the policy increase.

There exists a surprisingly widespread consensus among individuals on fairness norms like the “polluter pays” principle and the “ability to pay” principle (Ringius et al. 2002). Each of these principles suggests a specific distribution of costs that mirrors prominent conceptions of fairness. According to the polluter pays principle, a fair distribution of the costs arising from climate policy should be proportional to the distribution of greenhouse gas emissions. Given the current distribution of emissions and the stock of historical emissions, the polluter pays principle requires that industrialized countries carry almost all of the costs associated with the mitigation efforts agreed upon in a global climate agreement. Given the well-documented importance of fairness preferences, we expect that a distribution proportional to emissions increases support for a climate agreement as compared to an agreement that does not include such a norm of distributive fairness.

A second prominent fairness norm is the ability to pay principle. This norm, also known as the “stronger shoulders bear the greater burden” principle, requires that the costs of a policy should be proportional to the ability to pay. In the case of global climate policy that aims at reducing global CO<sub>2</sub> emissions, the ability to pay principle requires that rich countries finance a much larger share of the costs of mitigation policies than poorer countries. Since this distributive principle resonates with a widespread fairness norm, we expect that international agreements that distribute the costs of climate protection according to the ability to pay principle will receive more individual support than agreements that follow other allocation schemes that appear less fair.

### **Participation**

The level of participation in international institutions is a key aspect of international cooperation as it has important consequences for an institution’s decision-making capacity, evaluations of the fairness and legitimacy of the institution, and ultimately its success in reaching its objective (Keohane and Victor 2011; Thompson 2010; Bechtel and Tosun 2009; Mitchell and Keilbach 2001; Downs 2000; Barrett 1997). In the context of global climate policy, we distinguish two ways of conceptualizing the level of participation in international cooperation. First, we can think of participation in terms of how many countries join an agreement. Second, one can conceptualize participation levels by looking at the share of greenhouse gas emissions represented by the participating countries. The latter conceptualization appears particularly interesting and relevant in the context of climate change, as climate agreements that represent a larger share of emissions may potentially be more effective than an agreement that represents only a very small share of global emissions, even if participating countries eventually reach a lower reduction in greenhouse gas emissions than those participating in the less encompassing agreement. Generally, we hypothesize that individuals have a preference for more encompassing agreements both because such agreements are more effective and because they are perceived to be more fair.

### **Enforcement**

International climate policy ultimately aims to realize reductions in CO<sub>2</sub> emissions to prevent or at least mitigate global warming. However, as is typical with the provision of public goods, there exists an incentive to freeride on the mitigation efforts of other countries. To counter these enforcement problems, a large literature (Keohane 1988; Fearon 1988; Abbott and Snidal 1998) has highlighted that the effectiveness of international institutions crucially depends on two aspects of enforcement efforts: monitoring and sanctions. While monitoring provides information about the degree of compliance, which allows for blaming and shaming mechanisms, sanctions directly punish freeriding and thereby increase the level of compliance. Unsurprisingly, these mechanisms also play a crucial role in proposals for an effective international climate policy architecture and we expect public support for agreements to be sensitive to whether and how agreements are monitored and enforced (Frankel 2008; Olmstead and Stavins 2010). More specifically, we expect that individuals that have a stronger preference for environmental protection in general will be more supportive of agreements that include a sanction than individuals that are less concerned about the environment.

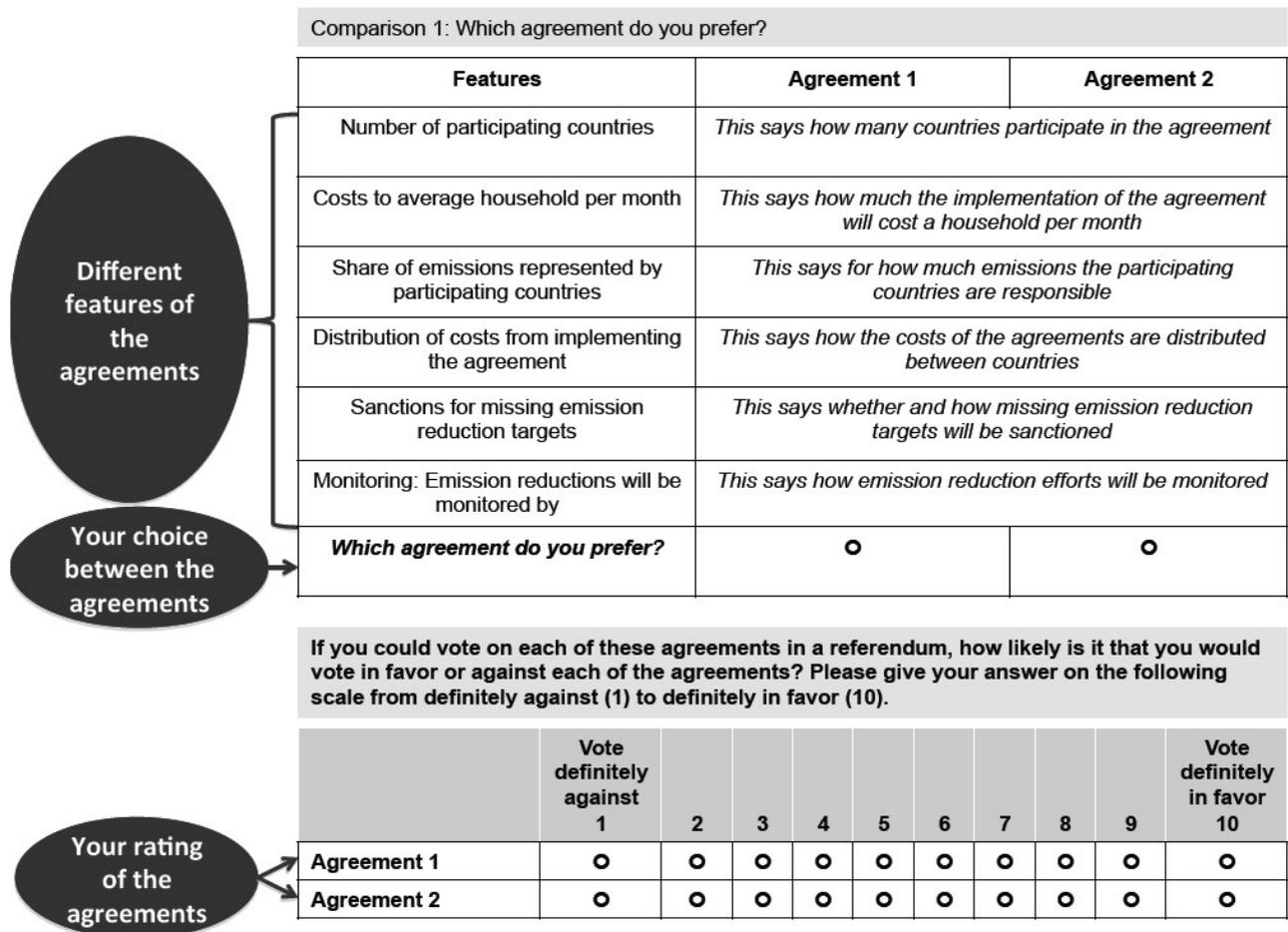
### 3. Research Design

To evaluate these hypotheses we developed a comprehensive questionnaire that includes quasi-behavioral measures of social norms, such as, reciprocity. Second, we have designed a unique conjoint experiment to explore how different features of international environmental agreements affect individual support for these policies. Using an experimental conjoint approach has significant efficiency advantages over traditional experimental items in surveys, as it allows us to explicitly compare the effects of specific features and the trade-offs individuals make between them (Hainmueller, Hopkins and Yamamoto 2012; Bechtel, Hainmueller and Margalit 2012; Hainmueller and Hopkins 2012). We embedded the conjoint experiment in the survey conducted on representative samples of the adult populations in France, Germany, the United Kingdom, and the United States.

The core of our study is an experimental conjoint analysis that allows us to estimate how citizens' support for an international climate agreement varies as a function of its specific design features (participation, costs and distribution, and enforcement). In each conjoint, we showed a respondent two international agreements in comparison and ask them to rank and rate them. Each respondent was shown four such binary comparisons. In addition to asking respondents which of the two agreements they prefer, we asked: "If you could vote on each of these agreements in a referendum, how likely is it that you would vote in favor or against each of the agreements? Please give your answer on the following scale from definitely against (1) to definitely in favor (10)."

We carefully instructed respondents to ensure that they understood the comparisons and the dimensions used in the conjoint. Figure 1 shows a screenshot of the example comparison we used to instruct respondents (we also provided additional verbal instructions not shown in Figure 1). To avoid confusing our respondents, we kept the order of the dimensions fixed. Table 1 shows the dimensions and values used in the conjoint. The values for the costs to average households directly mirror the different cost scenarios discussed in the public and scientific debate. According to Stern (2007) and others (Cline 1992; Cline 2004), stabilizing CO<sub>2</sub> concentration at 550 particles per million (ppm) will require abatement costs in the order of 2 percent of GDP in industrialized

**Figure 1: Screenshot of the Conjoint Part of the Survey**



Nordhaus (2007), however, has argued that the discount rates used by Stern (2007) are too low since they are inconsistent with the existing market returns on capital investment. From this perspective, the immediate costs of climate mitigation required to stabilize greenhouse gas concentrations at around 550ppm will be lower than those reported by Stern (2007). To account for these different cost scenarios, we computed monthly abatement costs to the average household for five different cost scenarios, ranging from 0.5 to 2.5% of a country’s GDP in steps of 0.5 percentage points (OECD 2010; Ackerman and Bueno 2011). We used a similar approach to choose the size of sanctions to households for a country missing its emission reduction targets, distinguishing between no sanction and a small (\$ 11), medium (\$ 32), and high (\$ 43) sanction.

Our choice of allocation principles to distribute the costs of climate policy mirrors the debate and includes variants of the polluters principle (proportional to current emissions and proportional to history of emissions), as well as the ability to pay principle (only rich countries pay and rich countries pay more than poor countries). The sample size for the United States was 2,500 and the sample size for France, Germany, and the United Kingdom was 2,000 each. Thus, the total sample size was 8,500. As each respondent rated 8 climate agreements, the total number of rated climate agreements that we can use to estimate the effects of institutional design features is 68,000.

## 4. Findings

Since our research design fully randomizes the attributes of the climate agreements under consideration, it is possible to nonparametrically compare levels of support across attribute levels

for any given dimension of an agreement to determine the average causal effect of a given attribute on support for an agreement.

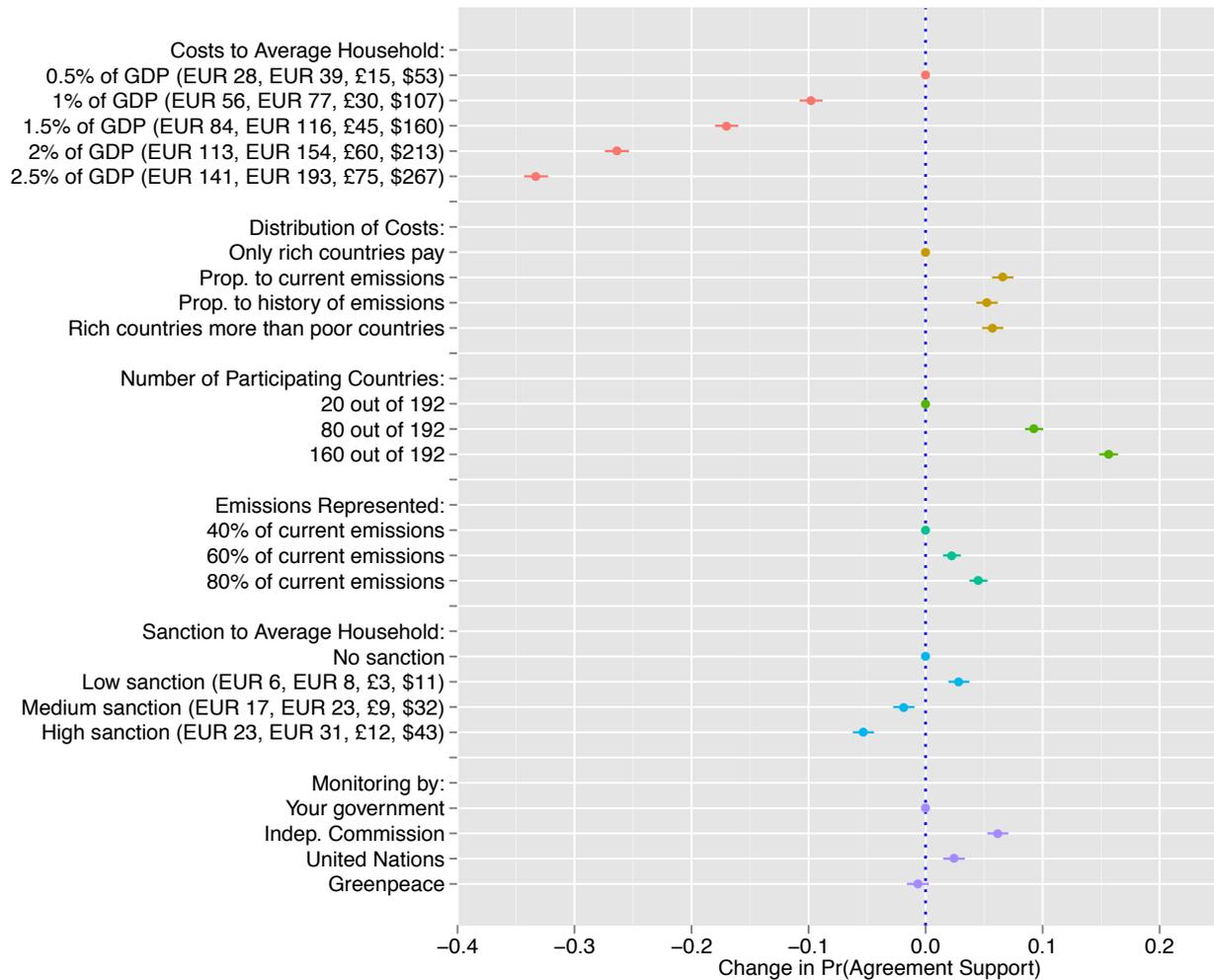
**Table 1: Policy Dimensions and Values for the Global Climate Agreement Conjoint**

Dimension	Values
<i>Costs and Distribution</i>	
Costs to Average Household per Month	€28, €39, £15, \$53 €56, €77, £30, \$107 €84, €116, £45, \$160 €113, €154, £60, \$213 €141, €193, £75, \$267
Distribution of Costs	Only rich countries pay Proportional to current emissions Proportional to history of emissions Rich countries pay more than poor countries
<i>Participation</i>	
Number of Participating Countries	20 out of 192 80 out of 192 160 out of 192
Emissions Represented	40% of current emissions 60% of current emissions 80% of current emissions
<i>Enforcement</i>	
Monitoring	Own government Independent commission United Nations Greenpeace
Sanctions to Average Household per Month	No sanction €6, €8, £3, \$11 €17, €23, £9, \$32 €23, €31, £12, \$43

Thus, we do not rely on any assumption about the model’s functional form. Figure 2 presents our estimates of the effects of climate treaty design on public support. The point estimates without confidence intervals form the reference category. We find that the effects of international climate policy features on individual support for an agreement are statistically and substantively significant. Costs are a main driver of support for climate cooperation. An increase of average household costs from 0.5% to 1% of gross domestic product decreases public support for an agreement by 10 percentage points. An agreement that is expected to cost 2% of GDP, which corresponds to €113 in France, €154 in Germany, £60 in the United Kingdom, and \$213 in the United States per household and month, decreases support among citizens by 25 percentage points on average if compared to an agreement that costs only 0.5% of GDP. The strong sensitivity to costs is consistent with the view that manageable greenhouse gases are a global public good which individuals would like to consume but their demand for it is sensitive to its price. This finding sets a noteworthy qualification on previous survey work that has documented largely stable levels of support for environmental protection even if the survey question used to measure attitudes mentions that the policy will be associated with costs (Krosnick and MacInnis 2012; Krosnick, Holbrook, Lowe and Visser 2006). While we also find broad support for climate change cooperation, that support depends substantially on its expected costs.

Although costs are important, fairness considerations matter as well. One way in which the importance of fairness norms is evident is in the sensitivity of opinion to the principles of the distribution of costs across countries. Distributing the costs of emissions reductions “proportional to current emissions” increases support by about 6 percentage points when compared to an agreement in which “only rich countries pay.” This effect may suggest that perceptions of agreement fairness are most powerfully determined by a “polluter-pays” principle as opposed to a strong version of the “ability-to-pay” principle.

**Figure 2: The Effects of Global Climate Policy Features on Public Support**



*Note:* Effects of climate policy features on the probability of supporting the agreement. Horizontal lines indicate 95% robust (clustered by respondent) confidence intervals; points without lines indicate the reference categories for the effects of the features.  $N=68,000$  ranked climate agreements from conjoint experiment.

The results also suggest that publics are more willing to support global climate cooperation if it involves more countries. When we increase the number of countries that participate in a hypothetical agreement from “20 out of 192” to “80 out of 192” this raises public support by 15 percentage points. We also find that enforcement features matter: Individuals prefer an agreement that includes a small sanction over agreements that do not sanction countries that did not meet their emission reduction obligations. However, medium or high sanctions make a treaty less attractive than an agreement without sanctions. We also explore the potential mechanisms that drive the sensitivities to climate treaty design features. Our results are consistent with the interpretation that the effects of agreement features are partly due to effectiveness concerns and a reciprocity norm.<sup>1</sup>

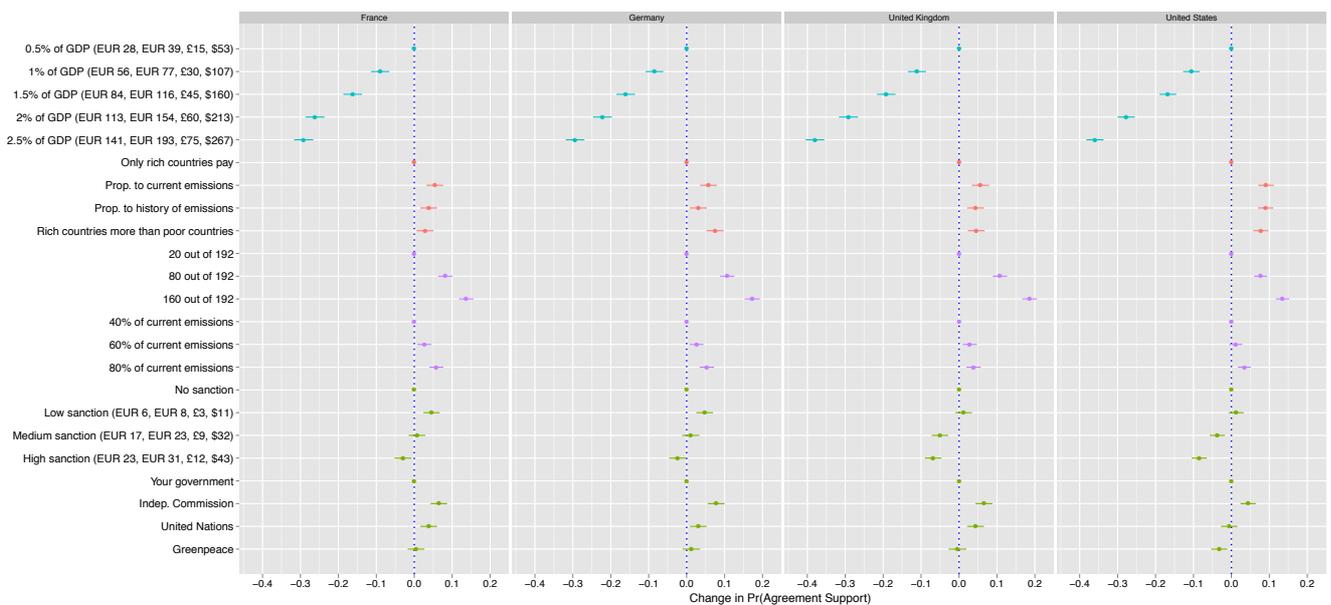
Our main results are based on the pooled data from all four countries. We also explore the potential heterogeneity of our findings across countries. Figure 3 shows the results. We find that publics in France, Germany, the United Kingdom, and the United States respond very similarly to changes in climate agreement features. This means that policymakers face similar domestic constraints on their international climate policy choices. Thus, in all four countries, citizens prefer a less costly treaty that includes as many countries as possible and has an

<sup>1</sup> See Bechtel and Scheve (2013) and the corresponding Supporting Information Appendix for the detailed results.

independent institution monitor member countries' mitigation efforts. Notably, including a low sanction only increases support in France and Germany, but not in the United Kingdom and the United States.

Despite the similarity in how public demand responds to climate policy features, differences between these countries remain in terms of the level of support for climate policy and the possibility of of agreement features to bring about a decisive shift in support for global climate policy. In other words, whether treaty design choices can turn a climate treaty that the majority of citizens opposes into one that receives support by a majority also depends on the level of support. To explore whether agreement features can induce decisive shifts in public support, we compute predicted levels of support for hypothetical agreements. The SI Appendix for Bechtel and Scheve (2013) provides details about the algorithm for these simulations.<sup>2</sup> The main finding is that the most popular agreement brings about such a decisive shift in France, Germany, and the United Kingdom. In the United States, the most desirable climate treaty design features shifts support from 29 percent to 47. Thus, even in the United States, for which the relatively low levels of support for environmental policy are well documented, the right combination of climate agreement features can bring up support for climate policy close to the 50%.

**Figure 3: The Effect of International Climate Policy Features on Public Support in France, Germany, the United Kingdom, and the United States**



Note: Effects of climate policy features on the probability of supporting the agreement. Horizontal lines indicate 95% robust (clustered by respondent) confidence intervals; points without lines indicate the reference categories for the effects of the features.

## 5. Conclusion

Our study provides knowledge about which types of climate cooperation are likely to have long-term prospects in democracies and which will not. Thus, we believe that the results carry several important implications that appear relevant for policymakers and the interested public. First, this is the first study to estimate the cost elasticity of support for global climate cooperation.

<sup>2</sup> The SI appendix is available at <http://www.pnas.org/content/110/34/13763/suppl/DCSupplemental>.

Although costs are the main driver of public support for global climate cooperation, our results suggest that policymakers can significantly increase individuals' willingness to support an agreement by choosing the right combination of features other than costs. In particular, architects of climate treaties can increase support by aiming at encompassing treaties that include many countries and that represent a large share of global emissions. Moreover, the enforcement structure matters: Including independent monitoring institutions and a small sanction for countries that fail to meet their obligations also raises public support for a treaty. This knowledge may help governments to design climate treaties that are more likely to find support by a majority of citizens and therefore, have better prospects of becoming an effective tool to address climate change.

## References

- Abbott, Kenneth W. and Duncan Snidal (1998), 'Why states act through formal international organizations', *Journal of Conflict Resolution* 42(1), 3–32.
- Ackerman, Frank and Ramón Bueno (2011), Use of McKinsey Abatement Cost Curves for Climate Economics Modeling, Technical report, Stockholm Environment Institute.
- Bank, World (2010), World development report 2010: Development and climate change, Technical report, World Bank.
- Barrett, Scott (1997), 'The Strategy of Trade Sanctions in International Environmental Agreements', *Resource and Energy Economics* 19(4), 345–361.
- Bechtel, Michael M. and Jale Tosun (2009), 'Changing Economic Openness for Environmental Policy Convergence: When Can Bilateral Trade Agreements Induce Convergence of Environmental Regulation?', *International Studies Quarterly* 53(4), 931–953.
- Bechtel, Michael M., Jens Hainmueller and Yotam Margalit (2012), Studying public opinion on multidimensional policies: The case of the eurozone bailouts. Submitted Working Paper.
- Bechtel, Michael M. and Kenneth F. Scheve (2013), 'Mass support for global climate agreements depends on institutional design', *Proceedings of the National Academy of Sciences of the United States of America* 110(34), 13763–13768.
- Bodansky, Daniel, Sophie Chou and Christie Jorge-Tresolini (2004), International Climate Efforts Beyond 2012: A Survey of Approaches. Prepared for the Pew Center on Global Climate Change.
- Bosetti, Valentina and Jeffrey A. Frankel (2009), Global Climate Policy Architecture and Political Feasibility: Specific Formulas and Emission Targets to Attain 460ppm CO<sub>2</sub> Concentrations. NBER Working Paper 15516.
- Cline, William R. (1992), *The Economics of Global Warming*, Peterson Institute for International Economics.
- Cline, William R. (2004), *Global Warming and Agriculture: Impact Estimates by Country*, Peterson Institute for International Economics.
- Czap, Natalia V. and Hans J. Czap (2010), 'An Experimental Investigation of Revealed Environmental Concern', *Ecological Economics* 69(10), 2033–2041.
- Daniels, David P., Jon A. Krosnick, Michael P. Tichy and Trevor Tompson (2012), Public Opinion on Environmental Policy in the United States: A Bouquet of Multiple Dimensions, in M.Kraft and S.Kamieniecki, eds, 'Handbook of U.S. Environmental Policy', Oxford University Press, New York, p. forthcoming.
- Diekmann, Andreas and Axel Franzen (1999), 'The Wealth of Nations and Environmental Concern', *Environment and Behavior* 31(4), 540–549.
- Downs, George W. (2000), 'Constructing effective environmental regimes', *Annual Review of Political Science* 3, 25–42.
- Fearon, James D. (1988), 'Bargaining, Enforcement, and International Cooperation', *International Organization* 52(2), 269–305.

- Finus, Michael and Sigve Tjøtta (2003), 'The oslo protocol on sulfur reduction: the great leap forward?', *Journal of Public Economics* 87, 2031–2048.
- Fischbacher, Urs, Simon Gächter and Ernst Fehr (2001), 'Are People Conditionally Cooperative? Evidence from a Public Goods Experiment', *Economics Letters* 71(3), 397–404.
- Frankel, Jeffrey (2008), An elaborated proposal for global climate policy architecture: Specific formulas and emission targets for all countries in all decades. Discussion Paper 08-08, Harvard Project on International Climate Agreements, Belfer Center for Science and International Affairs, Harvard Kennedy School.
- Hainmueller, Jens and Daniel Hopkins (2012), The Hidden American Immigration Consensus: A Conjoint Analysis of Attitudes Toward Immigrants. MIT Political Science Department Research Paper No. 2012-22.
- Hainmueller, Jens, Daniel Hopkins and Tepei Yamamoto (2012), Causal inference in conjoint analysis: Understanding multi-dimensional choices via stated preference experiments. Submitted Working Paper.
- Keohane, Robert O. (1988), 'International Institutions: Two Approaches', *International Studies Quarterly* 32(4), 379–396.
- Keohane, Robert O. and David G. Victor (2011), 'The regime complex for climate change', *Perspectives on Politics* 9(1), 7–23.
- Krosnick, Jon A., Allyson Holbrook, Laura Lowe and Penny S. Visser (2006), 'The origin and consequences of democratic citizens' policy agendas: A study of popular concern about global warming', *Climatic Change* 77(1), 7–43.
- Krosnick, Jon A. and Bo MacInnis (2012), Trends in american public opinion on global warming policies between 2010 and 2012. Submitted Working Paper.
- Mitchell, Ronald B. and Patricia M. Keilbach (2001), 'Situation structure and institutional design: Reciprocity, coercion, and exchange', *International Organization* 55(4), 871–917.
- Nordhaus, William (2007), '2008', *A Review of The Stern Review on the Economics of Climate Change* 54(3), 686–702.
- OECD (2010), Costs and Effectiveness of the Copenhagen Pledges: Assessing the Global Greenhouse Gas Emissions Targets and Actions for 2020, Technical report, OECD.
- Olmstead, Sheila M. and Robert N. Stavins (2010), 'Three Key Elements of Post-2012 International Climate Policy Architecture', *Harvard Kennedy School Discussion Paper 10-37*.
- Page, Edward A. (2007), 'Fairness and the Day after Tomorrow: Justice, Reciprocity and Global Climate Change', *Political Studies* 55(1), 225–242.
- Ringius, Lasse, Asbjorn Torvanger and Arild Underdal (2002), 'Burden Sharing and Fairness Principles in International Climate Policy', *International Environmental Agreements: Politics, Law and Economics* 2(1), 1–22.
- Stern, Nicholas (2007), *The Stern Review on the Economics of Climate Change*, Cambridge University Press, Cambridge.
- Thompson, Alexander (2010), 'Rational design in motion: Uncertainty and flexibility in the global climate regime', *European Journal of International Relations* 16(2), 269–296.
- Tingley, Dustin and Michael Tomz (2012), Conditional Cooperation and Climate Change. Working Paper.
- Victor, David G. (2006), 'Toward Effective International Cooperation on Climate Change: Numbers, Interests and Institutions', *Global Environmental Politics* 6(3), 90–103.
- Victor, David G. (2011), *Global Warming Gridlock: Creating More Effective Strategies for Protecting the Planet*, Cambridge University Press, Cambridge.
- Worldpublicopinion.org (2009), Publics Want More Government Action on Climate Change: Global Poll, Technical report, World Public Opinion.

Yeager, David Scott, Samuel B. Larson, Jon A. Krosnick and Trevor Tompson (2011), 'Measuring Americans' Issue Priorities: A New Version of the Most Important Problem Question Reveals More Concern about Global Warming and the Environment', *Public Opinion Quarterly* 75(1), 709–747.