Benchmarking Support for Climate Action in International Organizations*

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Abstract

Climate change is one of the greatest collective action problems we face as a society. Yet, effective climate action is not only associated with short-term costs, it also requires international collaboration, which may constrain the degree to which governments and voters make necessary changes. In this paper, we study the conditions that induce voters to accept higher costs for collective climate action in international organizations. Specifically, we examine the degree to which benchmarking relative vulnerability to climate change and the relative costs associated with climate change policies vis-à-vis other nations influence support for the European Green Deal. To do so, we fielded a randomized visual survey experiment embedded in the 2024 European Election Study (EES), conducted among representative samples in all 27 EU member states. Our findings show that perceptions of a country's relative contribution to the EU Green Deal significantly decreases public support, whereas relative vulnerability to climate change does not have a clear effect. These results suggest that public support for international climate efforts is constrained when voters perceive their own country as disproportionately bearing the costs of the green transition.

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Introduction

Climate change represents one of the most urgent and complex challenges of our time. It is not only a pressing environmental crisis, but also a quintessential collective action problem: its resolution requires extensive cooperation across boundaries with incentives for nations to free-ride on others' efforts. While the long-term benefits of climate mitigation are global, the associated short-term costs are often borne locally (Gaikwad, Genovese, and Tingley 2022), creating political and distributive tensions that can constrain policy ambition of policy-makers, particularly within international organizations (Alesina, Angeloni, and Etro 2005; Bechtel and Scheve 2013). In this context, public support becomes both a prerequisite for, and a constraint on, effective multilateral climate action.

This challenge is particularly acute in the context of international organizations such as the European Union. These institutions must coordinate ambitious climate action across diverse member states with varying levels of exposure to climate risks and differing capacities to absorb the economic costs of a green transition (Rayner and Jordan 2016). While the EU has committed to far-reaching climate goals – most notably through the European Green Deal – implementing these policies requires not only elite agreement but also broad-based citizen support (Bongardt and Torres 2022; Kollberg et al. 2025). Yet, in such multilateral settings, citizens may resist policies they perceive as unfair, especially when they believe their country is being asked to shoulder a disproportionate share of the financial burden. The perception that one's own nation is "paying for the others" can reduce support for otherwise popular climate measures, undermining the political feasibility of collective action. Consequently, the success of EU climate policy is inseparable from public perceptions of fair burden sharing.

This paper examines the political psychology of burden sharing in international climate policy. Specifically, we investigate how information about the relative vulnerability to climate change and the relative costs of climate mitigation policies, benchmarked against other EU member states, influence public support for collective climate action within the European Union. Our research question asks *to what extent does benchmarking national risk and cost exposure relative to other EU countries shape voter support for EU-wide climate policy?*

Our analysis builds on a growing body of research examining the effects of economic costs on environmental policy preferences (Dechezleprêtre et al. 2022; Andre et al. 2024; Bolet, Green, and Gonzalez-Eguino 2024), while contributing new insight into how these factors operate in the context of multilateral burden sharing. Drawing on benchmarking theory (Kayser and Peress 2012; Hobolt and De Vries 2016; De Vries 2018; Hobolt et al. 2022), we argue that citizens compare their own country's exposure to climate risks and their contribution to green policies against those of other European countries. These relative assessments help shape whether individuals view EU-wide climate policy as desirable. When citizens perceive that their country is more vulnerable than others, they may view collective action as urgent and necessary. Conversely, when they perceive that their country is bearing an unfair share of the cost, their willingness to support such efforts may decline. These attitudes are not shaped solely by absolute figures, but by comparative reasoning embedded in perceived national standing.

To test these expectations, we fielded a preregistered, randomized visual vignette experiment embedded in the 2024 European Election Study (EES) (Popa et al. 2024). The experiment was conducted across all 27 EU member states, providing a unique cross-national context for our study. Respondents were randomly assigned to one of three groups: (1) a vulnerability treatment, where they viewed a vignette and map displaying their country's relative vulnerability to climate change; (2) a cost treatment, where they received a vignette and map showing their country's relative financial contribution to the EU Green Deal; or (3) a control group, which received no comparative information before answering climate policy preference questions. Our primary outcome variable of interest was the level of support for the European Green Deal.

The results reveal that relative country costs exert a stronger influence on support for EU climate policy than do relative vulnerability assessments. Specifically, individuals are less likely to support collective climate action when they are reminded of their country's contributions to climate policy. In contrast, providing information about national vulnerability to climate change – while directionally increasing support – has a more limited and inconsistent effect. We find that the *relative* costs conditions support for climate policy. In other words, when individuals are made aware of their country's relative contributions to EU climate policy, they adjust their support accordingly.

Our findings contribute to the literature in several ways. First, we extend research on public opinion towards climate change by highlighting the role of relative, rather than absolute, perceptions of risk and cost in shaping attitudes toward supranational policy. Second, we contribute to work on benchmarking and burden sharing in international cooperation by showing how citizens' preferences are influenced by cross-national comparisons. Finally, we employ a novel methodological approach by embedding a randomized experiment in a large-scale, cross-national survey, allowing for robust identification of causal effects across diverse political contexts. In sum, this paper demonstrates that support for international climate action depends not only on environmental concern or economic self-interest, but also on how individuals perceive the fairness of burden sharing within multilateral institutions. For organizations like the European Union, where climate action requires cooperation among states with differing levels of vulnerability and capacity, managing public perceptions of distributive equity is essential.

Benchmarking support for EU climate action

What shapes public support for climate action at the EU level? A growing literature shows that public support for, and opposition to, climate policy is shaped by concerns over economic costs. Evidence shows that voters are particularly sceptical of climate policies that impose direct and visible costs, such as carbon taxes, bans, or regulatory standards (Aklin and Mildenberger 2020; Bayer and Genovese 2020; Bolet, Green, and Gonzalez-Eguino 2024; Schaffer 2024; Voeten 2025). These policies, although often effective, are politically contentious because they concentrate costs on identifiable groups, which can lead to electoral backlash. For instance, voters have been shown to punish incumbents following the introduction of low-emission zones (Colantone et al. 2024) or the closure of coal mines (Egli, Schmid, and Schmidt 2022), each of which are visible interventions with concentrated local effects. Comparative evidence of public support for climate policies shows that initiatives with concentrated costs, like carbon pricing, are among the least popular with voters. In contrast, policies that diffuse costs across the broader population, such as green industrial subsidies or investments, are much more favorably received (Abou-Chadi et al. 2024). Bolet, Green, and Gonzalez-Eguino (2024) further show that public support for climate change policies increases when individuals perceive that policies are fair, particularly when costs are distributed equitably across income groups and countries.

While this literature provides valuable insights into climate policy support at the national level, we know less about how citizens evaluate climate action undertaken by international organizations. Some existing research explores public attitudes towards global or EU-level climate initiatives (Bechtel and Scheve 2013; Bayer and Genovese 2020; Baute 2025; Kollberg et al. 2025), yet we still lack systematic evidence on how the international dimension itself – especially the cross-national distribution of costs and risks – shapes public opinion. Specifically, how does the multilateral nature of policymaking in international organizations like the European Union influence voter support? And to what extent does benchmarking against other nations shape public attitudes towards EU-level climate efforts?

In this paper, we address these questions by focusing on the European Green Deal, a flagship EU initiative with significant redistributive implications across member states. The European Green Deal, introduced in 2020, is an ambitious strategy aimed at achieving climate neutrality by 2050 (Bongardt and Torres 2022). We argue that in order to understand public support for climate action in international organizations (IOs), we must examine citizens' willingness to bear the costs of the green transition relative to the contributions and vulnerabilities of other countries. The European Union provides a particularly useful context for this inquiry because it requires member states to commit to shared goals and distribute policy costs through common institutions, often with uneven burdens across countries.

Our theoretical framework draws on benchmarking theory (Kayser and Peress 2012; De Vries 2018; Hobolt et al. 2022), which posits that citizens evaluate policies and political performance not in isolation, but in comparison to other relevant units, often neighboring or peer countries. In the EU context, this means citizens may assess the legitimacy and desirability of EU climate action by comparing their own country's exposure to climate risks and its financial contributions to those of other member states. When voters perceive that their country is especially vulnerable to climate change, they may be more inclined to support collective action. Conversely, when they believe their country is contributing disproportionately to the cost of green policies, support may weaken. Building on benchmarking theory, we argue that these perceptions are often based on relative rather than absolute assessments. Individuals do not necessarily reject green policies because the costs are high in absolute terms, but rather because the costs appear higher than those faced by peer nations. Similarly, perceptions of fairness and burden-sharing – central to evaluations of international cooperation – can significantly influence attitudes towards collective climate measures.

The most comprehensive account of benchmarking theory in a European context is offered by De Vries (2018), who argues that citizens evaluate EU membership by comparing the current state of integration to the perceived benefits of potential alternatives, such as national independence. One key benchmark in this evaluation is the perceived performance of domestic institutions. When voters expect national governance to outperform EU-level governance, support for integration declines. We argue that this logic can be extended to climate policy: citizens benchmark their country's situation – climate vulnerability and financial burden – against other member states when evaluating the desirability of EU-level climate action.

This comparative lens is supported by related work on economic voting. Kayser and Peress (2012) demonstrate that voters evaluate national economic performance in reference to international peers, particularly in open economies. Similarly, in the context of the COVID-19 pandemic, Rodríguez et al. (2025) find that the UK's early COVID-19 vaccine roll-out, widely seen as faster and more efficient than the EU's, served as a benchmark that significantly reduced specific support for the EU's authority in health policy among citizens in member states, demonstrating how external performance comparisons can shape public attitudes toward international institutions.

While Arel-Bundock, Blais, and Dassonneville (2021) find more limited evidence of benchmarking in their study of economic voting, they suggest that responsiveness to international comparisons may depend on institutional context and issue salience. The EU, where climate policy is negotiated and implemented collectively, offers a salient context for such benchmarking to occur (Hobolt et al. 2022). Political jurisdictions like the EU serve as especially credible and relevant comparative spaces for voters when it comes to both the exposure to climate change (vulnerability) and the cost of climate action.

Drawing on this perspective, we argue that both relative vulnerability to climate risks and relative financial contribution to EU climate action are key benchmarks shaping support. When individuals are informed that their country is more vulnerable than others, we expect increased support for EU-wide climate measures, especially among those who had underestimated their country's exposure. Conversely, information suggesting their country is paying more than others may dampen support, particularly among those previously unaware of this imbalance.

Empirically, we test these arguments about the relative benchmarking of the benefits and costs of climate action in the EU by exposing people to information about their country's relative vulnerability to climate change and their country's relative contribution to the cost associated with climate change at the EU-level. This allows us to test the following pre-registered hypotheses, derived from the benchmarking approach.

Starting with relative vulnerability to climate change, we hypothesize that:

- **H1a:** *Exposure to information about the vulnerability to the negative consequences of climate change across Europe increases support for green policies and related taxation.*

- **H1b:** *The positive effect of exposure to information about the consequences of climate change on support for green policies and related taxation is greater for individuals in countries classified as higher vulnerability than in countries classified as lower vulnerability to climate change.*

- **H1c:** *The positive effect of exposure to information about the consequences of climate change on support for green policies and related taxation is greater for individuals who underestimate relative country risk than for individuals who overestimate or correctly estimate their country's relative climate change vulnerability.*

Moving to the relative cost associated with climate action, we hypothesize that:

- **H2a:** *Exposure to information about the relative levels of country contributions to finance green policies reduces support for green policies and related taxation.*

- **H2b:** *The negative effect of exposure to information about country contributions on support for green policies and related taxation is greater for individuals in higher contributor countries compared to those in lower contributor countries.*

- **H2c:** *The negative effect of exposure to information about country contributions on support for green policies and related taxation is greater for individuals who underestimate relative country contributions than for individuals who overestimate or correctly estimate their country's relative contribution to collective climate action.*

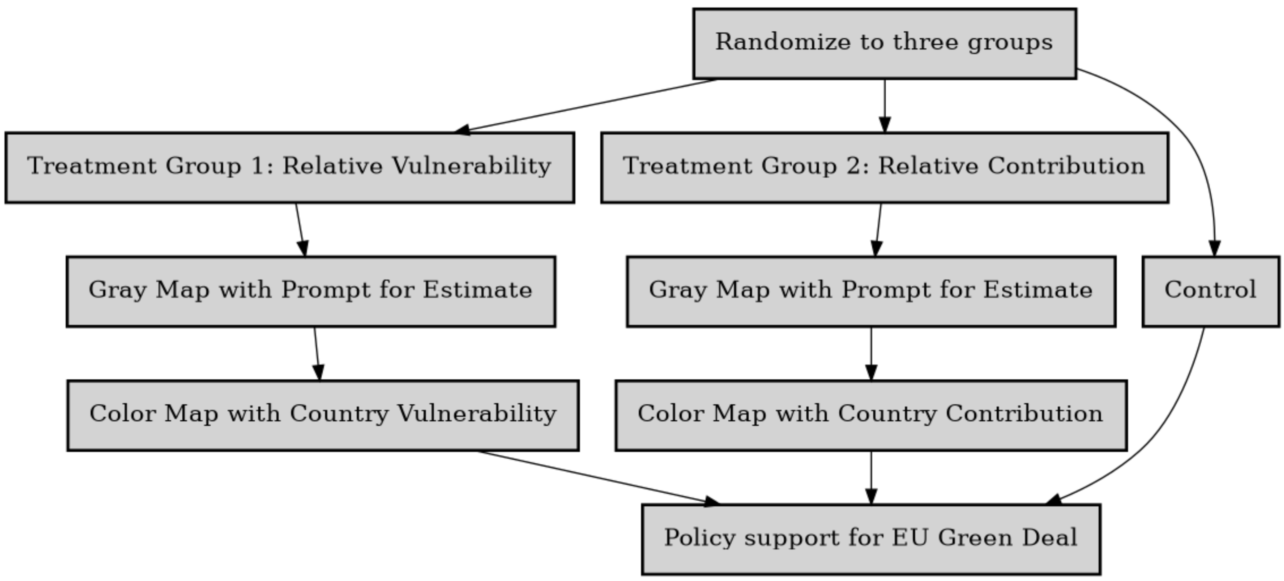
Experimental Design

To test our hypotheses, we conducted a cross-national survey-embedded experiment. Our experimental design includes a visual vignette survey experiment which is embedded in the European

Election Study following the 2024 European Parliamentary Elections (Popa et al. 2024).[1] The survey experiment has two treatment groups and a control group. The primary outcome variable is a question that asks about respondent's support for the EU Green Deal on an 11-point scale.

All three groups receive a generic message about climate change (*Climate change is one of the main challenges facing Europe. In response, the European Union has introduced the European Green Deal to meet its climate policy objectives of reducing net greenhouse gas emissions.*) The control group only receives the opening statement. The "relative vulnerability" treatment group is provided with a grey map and is asked to provide a prediction of the country's vulnerability relative to other EU countries.[2] Respondents in the "relative contributions" treatment group are presented with a grey map and are asked to provide an estimate of their country's relative contributions to the EU Green Deal.[3]

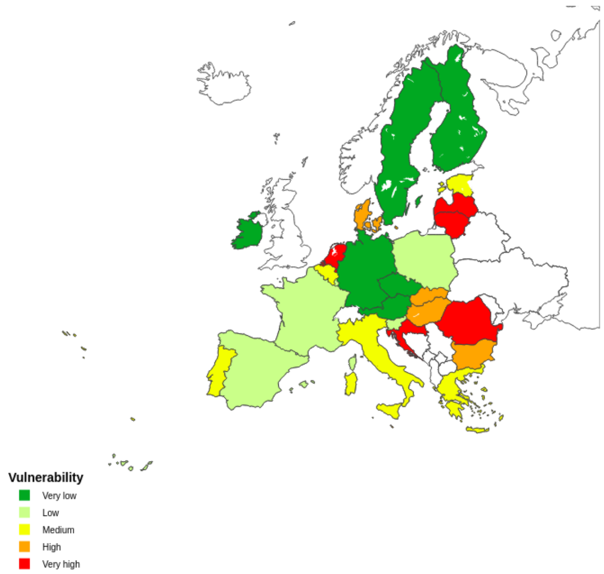
Figure 1: Survey Experiment Flowchart



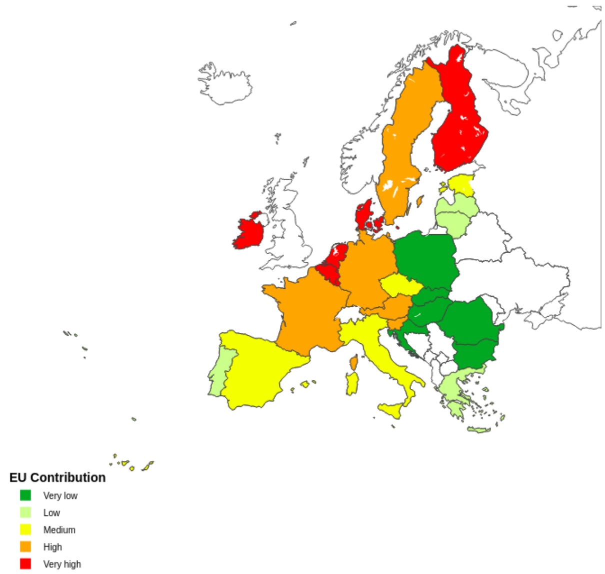
In addition to the map, respondents in the "relative vulnerability" treatment group receive the following prompt: *Yet, some countries face greater negative consequences of climate change than others, including heat waves, wild fires, floods and severe storms. Based on current scientific forecasts, EU member states can be classified into 5 categories based on their relative vulnerability to the negative consequences of climate change.* For the "relative contributions"

1. Pre-analysis plan: https://osf.io/dvwk8. IRB approval: GESIS & LSE
2. Relative vulnerability is derived from the University of Notre Dame Global Adaptation Country Index (Chen et al. 2015).
3. Relative contributions to the EU Green Deal are derived from 2021-2027 EU Spending and Revenue (see: https://commission.europa.eu/strategy-and-policy/eu-budget).

Figure 2: Experimental Treatment Maps



(a) Relative Vulnerability Treatment Map



(b) Relative Contributions Treatment Map

group, respondents receive in addition to the map: *Yet, some countries will pay more than others to finance these green policies. Based on the current EU budget, EU member states can be classified into 5 categories based on how much they are likely to pay per capita to finance the EU's Green Deal. On a scale of 1 to 5 where "1" is paying the least per capita for the European Green Deal and "5" is paying the most per capita, where do you think your country is?*. After providing an estimate, respondents are made aware of their country's relative vulnerability via text and the map, which switches to a color-coded map that presents the country's relative vulnerability or relative contributions.

Figure 1 presents a flowchart of the survey experiment. The maps that are used for the Vulnerability and Contributions treatments are provided in Figure 2a and Figure 2b, respectively.

Estimation

We use Bayesian methods for estimating treatment effects to take advantage of the more intuitive interpretation of uncertainty in parameter estimates. Unlike OLS, which provides confidence intervals based on hypothetical repeated sampling, Bayesian methods yield credibility intervals that directly represent the probability of parameters lying within a given range, given the data. This probabilistic framing aligns more naturally with how we interpret uncertainty.

We use weakly informative priors for all specifications which are reported in Appendix B.

To test the primary hypothesis (H1a and H2a), we estimate models with random intercepts for countries. The model is specified as follows:

$$
\begin{aligned}
&Y_{ic} \sim \mathcal{N}(\mu_i, \sigma^2),\\
&\mu_i = \beta_0 + \beta_1 \text{VulnerabilityTreatment}_i + \beta_2 \text{CostsTreatment}_i + u_{c[i]}
\end{aligned}
\tag{1}
$$

where Y_i is support for the EU Green Deal for individual i in country c, CostsTreatment indicates treatment assignment for the country contributions treatment and VulnerabilityTreatment is assignment to the vulnerability treatment. $u_{c[i]}$ is a random intercept for the country c of individual i.

To test the other hypotheses, we estimate interaction models that are an extension of equation 1. Using H1b as an example, we estimate the following equation:

$$
\begin{aligned}
&Y_{ic} \sim \mathcal{N}(\mu_i, \sigma^2),\\
&\mu_i = \beta_0 + \beta_1 \text{VulnerabilityTreatment}_i + \beta_2 \text{CostsTreatment}_i +\\
&\beta_3(\text{CountryVulnerability}_c \times \text{CostsTreatment}_i) + u_{c[i]}
\end{aligned}
\tag{2}
$$

Where VulnerabilityTreatment is a binary variable indicating the country vulnerability treatment and CostsTreatment is a binary variable indicating the contributions treatment. CountryVulnerability is country c's vulnerability to climate change.

We further estimate heterogeneous treatment effects across the 27 EU member states using a third hierarchical model. This structure allows the treatment effects to vary by country, borrowing strength across countries to produce more stable estimates. The level 1 model for an individual i in country j is specified the same as Equation 1. However, country effects in the second level of the model are specified as follows:

$$
\begin{pmatrix} \alpha_j \\ \beta_{1j} \\ \beta_{2j} \end{pmatrix} \sim \mathcal{MVN}\left(\begin{pmatrix} \gamma_\alpha \\ \gamma_{\beta 1} \\ \gamma_{\beta 2} \end{pmatrix}, \mathbf{\Sigma} \right)
\tag{3}
$$

Differing from the random intercepts model in Equation 1, country-level effects in Equation 3 are modeled as draws from a multivariate normal distribution ($\mathcal{MVN}$). The means of this distribution are fixed effects (e.g. $\gamma_a, \gamma_{\beta 1}, \gamma_{\beta 2}$) capturing the average intercept and treatment effects across all countries. Σ is the variance-covariance matrix that models the variance of the random effects across countries (e.g., how much the treatment effects vary from country to country) as well as the correlation between them. σ_y^2 is the residual variance at the individual level.[4]

To estimate heterogeneous treatment effects using individual characteristics, we rely on Hainmueller, Mummolo, and Xu (2019)'s kernel estimator for multiplicative interaction effects. The method estimates the marginal effect of the treatment on support for the EU Green Deal across the full range of values of a given moderating variable, X, using a kernel reweighting scheme. We use the `Interflex` library in `R` for these estimations. We return to this analysis below.

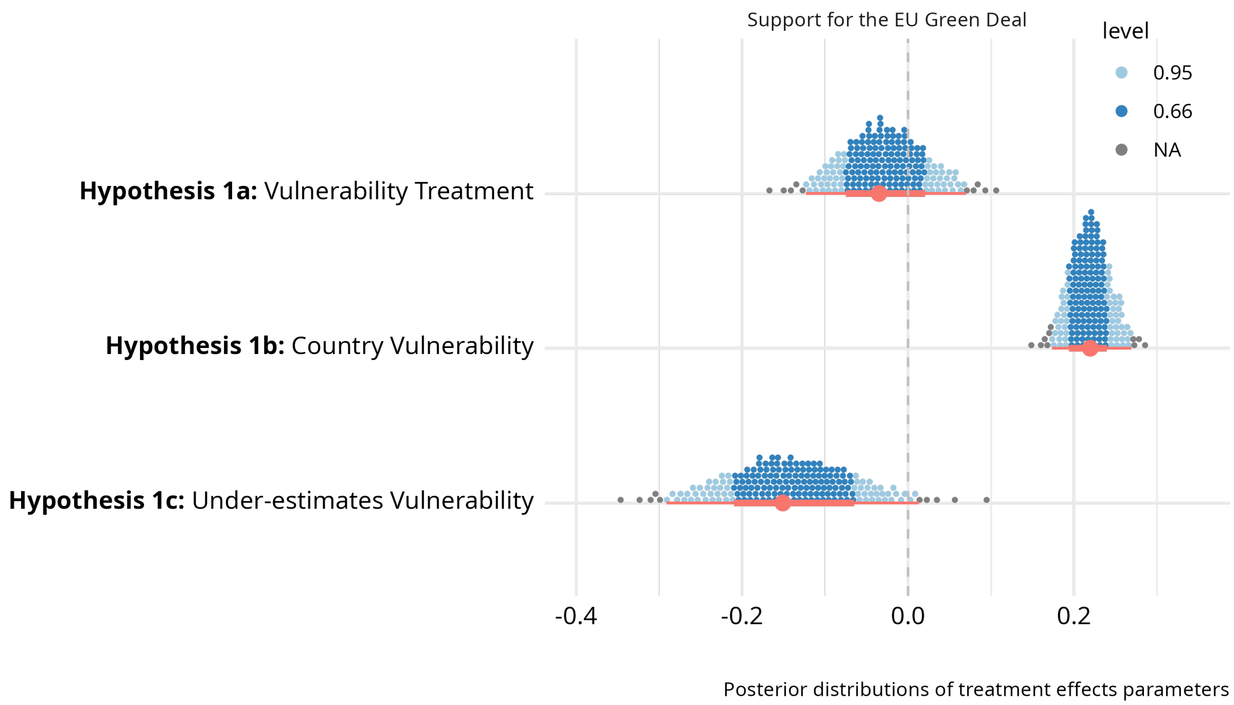
Results

We first present the results from the first treatment intended to induce feelings of vulnerability relative to other EU nations pictured in the map given to respondents. There were three expectations based on benchmarking theory. First, that respondents view their country's relative vulnerability in the context of their EU neighbors, which would lead to increased support for the EU Green Deal. Second, that the effects of the relative vulnerability treatment would be conditional on the level of vulnerability that a given country is to climate change, which is displayed on the map provided to respondents. Third, that individuals who underestimated their country's vulnerability would update their views of vulnerability to climate change, leading to an increase in support for the EU Green Deal. We find support for only one of these.

Figure 3 presents the posterior distributions for the parameters of interest for each of the three expectations in the first hypothesis. H1a and H1c overlap zero and can therefore be rejected. Country-level vulnerability, however, shapes support for the EU Green Deal in line with expectations. Namely, the vulnerability treatment has a greater effect on voters in countries

4. For all Bayesian estimations, we rely on the `brms` library in R (Bürkner 2017) which uses `Stan` as a backend (Gelman, Lee, and Guo 2015).

Figure 3: Relative Country Vulnerability Treatment Posterior Distributions

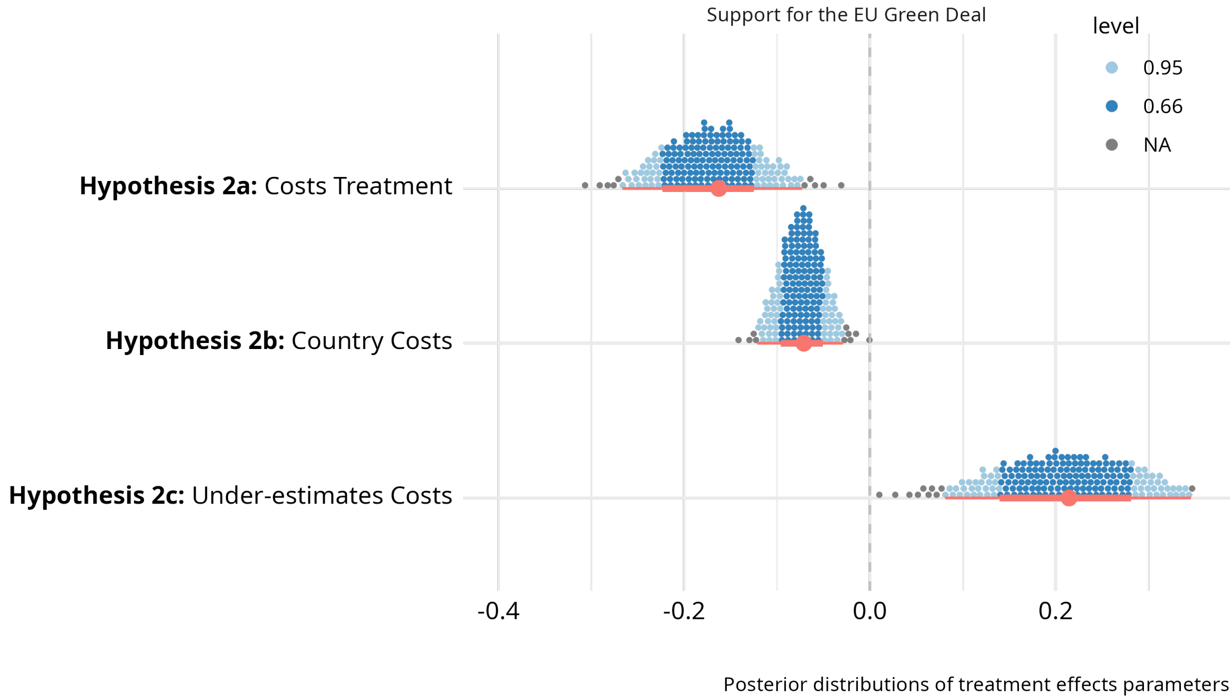


Note: The figure presents the posterior sampling distribution for the parameter of interest for H1a, H1b and H1c. For H1b, the posterior is an interaction between a binary treatment assignment variable and the respondent's estimated vulnerability to climate change, according to (Chen et al. 2015). For H1c, the posterior is an interaction between treatment assignment and binary variable that is one in the case that the respondent underestimates their country's relative vulnerability to climate change. Full results, including all estimates, are available in Appendix C.

that are more vulnerable to the effects of climate change when shown how their country ranks in relation to the rest of the EU.

The second hypothesis focused instead on the level of relative country contributions that are made towards the EU's Green Deal – the primary climate policy of the European Union. When reminded of relative country costs associated with contributions to the EU Green Deal, respondents reduced their support for the EU Green Deal, as seen in the first posterior distribution in Figure 4. This is in line with our hypothesized expectation. Moreover, the effects of the relative contributions treatment are conditioned by the current level of contributions of the respondent's country to the EU Green Deal, which is also in line with our expectations. Yet, as with the first hypothesis, there does not appear to be an "information updating" effect. In H1c and H2c, we expected that voters who underestimated their country's contributions [vulnerability] would respond to the new information by shifting their support for the EU Green Deal.

Figure 4: Relative Country Contributions Treatment Posterior Distributions



Note: The figure presents the posterior sampling distribution for the parameter of interest for H2a, H2b and H2c. For H2b, the posterior is an interaction between a binary treatment assignment variable and the respondent's estimated country contributions to the EU Green Deal. For H2c, the posterior is an interaction between treatment assignment and binary variable that is one in the case that the respondent underestimates their country's relative contributions to the EU Green Deal. Full results, including all estimates, are available in Appendix C.

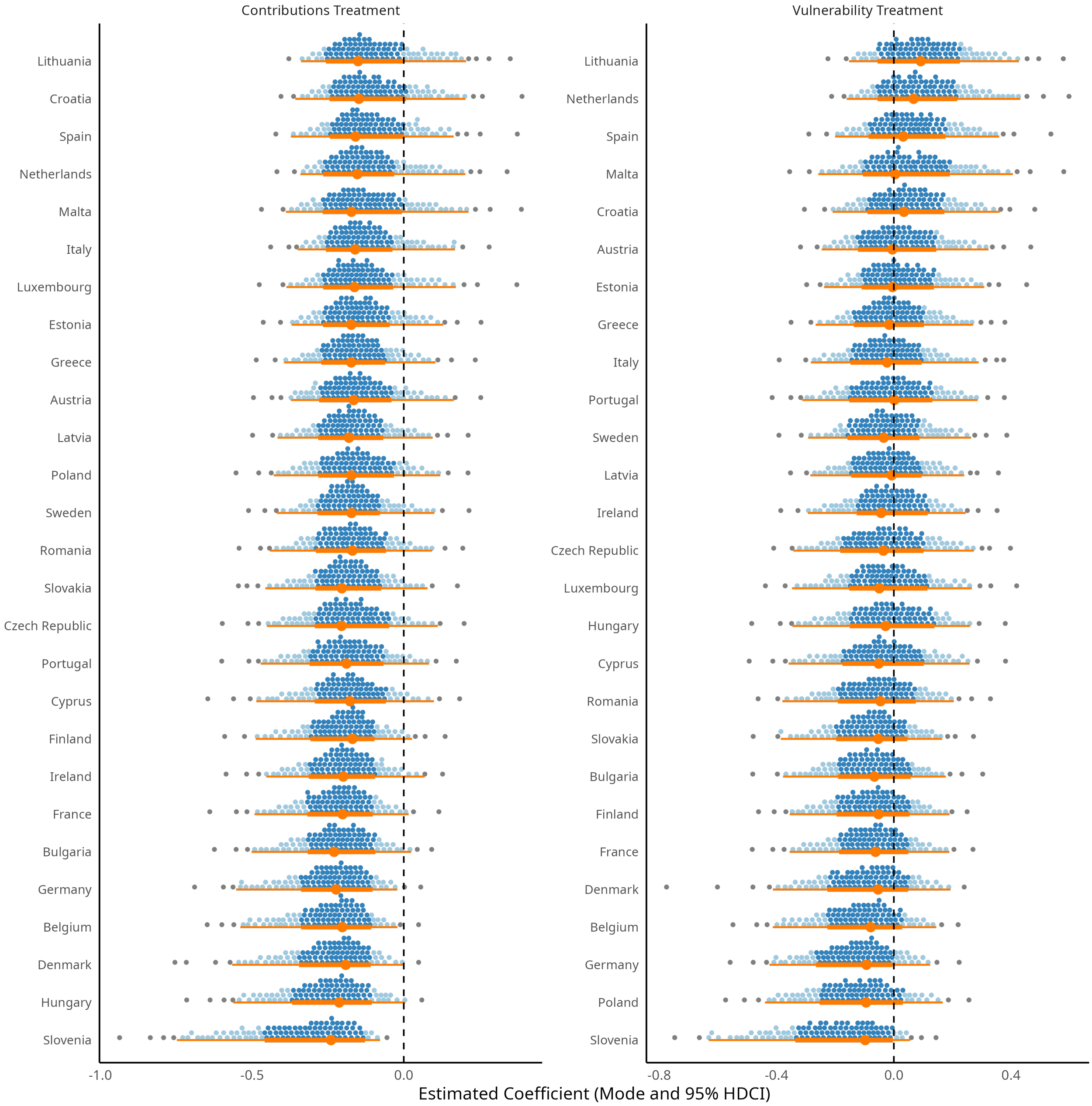
In fact, we find the opposite, which suggests that voters' support for climate change policy drives perceptions of country contributions [vulnerability], rather than the other way around.

Treatment Effects by Country

We consider country-level heterogeneity in response to the two different treatments. Given that our design is randomized at the country level, we estimate treatment effects for each country using the hierarchical specification outlined in the Estimation section (Equation 3). We present the estimates for each country and for both treatments in Figure 5. In many ways, the estimates for the vulnerability treatment (right panel) confirm the null effects that occur in the sample of all all countries in Figure 3. There is limited variation in the effectiveness of the treatment, with multiple countries responding negatively to the treatment, which contradicts our expectations.

However, for the country contributions treatment on the left panel, the vignette consistently

Figure 5: Estimated Effects by Country



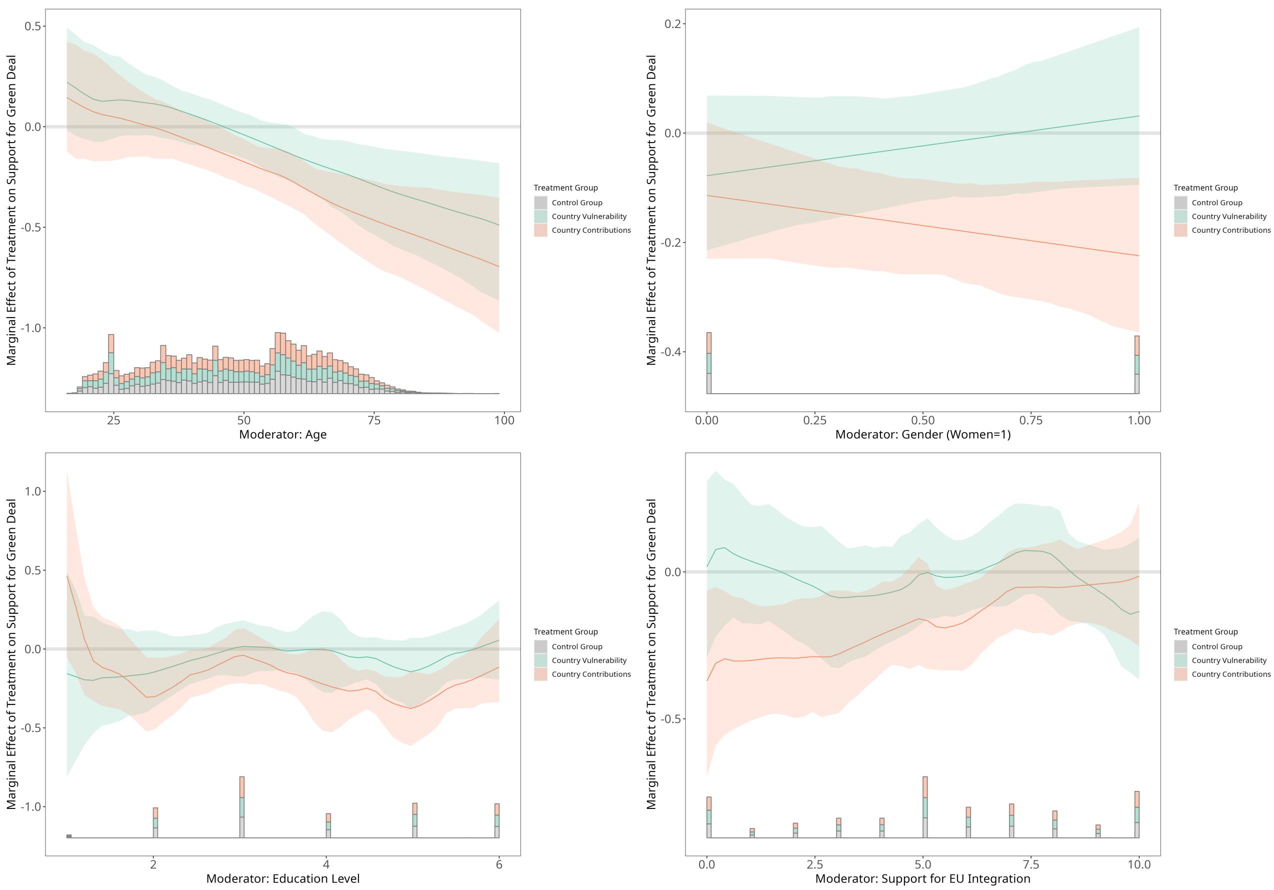
Note: The figure presents the estimated country-level effects for the country contributions treatment (left) and the country vulnerability treatment (right). Each estimate is presented with 95 percent credibility intervals. Estimates are derived from Equation 3. Full results in table form are available in Appendix D.

reduced support for the EU Green Deal. The contributions estimates are ordered such that the countries that were the least responsive to the treatment are at the top, with the most responsive at the bottom. Countries such as Slovenia, Hungary, Denmark, Belgium, and Germany meet conventional thresholds for statistical significance on their own, while individuals in countries such as Lithuania, Croatia, Spain and Malta were affected relatively less by the contributions treatment but share the same directionality.

Heterogeneous Treatment Effects

In addition to country-level differences, we further examine heterogeneity in treatment effects across different values of several moderating variables. Namely, we consider age, gender, education, and support for EU integration. As described in the Estimations section, we estimate the marginal effects of the treatment on support for the EU Green Deal at different levels of the moderating variables. Figure 6 presents the results for each of the moderating variables examined. The figures suggest that there is only limited heterogeneity in the different moderating variables examined. As perhaps expected, younger individuals are more likely to support the EU Green Deal than older individuals. At around age 60, all individuals regardless of the treatment assignment appear to oppose the EU Green Deal. Moreover, women appear to be more sensitive to both treatments than men, with women responding more positively towards the country vulnerability treatment and more negatively to the country contributions treatment.

Figure 6: Heterogeneous Treatment Effect Estimates



Note: The figure presents the estimated marginal effects of the respective treatments at different levels of the moderators. Full results, including significance testing at different levels of the moderators, is presented in Appendix E.

Discussion and Conclusion

In this paper, we have investigated how benchmarking a country's costs and vulnerabilities against other EU member states shapes public support for collective climate action in the European Union. Drawing on benchmarking theory (Kayser and Peress 2012; De Vries 2018), we expected that informing citizens that their country was shouldering a disproportionate share of the costs of the European Green Deal would decrease support, while learning their country was more vulnerable to the effects of climate change in relation to neighboring countries would increase support. We tested these expectations via a large-scale randomized visual survey experiment in all 27 EU countries as part of the 2024 European Election Study.

Our results reveal a clear hierarchy in how citizens weigh benchmarks for climate action. We find that information about the relative costs of climate policy is a much stronger driver of public opinion than information about relative vulnerability. Our findings in this regard are twofold. First, we find that simply reminding individuals of their country's contributions to the European Green Deal – regardless of where their country is positioned in its relative contributions – decreases support for the European Green Deal. Second, voters appear to know where their country stands regarding relative contributions. Specifically, individuals in countries that contribute more already to the EU budget are more responsive to the contributions treatment and reduce their support for the European Green Deal more than countries that do not contribute as much.

Furthermore, a similar dynamic played out with the vulnerability treatment. Although the relative vulnerability treatment on its own did not increase support for the European Green Deal, the interaction between the vulnerability treatment and the relative vulnerability of the respondent's country to climate change was significant, which suggests that voters know where their country stands and this information shapes their preferences for climate change policies.

Despite our expectation that voters would update their preferences after being told their country's relative vulnerability [contributions], our results clearly show that this is not the case. Rather – and when taken together with the other results of our analysis – it appears that voters are already aware of what is at stake regarding climate change and likely have narrower priors than might be expected.

These findings have crucial implications for the politics of international cooperation on climate change. They underscore that the success of supranational climate policy, like the European Green Deal, is contingent on public perceptions of fair burden-sharing (Bechtel and Scheve 2013; Maestre-Andrés, Drews, and Bergh 2019). The perception that one's own nation is "paying for the others" is a potent political constraint that can undermine support for otherwise popular green policies. For international organizations like the European Union, our results demonstrate that simply highlighting shared risks is not enough to build consensus. To maintain public support for ambitious, internationally coordinated climate action, policymakers must directly address and manage the distributive politics of the green transition, ensuring that the costs of cooperation are—and are perceived to be—distributed equitably.

References

Abou-Chadi, Tarik, Jannik Jansen, Markus Kollberg, and Nils Redeker. 2024. "Debunking the Backlash-Uncovering European Voters' Climate Preferences."

Aklin, Michaël, and Matto Mildenberger. 2020. "Prisoners of the wrong dilemma: why distributive conflict, not collective action, characterizes the politics of climate change." *Global Environmental Politics* 20 (4): 4–27.

Alesina, Alberto, Ignazio Angeloni, and Federico Etro. 2005. "International unions." *American Economic Review* 95 (3): 602–615.

Andre, Peter, Teodora Boneva, Felix Chopra, and Armin Falk. 2024. "Globally representative evidence on the actual and perceived support for climate action." *Nature Climate Change,* 1–7.

Arel-Bundock, Vincent, André Blais, and Ruth Dassonneville. 2021. "Do voters benchmark economic performance?" *British Journal of Political Science* 51 (1): 437–449.

Baute, Sharon. 2025. "The distributive politics of the green transition: a conjoint experiment on EU climate change mitigation policy." *Journal of European Public Policy* 32 (1): 52–80.

Bayer, Patrick, and Federica Genovese. 2020. "Beliefs about consequences from climate action under weak climate institutions: sectors, home bias, and international embeddedness." *Global Environmental Politics* 20 (4): 28–50.

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* 110 (34): 13763–13768.

Bolet, Diane, Fergus Green, and Mikel Gonzalez-Eguino. 2024. "How to get coal country to vote for climate policy: The effect of a "Just Transition Agreement" on Spanish election results." *American Political Science Review* 118 (3): 1344–1359.

Bongardt, Annette, and Francisco Torres. 2022. "The European green deal: More than an exit strategy to the pandemic crisis, a building block of a sustainable European economic model." *JCMS: Journal of Common Market Studies* 60 (1): 170–185.

Bürkner, Paul-Christian. 2017. "brms: An R Package for Bayesian Multilevel Models Using Stan." *Journal of Statistical Software* 80 (1): 1–28.

Chen, Chen, Ian Noble, Jessica Hellmann, Joyce Coffee, Martin Murillo, and Nitesh Chawla. 2015. "University of Notre Dame global adaptation index country index technical report." *ND-GAIN: South Bend, IN, USA.*

Colantone, Italo, Livio Di Lonardo, Yotam Margalit, and Marco Percoco. 2024. "The political consequences of green policies: Evidence from Italy." *American Political Science Review* 118 (1): 108–126.

De Vries, Catherine E. 2018. *Euroscepticism and the future of European integration.* Oxford University Press.

Dechezleprêtre, Antoine, Adrien Fabre, Tobias Kruse, Bluebery Planterose, Ana Sanchez Chico, and Stefanie Stantcheva. 2022. "Fighting Climate Change: International Attitudes Toward Climate Policies." *National Bureau of Economic Research* (1050 Massachusetts Avenue, Cambridge, MA 02138), no. Working Paper 30265.

Egli, Florian, Nicolas Schmid, and Tobias S Schmidt. 2022. "Backlash to fossil fuel phase-outs: the case of coal mining in US presidential elections." *Environmental Research Letters* 17 (9): 094002.

Gaikwad, Nikhar, Federica Genovese, and Dustin Tingley. 2022. "Creating climate coalitions: mass preferences for compensating vulnerability in the world's two largest democracies." *American Political Science Review* 116 (4): 1165–1183.

Gelman, Andrew, Daniel Lee, and Jiqiang Guo. 2015. "Stan: A probabilistic programming language for Bayesian inference and optimization." *Journal of Educational and Behavioral Statistics* 40 (5): 530–543.

Hainmueller, Jens, Jonathan Mummolo, and Yiqing Xu. 2019. "How much should we trust estimates from multiplicative interaction models? Simple tools to improve empirical practice." *Political Analysis* 27 (2): 163–192.

Hobolt, Sara B, and Catherine E De Vries. 2016. "Public support for European integration." *Annual Review of Political Science* 19:413–432.

Hobolt, Sara B, Sebastian Adrian Popa, Wouter Van der Brug, and Hermann Schmitt. 2022. "The Brexit deterrent? How member state exit shapes public support for the European Union." *European Union Politics* 23 (1): 100–119.

Kayser, Mark Andreas, and Michael Peress. 2012. "Benchmarking across borders: electoral accountability and the necessity of comparison." *American Political Science Review* 106 (3): 661–684.

Kollberg, Markus, Jannik Jansen, Tarik Abou-Chadi, and Nils Redeker. 2025. "Green but cautious. How preferences on European integration shape public opinion on the European Green Deal." *Journal of European Public Policy,* 1–28.

Maestre-Andrés, Sara, Stefan Drews, and Jeroen van den Bergh. 2019. "Perceived fairness and public acceptability of carbon pricing: a review of the literature." *Climate Policy* 19 (9): 1186–1204.

Popa, Sebastian A, Sara B Hobolt, A Katsanidou, K Gattermann, M Sorace, I Toygur, et al. 2024. "European Parliament Election Study 2024, Voter Study."

Rayner, Tim, and Andrew Jordan. 2016. "Climate change policy in the European Union." In *Oxford research encyclopedia of climate science.*

Rodríguez, Irene, Toni Rodon, Asli Unan, Lisa Herbig, Heike Klüver, and Theresa Kuhn. 2025. "Benchmarking pandemic response: How the UK's COVID-19 vaccine rollout impacted diffuse and specific support for the EU." *British Journal of Political Science* 55:e35.

Schaffer, Lena Maria. 2024. "Who's afraid of more ambitious climate policy? How distributional implications shape policy support and compensatory preferences." *Environmental Politics* 33 (4): 567–590.

Voeten, Erik. 2025. "The energy transition and support for the radical right: Evidence from the Netherlands." *Comparative Political Studies* 58 (2): 394–428.

Part I

Appendix

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A Hypotheses

- **H1a:** Exposure to information about the vulnerability to the negative consequences of climate change across Europe increases support for green policies and related taxation.
- **H1b:** The positive effect of exposure to information about the consequences of climate change on support for green policies and related taxation is greater for individuals in countries classified as higher vulnerability than in countries classified as lower vulnerability to climate change.
- **H1c:** The positive effect of exposure to information about the consequences of climate change on support for green policies and related taxation is greater for individuals who underestimate relative country risk than for individuals who overestimate or correctly estimate their country's relative climate change vulnerability.

A.1 Cost Treatment

- **H2a:** Exposure to information about the relative levels of country contributions to finance green policies reduces support for green policies and related taxation.
- **H2b:** The negative effect of exposure to information about country contributions on support for green policies and related taxation is greater for individuals in higher contributor countries compared to those in lower contributor countries.
- **H2c:** The negative effect of exposure to information about country contributions on support for green policies and related taxation is greater for individuals who underestimate relative country contributions than for individuals who overestimate or correctly estimate their country's relative contribution to collective climate action.

A.2 Information Updating

- **H3a:** Individuals who underestimate their country's relative vulnerability to climate change are more supportive of increasing national contributions to the EU's investment in climate change policies.

- **H3b:** Individuals who overestimate their country's relative vulnerability to climate change are less supportive of increasing national contributions to the EU's investment in climate change policies.
- **H3c:** Individuals who underestimate their country's relative contribution to the EU's Green Deal are less supportive of increasing national contributions to the EU's investment in climate change policies.
- **H3d:** Individuals who overestimate their country's relative contribution to the EU's Green Deal are more supportive of increasing national contributions to the EU's investment in climate change policies.

B Bayesian Model Specifications

Below, the model specifications are formalized.

Hypothesis 1a and 2a: Main Treatment Effect

We model support for the Green Deal (y_i) as a function of treatment assignment:

$$
\begin{aligned}
y_i &\sim \mathcal{N}(\mu_i, \sigma) \\
\mu_i &= \alpha + \beta_1 \cdot \text{VulnerabilityTreatment}_i + \\
&\quad \beta_2 \cdot \text{ContributionsTreatment}_i \\
\alpha &\sim \mathcal{N}(0, 10) \\
\beta_1 &\sim \mathcal{N}(0, 2.5) \\
\beta_2 &\sim \mathcal{N}(0, 2.5) \\
\sigma &\sim \text{Exponential}(1)
\end{aligned}
$$

Hypothesis 1b: Country Vulnerability Interaction

$$
\begin{aligned}
y_i &\sim \mathcal{N}(\mu_i, \sigma) \\
\mu_i &= \alpha + \beta_1 \cdot \text{VulnerabilityTreatment}_i \\
&\quad + \beta_2 \cdot \text{ContributionsTreatment}_i \\
&\quad + \beta_3 \cdot (\text{CountryVulnerability}_i \cdot \text{VulnerabilityTreatment}_i) \\
\alpha &\sim \mathcal{N}(0, 10) \\
\beta_j &\sim \mathcal{N}(0, 2.5), \quad j = 1, 2, 3 \\
\sigma &\sim \text{Exponential}(1)
\end{aligned}
$$

Hypothesis 1c: Information Updating Interaction

$$
\begin{aligned}
y_i &\sim \mathcal{N}(\mu_i, \sigma) \\
\mu_i &= \alpha + \beta_1 \cdot \text{VulnerabilityTreatment}_i \\
&\quad + \beta_2 \cdot \text{ContributionsTreatment}_i \\
&\quad + \beta_3 \cdot (\text{UnderEstimatesVulnerability}_i \cdot \text{VulnerabilityTreatment}_i) \\
\alpha &\sim \mathcal{N}(0, 10) \\
\beta_j &\sim \mathcal{N}(0, 2.5), \quad j = 1, 2, 3 \\
\sigma &\sim \text{Exponential}(1)
\end{aligned}
$$

Hypothesis 2b: Country Vulnerability Interaction

$$
\begin{aligned}
y_i &\sim \mathcal{N}(\mu_i, \sigma) \\
\mu_i &= \alpha + \beta_1 \cdot \text{ContributionsTreatment}_i \\
&\quad + \beta_2 \cdot \text{VulnerabilityTreatment}_i \\
&\quad + \beta_3 \cdot (\text{CountryContributions}_i \cdot \text{ContributionsTreatment}_i) \\
\alpha &\sim \mathcal{N}(0, 10) \\
\beta_j &\sim \mathcal{N}(0, 2.5), \quad j = 1, 2, 3 \\
\sigma &\sim \text{Exponential}(1)
\end{aligned}
$$

Hypothesis 2c: Information Updating Interaction

$$
\begin{aligned}
y_i &\sim \mathcal{N}(\mu_i, \sigma) \\
\mu_i &= \alpha + \beta_1 \cdot \text{VulnerabilityTreatment}_i \\
&\quad + \beta_2 \cdot \text{ContributionsTreatment}_i \\
&\quad + \beta_3 \cdot (\text{UnderEstimatesContributions}_i \cdot \text{ContributionsTreatment}_i) \\
\alpha &\sim \mathcal{N}(0, 10) \\
\beta_j &\sim \mathcal{N}(0, 2.5), \quad j = 1, 2, 3 \\
\sigma &\sim \text{Exponential}(1)
\end{aligned}
$$

C Full Results for H1 and H2

Table A1 and t present the full results from hypotheses 1 and 2. 95 per cent credibility intervals are presented in brackets. Estimates are derived from 2000 samples from the posteriors in each model.

Table A1: Posterior Estimates for Relative Vulnerability Treatment (H1)

	H1a	H1b	H1c
Relative Vulnerability Treatment	-0.030	-0.676	0.022
	[-0.130, 0.071]	[-0.851, -0.506]	[-0.095, 0.137]
Country Vulnerability * Vulnerability Treatment		0.219	
		[0.171, 0.267]	
Under-estimate Vulnerability * Vulnerability Treatment			-0.141
			[-0.295, 0.012]
Num.Obs.	21320	21320	21320
R2	0.001	0.004	0.001
Log.Lik.	-53888.189	-53848.332	-53885.908
ELPD	-53891.4	-53852.8	-53890.6
ELPD s.e.	83.4	83.6	83.3
LOOIC	107782.8	107705.7	107781.1
LOOIC s.e.	166.7	167.2	166.7
WAIC	107782.8	107705.7	107781.1
RMSE	3.03	3.02	3.03

$+p < 0.1, *p < 0.05, **p < 0.01, ***p < 0.001$

Table A2: Posterior Estimates for Relative Contributions Treatment (H2)

	fit2a	fit2b	fit2c
Relative Contributions Treatment	-0.170	0.045	-0.245
	[-0.268, -0.074]	[-0.124, 0.214]	[-0.354, -0.130]
Country Contributions * Contributions Treatment		-0.073	
		[-0.119, -0.026]	
Under-estimates Contributions * Contributions Treatment			0.213
			[0.061, 0.357]
Num.Obs.	21320	21320	21320
R2	0.001	0.001	0.001
Log.Lik.	-53888.741	-53883.549	-53884.305
ELPD	-53891.4	-53887.7	-53888.3
ELPD s.e.	83.4	83.4	83.3
LOOIC	107782.7	107775.3	107776.6
LOOIC s.e.	166.7	166.8	166.6
WAIC	107782.7	107775.3	107776.6
RMSE	3.03	3.03	3.03

$+p < 0.1, *p < 0.05, **p < 0.01, ***p < 0.001$

D Country-level Treatment Effect Heterogeneity

Table A3: Full Country-Specific Treatment Effect Estimates

Country	Costs Treatment	Vulnerability Treatment
Austria	-0.15 [-0.4, 0.14]	0.03 [-0.24, 0.34]
Belgium	-0.26 [-0.56, -0.03]	-0.12 [-0.43, 0.13]
Bulgaria	-0.23 [-0.51, 0.02]	-0.08 [-0.37, 0.19]
Croatia	-0.09 [-0.33, 0.23]	0.06 [-0.21, 0.36]
Cyprus	-0.2 [-0.51, 0.08]	-0.04 [-0.37, 0.25]
Czech_Republic	-0.19 [-0.48, 0.09]	-0.02 [-0.32, 0.3]
Denmark	-0.26 [-0.62, -0.03]	-0.11 [-0.48, 0.16]
Estonia	-0.14 [-0.37, 0.13]	0.02 [-0.23, 0.33]
Finland	-0.21 [-0.48, 0.04]	-0.08 [-0.37, 0.18]
France	-0.22 [-0.52, 0.01]	-0.08 [-0.37, 0.18]
Germany	-0.26 [-0.56, -0.03]	-0.14 [-0.43, 0.12]
Greece	-0.15 [-0.39, 0.11]	0.01 [-0.25, 0.3]
Hungary	-0.27 [-0.59, -0.02]	-0.03 [-0.35, 0.26]
Ireland	-0.21 [-0.48, 0.04]	-0.02 [-0.29, 0.25]
Italy	-0.12 [-0.35, 0.17]	-0.01 [-0.27, 0.31]
Latvia	-0.16 [-0.41, 0.11]	-0.02 [-0.27, 0.26]
Lithuania	-0.08 [-0.31, 0.24]	0.12 [-0.14, 0.45]
Luxembourg	-0.13 [-0.37, 0.2]	-0.03 [-0.33, 0.29]
Malta	-0.11 [-0.37, 0.24]	0.06 [-0.25, 0.42]
Netherlands	-0.1 [-0.33, 0.22]	0.11 [-0.15, 0.45]
Poland	-0.16 [-0.44, 0.11]	-0.14 [-0.46, 0.15]
Portugal	-0.19 [-0.48, 0.08]	-0.01 [-0.32, 0.28]
Romania	-0.17 [-0.44, 0.09]	-0.06 [-0.36, 0.22]
Slovakia	-0.19 [-0.48, 0.06]	-0.08 [-0.39, 0.18]
Slovenia	-0.37 [-0.79, -0.11]	-0.23 [-0.63, 0.06]
Spain	-0.1 [-0.34, 0.21]	0.07 [-0.19, 0.37]
Sweden	-0.17 [-0.42, 0.1]	-0.01 [-0.28, 0.28]

E Individual Level Treatment Heterogeneity

E.1 Age

Country vulnerability is the first table. Country contributions is the second table.

Table A4: Estimates for Age Heterogeneity

	diff.estimate	sd	z-value	p-value	lower CI(95%)	upper CI(95%)
50% vs 25%	-0.210	0.089	-2.367	0.018	-0.383	-0.036
75% vs 50%	-0.247	0.090	-2.755	0.006	-0.423	-0.071
75% vs 25%	-0.457	0.144	-3.183	0.001	-0.738	-0.176
	diff.estimate	sd	z-value	p-value	lower CI(95%)	upper CI(95%)
50% vs 25%	-0.208	0.090	-2.309	0.021	-0.385	-0.031
75% vs 50%	-0.201	0.099	-2.024	0.043	-0.395	-0.006
75% vs 25%	-0.409	0.155	-2.631	0.009	-0.713	-0.104

E.2 Gender

Country vulnerability is the first table. Country contributions is the second table.

Table A5: Estimates for Age Heterogeneity

	diff.estimate	sd	z-value	p-value	lower CI(95%)	upper CI(95%)
100% vs 0%	-0.110	0.105	-1.051	0.293	-0.317	0.096
	diff.estimate	sd	z-value	p-value	lower CI(95%)	upper CI(95%)
100% vs 0%	0.109	0.103	1.057	0.290	-0.093	0.311

E.3 Education

Country vulnerability is the first table. Country contributions is the second table.

Table A6: Estimates for Age Heterogeneity

	diff.estimate	sd	z-value	p-value	lower CI(95%)	upper CI(95%)
50% vs 25%	0.088	0.100	0.878	0.380	-0.108	0.283
75% vs 50%	-0.191	0.090	-2.135	0.033	-0.367	-0.016
75% vs 25%	-0.104	0.124	-0.836	0.403	-0.347	0.139

	diff.estimate	sd	z-value	p-value	lower CI(95%)	upper CI(95%)
50% vs 25%	0.096	0.107	0.901	0.368	-0.113	0.306
75% vs 50%	-0.094	0.091	-1.034	0.301	-0.272	0.084
75% vs 25%	0.002	0.135	0.018	0.986	-0.261	0.266

E.4 EU Integration

Country vulnerability is the first table. Country contributions is the second table.

Table A7: Estimates for Age Heterogeneity

	diff.estimate	sd	z-value	p-value	lower CI(95%)	upper CI(95%)
50% vs 25%	0.124	0.130	0.952	0.341	-0.131	0.380
75% vs 50%	0.119	0.117	1.023	0.306	-0.109	0.348
75% vs 25%	0.244	0.131	1.856	0.063	-0.014	0.501

	diff.estimate	sd	z-value	p-value	lower CI(95%)	upper CI(95%)
50% vs 25%	0.042	0.140	0.300	0.764	-0.232	0.316
75% vs 50%	0.090	0.124	0.724	0.469	-0.154	0.334
75% vs 25%	0.132	0.128	1.029	0.303	-0.119	0.384