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Heinz Welsch

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Department of Economics
University of Oldenburg, D-26111 Oldenburg

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Heinz Welsch
Department of Economics
University of Oldenburg
26111 Oldenburg, Germany
welsch@uni-oldenburg.de

Abstract

The Paris Agreement on Climate Change requests signatory countries to specify voluntary caps on their greenhouse gas emissions. The caps stated by the end of 2021 imply percentage emission reductions that vary widely across countries. This paper uses globally representative data from the Global Climate Change Survey to study how countries' emission reduction pledges are related to climate action preferences of their respective citizens. The study finds the following: (1) Nations' percentage reduction pledges (PRPs) are not significantly related to citizens' mean national willingness to contribute (WTC) to climate change mitigation. (2) WTC and PRPs are linked to key country characteristics in diametrically opposite ways. Specifically, (2a) WTC is positively related to average annual temperatures and negatively related to per-capita income and per-capita emissions, whereas (2b) PRPs are negatively related to average annual temperature and positively related to per-capita income and per-capita emissions. (3) Measures of divergence between PRPs and WTC are negatively related to citizens' satisfaction with democracy. Assuming that temperatures, per-capita income, and per-capita emissions indicate sensitivity to climate change, adaptive capacity, and mitigation costs, respectively, finding (2a) is consistent with standard cost-benefit considerations. Assuming that per-capita emissions and per-capita income indicate "Differentiated Responsibilities and Respective Capabilities", finding (2b) is consistent with ethical principles of equity and fairness. Considering right-wing populists' using climate change as a political battleground, finding (3) suggests the possibility that ambitious mitigation targets may backfire by fuelling support for anti-climate populist parties – a political- economy tragedy of the commons.

Keywords: Paris Agreement pledges; climate action preference; willingness to contribute; cost-benefit calculus; climate ethics; satisfaction with democracy
JEL codes: Q54; D61; D63; D72

1. Introduction

As a means for limiting global warming, the Paris Agreement on Climate Change requests signatory countries to specify "nationally determined contributions" (NDCs), that is, voluntary caps on future greenhouse gas emissions (in terms of carbon equivalents). The national emission limitation pledges submitted up-front of the 26th Conference of the Parties (COP 26) in December 2021 entail reductions of greenhouse gas emissions per capita by up to 67 percent (Iceland) as well as expansions by up to 48 percent (Nicaragua) by 2030 relative to 2019 (Meinshausen et al. 2022).

A considerable number of studies have discussed the potential determinants of national climate change mitigation pledges (e.g., Chunark et al. 2017, Dash and Gim 2019, Day et al. 2015, Harris, 2004, Michalena et al. 2018, Pauw et al. 2019, Röser et al. 2019, Vona, 2019, Willis, 2017, Zheng et al. 2021). The factors considered include the country-specific costs and benefits of greenhouse gas mitigation, ethical principles of equity, fairness and responsibility, public preferences and support for climate action, and countries' institutional and cultural characteristics (Zheng et al. 2021). The key potential drivers can be grouped into two main categories: domestic factors relating to public support and its correlates (costs and benefits, in particular), and international factors relating to equity and fairness, as codified in the principle of "Common but Differentiated Responsibilities and Respective Capabilities" stipulated in the UN Framework Convention on Climate Change.

This paper focuses on the role for national mitigation pledges of citizen support, and the interplay with international equity, fairness and responsibility on the one hand and the country-specific costs and benefits of mitigation on the other. Specifically, the paper uses globally representative data from the Global Climate Change Survey (Andre et al. 2024) to study the role of citizens' climate action preferences and support – along with factors at the international level – in shaping governments' climate change mitigation targets, specified as percentage reduction pledges (PRPs). In addition, drawing on recent findings on the drivers of citizens' willingness to contribute (WTC) to climate change mitigation (Andre et al. (2024), the study investigates whether the core drivers of WTC – country-specific sensitivity to climate change, capacity for adaptation, and mitigation costs – play an independent (direct) role for national PRPs in addition to a potential indirect role through WTC.[1]

[1] Sensitivity to climate change refers to the country-specific risk of damage from climate change gross of adaptation (protection) measures. High sensitivity combined with low adaptive capacity constitutes high vulnerability (IPCC 2007).

The empirical analysis is based on a conceptual framework which involves both cost-benefit and equity-fairness considerations. The framework suggests a key role for both WTC and PRP of countries' average temperatures, income levels, and emission levels. The roles of these characteristics are, however, predicted to differ when considered from the cost-benefit and the equity-fairness perspectives. From a cost-benefit point of view, higher temperatures, per-capita incomes, and per-capita emissions indicate greater sensitivity to climate change, adaptive capacity, and mitigation costs, respectively. From an equity-fairness point of view, higher per-capita emissions and per-capita incomes indicate greater "culpability" for climate change and greater economic ability to mitigate, respectively. In sum, the roles of emission and income levels are ambiguous, depending on which prevails: cost-benefit or equity-fairness considerations.

Using data for 123 countries, representative of over 90 percent of the world population, I find that national PRPs are not significantly associated with national average WTC. In addition, I find that WTC and PRPs are related to the relevant country characteristics in opposite ways: While citizens' WTC is lower in carbon intensive countries (due to high mitigation costs) and wealthy countries (due to a greater capacity for adaptation) than in less carbon intensive and less wealthy countries, the opposite applies to the PRPs. Specifically, diametrically opposite to national average WTC, percentage emission reduction pledges, 2030 relative to 2019, are positively related to per-capita carbon emissions and per-capita income (GDP) in 2019. Moreover, WTC is higher in countries with warmer climates (due to higher climate change sensitivity) than in countries with colder climates whereas the opposite applies to the PRPs: countries with colder climates have larger PRPs than countries with warmer climates.

Taking – as discussed above – per per-capita emissions as an indicator of a country's responsibility (culpability) for climate change and per-capita GDP as an indicator of its (economic) ability to contribute to mitigation, the results on the PRP-emissions and PRP-income relationships suggest that national PRPs agree with the principle of "Differentiated Responsibilities and Respective Capabilities" cited above. The result on the PRP-temperature relationship suggests that countries with colder climates maydisplay a degree of solidarity with those in warmer climates. Together with the finding that PRPs are unrelated to citizens' WTC, this suggests that ethical principles, – and possibly international pressures that rely on them – prevail over citizens' climate action preferences when it comes to governments' PRPs. The pattern of national WTC, conversely, is consistent with standard cost-benefit calculus involving sensitivity to climate change, adaptive capacity, and mitigation costs.

The antagonism between the ways in which temperature, income and carbon intensity shape governments' mitigation targets on the one hand and citizens' climate action preferences on the other suggest a potential divergence between ambitious government policies and less ambitious citizen preferences in cold, rich and carbon-intensive countries. Against this background – combined with evidence of right-wing populist movements' using climate change as a battleground for challenging the democratic institutions and procedures that enact climate policies (Forchtner 2019, Gardiner 2019, Lockwood and Lockwood 2022) – the study furthermore investigates whether a divergence between governments' climate change mitigation targets and citizens' preferences is associated with citizens' dissatisfaction with the way democracy works in their respective countries. Focusing on the member states of the European Union and the UK, it is found that reported satisfaction with democracy in 2022/23 is significantly negatively related to measures of divergence between PRPs and citizens' climate action preferences. This finding is robust to controlling for an array of potential confounders, including county-specific COVID-19-related excess mortality rates and the rates of growth, unemployment and inflation.

In the main analysis, citizens' climate action preferences are measured by their willingness to contribute one percent of their income to climate change mitigation. This is a validated measure, as it correlates with what individuals donate for climate change mitigation in incentivized choice experiments (Andre et al. 2024). Using an alternative measure, citizens' demand for pro-climate government action, leads to the same results.

Three strands of literature are relevant to the present study. The first is concerned with the drivers of the Paris Agreement pledges (NDCs). As noted above, both factual aspects – such as country-specific benefits, costs and technical feasibility of mitigation, and institutional and cultural factors – and normative aspects – responsibility and equity, country image and international pressure – play a role at the inter-governmental level. With respect to responsibility and equity, despite their controversial character (Kartha et al. 2018, Pan et al. 2017, Robiou du Pont et al. 2016), accepted principles of "polluter-pays" and "ability-to-pay" can be taken to suggest that carbon-intensive and wealthy countries should contribute more to climate change mitigation than less carbon-intensive and less wealthy countries. In comparison with the factors and arguments invoked in the inter-governmental arena, the role of citizens' pro-environmental attitudes and preferences has received relatively little attention. Drummond et al. (2018) analyzed survey data for 71 countries and one region elicited in 2007-2008 and found a positive association between the proportion of people who are aware of climate change and the unconditional NDCs as of 2016. In a case study for Pakistan and

Bangladesh, Alvi et al. (2020) found that people who perceive climate change to be a threat to their lives, income, and welfare are more likely to support ambitious mitigation targets. By considering awareness of climate change and the perception of threat, those papers focused on climate change *cognitions* rather than the *preferences* for climate action studied in the present paper.

The second strand of relevant literature is concerned with explaining individuals' pro-environmental and pro-climate behaviors. The standard approach in economics (in the tradition of Samuelson 1954) is to conceive of pro-environmental behavior as a voluntary contribution to a public good. This approach involves evaluating the anticipated benefits of a pro-environmental behavior relative to the associated costs. While the benefits may include positive effects on others (altruism), it was found that altruistic motivation is insufficient to explain the extent of voluntary contributions typically observed (Andreoni 1988). It was therefore suggested that, in addition to the "material" benefit from the public good, the act of contributing *per se* yields a psychological benefit, metaphorically dubbed a "warm glow" (Andreoni 1990). The pertinent benefits can be extrinsic or intrinsic (Nyborg 2018). While extrinsic benefits involve social approval, or disapproval, of an act on the basis of social norms, intrinsic rewards involve inner feelings such as guilt or conscience based on moral norms. The inter-individual variation of pro-climate behaviors was found to be related to endorsement of both social norms (e.g., Farrow et al. 2017, Andre et al 2022, Welsch 2022a) and moral norms (e.g. Welsch 2020, Andre et al. 2022).[2] With respect to the country-level pattern of the willingness to contribute to climate change mitigation, the country-specific anticipated benefits from mitigation (in terms of reducing vulnerability) and the associated costs were found to play a significant role whereas further economic, institutional and cultural factors were not (Andre et al. 2024).

The third strand of relevant literature (reviewed by Forchtner 2019) is concerned with the interplay between climate policy, right-wing populist movements, and satisfaction with democracy. Political scientists have found evidence that right-wing populist parties and their supporters are hostile to climate and low-carbon energy policies (Fraune and Knodt 2018, Lockwood 2018), and the rise of right-wing populist parties has been shown to be associated with less stringent climate and sustainable energy policies and outcomes once elected to legislatures and governments (Böhmelt 2021, Ćetković and Hagemann 2020, Huber et al. 2021, Jahn 2021, Lockwood and Lockwood 2022). In addition to undermining climate policies when in power, right-wing populists spur climate

[2] Complementing the economics literature, psychological research has provided considerable detail on the factors motivating pro-climate behaviors (Hornsey et al. 2016, Van Valkengoed and Steg 2019).

skepticism as part of a broader strategy to question the effectiveness and legitimacy of current democratic systems. By framing climate policies as imposed by undemocratic elites, they portray these policies as "cosmopolitan" top-down projects that do not reflect the will of the people. This narrative is used to fuel broader skepticism towards democratic institutions and procedures and to advocate for greater national sovereignty and local control over environmental policies (Gardiner 2019, Huber 2020, Huber et al. 2020.)

This paper adds to the literature in the following ways. First, it proposes a concise conceptual model of the interplay between cost-benefit considerations, ethical principles, and citizens' climate action preferences in shaping national mitigation pledges. Second, it combines the latest available mitigation pledges with globally representative data on citizens' preferences to empirically test this model. Third, it explores how a divergence between governments' mitigation targets and citizens' climate action preferences may be linked to citizens' satisfaction with democracy against the background of rising right-wing populism.

The paper is organized as follows. Section 2 describes the conceptual model, its empirical implementation, and the data used. Section 3 reports the results. Section 4 provides a discussion and concludes.

2. Analytical Framework

2.1 Conceptual Model

Standard cost-benefit calculus suggests that an agent's optimal level of greenhouse gas abatement increases in her sensitivity to climate change and decreases in both her capacity to adapt to (protect herself against) climate change and the agent-specific costs of abatement (e.g., Ebert and Welsch 2012).[3] The predictions of the cost-benefit framework apply not only to citizens' willingness to contribute to climate change mitigation but – depending on the working of the democratic process – may carry over to the governments that represent them: Governments of more climate-sensitive countries with lower adaptive capacity and lower abatement costs are expected to pursue more ambitious abatement targets than governments of less sensitive countries with greater capacity for adaptation and higher costs of abatement.

While the working of cost-benefit considerations at the individual level may be moderated by normative or cultural influences (e.g., Farrow et al. 2017), governments' climate change mitigation targets, proclaimed in the international arena, are subject to specific factors in addition to citizens'

[3] Climate sensitivity and adaptive capacity jointly define a country's vulnerability (footnote 1).

preferences (Chunark et al. 2017, Dash and Gim 2019, Day et al. 2015, Harris, 2004, Kartha et al. 2018, Michalena et al. 2018, Pan et al. 2017, Pauw et al. 2019, Robiou du Pont et al. 2016, Röser et al. 2019, Vona, 2019, Willis, 2017, Zheng et al. 2021). In particular, demands for equity and fairness, as laid out in the notion of "Common but Differentiated Responsibilities and Respective Capabilities", may override national self-interest. Pertinent principles such as "polluter pays" and "ability to pay" suggest that high-emission ("dirty") countries and wealthy countries, respectively, should contribute more to the common good of climate change mitigation than less dirty and less wealthy ones. In addition, appeals to solidarity demand that the less vulnerable should not avoid their moral duty to contribute.

In sum, national mitigation pledges are assumed to be shaped by both citizens' willingness to contribute (WTC) to climate change mitigation (domestic level) and ethically-based demands for fairness and solidarity (international level). Citizens' WTC, in turn, is assumed to be shaped by cost-benefit considerations involving climate sensitivity, adaptive capacity, and mitigation costs. The following model captures these assumptions:

$$MitigationPledge = f(Fairness\&Solidarity, CitizenWTC), \quad (1)$$

$$CitizenWTC = g(ClimateSensitivity, AdaptiveCapacity, MitigationCosts). \quad (2)$$

2.2 Empirical Implementation and Hypotheses

To empirically implement this model, indicators are needed for the outcome variables *MitigationPledge* and *CitizenWTC*, the predictor variables *ClimateSensitivity*, *AdaptiveCapacity* and *AbatementCosts*, and indicators that capture international demands based on *Fairness&Solidarity*.

The pertinent indicators are specified as follows:

- *MitigationPledge* is the country-level percentage reduction pledge (*PRP*) for greenhouse gas emissions per capita, 2019 to 2030.
- *CitizenWTC* is the country-level percentage of citizens' willingness to contribute (*WTC*) one percent of their income to fight climate change.
- *ClimateSensitivity* is captured by a country's 10-year average annual temperature (on the account that countries with hotter climates are more exposed to global warming risks, see IPCC 2022).
- *AdaptiveCapacity* is captured by a country's GDP per capita as of 2019, *GDP_pc* (on the account that richer countries have a greater economic capacity to cope with climate change).

- *AbatementCosts* are captured by a country's greenhouse gas emissions (in CO_2 equivalents) per capita as of 2019, *Emissions_pc* (on the account that greater dependence on greenhouse gas emissions implies higher abatement costs).
- *Fairness&Solidarity* concerns are captured by emissions per capita (polluter pays), GDP per capita (ability to pay) and annual average temperature, *Temperature* (quest for solidarity).

The empirical analog to the theoretical model thus takes the following form:

$$PRP = f(WTC, Emissions\_pc, GDP\_pc, Temperature), \quad (3)$$

$$WTC = g(Temperature, GDP\_pc, Emissions\_pc). \quad (4)$$

In terms of these formulations, the following is hypothesized.

H1. The relationship between *PRP* and *WTC* is positive (equation 3).

H2. The relationships between *PRP* and *Emissions_pc* and *GDP_pc*, respectively, are positive, whereas the relationship between *PRP* and *Temperature* is negative (equation 3).

H3. The relationship between *WTC* and *Temperature* is positive, whereas the relationships between *WTC* and *GDP_pc* and *Emissions_pc*, respectively, are negative (equation 4).

In empirically estimating equations 3 and 4 (section 3) I restrict myself to those predictors of *WTC* that indicate country-level vulnerability (*Temperature*, *GDP_pc*) and mitigation costs (*Emissions_pc*), following Andre et al. (2024) who found a battery of additional economic, institutional and cultural variables to be insignificant and not to affect the results concerning the vulnerability and cost indicators.[4] The baseline specification of the *PRP* equation uses the same set of predictors whereas robustness checks involve additional controls.

A further step of the empirical analysis will focus on possible divergences between governments' mitigation targets and citizens' preference for climate action. It will first be studied if and how the cross-country pattern of divergences is related to the country characteristics *Temperature*, *GDP_pc* and *Emissions_pc*. Second (motivated by pertinent literature reviewed in the introduction), it will be studied if the divergences are associated with citizens' satisfaction with the way democracy works in their countries. Specifically, the following hypotheses are considered:

[4] The insignificance in equations for country-level WTC does not contradict evidence of a significant role of social and moral norms for pro-environmental attitudes and behaviors as this evidence refers to within-country variation of the predictor and outcome variables.

H4. Differences between government mitigation targets and citizens' preference for climate action, *PRP-WTC*, are positively related to *GDP_pc* and *Emissions_pc*, respectively, and negatively related to *Temperature* (a corollary to H2 and H3).

H5. A larger difference between government mitigation targets and citizens' preference for climate action, *PRP-WTC*, is associated with citizens being less satisfied with the way democracy works in their respective countries.

While tests of **H1**-**H4** rely on the overall set of countries (N = 123), tests of **H5** are restricted to a subset of countries, the member states of the European Union plus the UK (N = 28). The reasons for this choice are as follows. First, the member states of the European Union (EU) and the UK are all democracies (as opposed to hybrid or authoritarian systems), so that it is meaningful to ask how satisfied citizens are with the way democracy works in their respective countries.[5] The EU member countries and the UK make up close to 40 percent of the democratic countries worldwide (Economist Intelligence Unit 2024). Second, the EU member states and the UK stand out because representative data on satisfaction with democracy (in the sense stated above) that are comparable across countries and over time are regularly (semi-annually) elicited. Third, as will be detailed later, mean *PRP* of the EU countries is much larger than the corresponding world average, whereas mean *WTC* of EU citizens is less than the corresponding world average, so that *PRP-WTC* is relatively large. Fourth, right-wing populist parties in EU countries have used climate policy as a battleground for undermining trust in democratic institutions and procedures (Lockwood and Lockwood 2018).

2.3 Data and Variables

To derive nations' percentage reduction pledges (*PRP*), I used national emission targets for 2030 reported by Meinshausen et al. (2022) in their study of the Paris Agreement pledges' efficacy to keep global warming below 2°C. In contrast to the emission targets analyzed by Drummond et al. (2018), which were stated in 2015, the targets reported in Meinshausen et al. (2022) represent updated national emission limits officially submitted by November 2021, just before the 26th Conference of the Parties (COP26). Emission targets are specified in terms of greenhouse gas emissions per capita, measured in CO_2 equivalents. They are either unconditional (that is, valid irrespective of other countries' actions) or conditional upon external factors (e.g. financial support from other countries or

[5] This is actually a question about the perceived performance of the democratic institutions and procedures in place and, thus, only meaningful in democracies. It is to be distinguished from the question about the support of democracy as a regime type, which could be asked independent of the regime actually in place (e.g., Claassen and Magalhães 2022).

regions). I used the unconditional emission targets for 2030 and computed the implied percentage reductions relative to 2019 emissions (also taken from Meinshausen et al. 2022). Since a number of countries have target emissions that exceed their per capita emissions in 2019, *Emissions_pc* (including, e.g., Brazil, China and Russia), the respective percentage reduction targets are negative.

To measure climate action preferences, I draw on data from the Global Climate Change Survey designed and described by Andre et al. (2024). The survey was administered as part of the Gallup World Poll 2021/2022 in a set of 125 countries around the world using a common sampling and survey methodology. To ensure national representativeness, each country sample was randomly selected from the resident population aged 15 and above. Most country samples included approximately 1,000 respondents.

I use two measures of nationally representative climate action preferences from this source. The first – willingness to contribute (*WTC*) – is the national percentage of respondents who answer affirmatively to the question whether they would be 'willing to contribute 1% of [their] household income every month to fight global warming'. Respondents' answers reflect how strongly they value climate action relative to alternative uses of their income. Since this WTC measure has been empirically validated and shown to predict incentivized pro-climate donation decisions (Andre et al. 2024), it is the primary measure used in this study.

The second measure – government action demand (*GAD*) – is individuals' demand for pro-climate policy action, elicited by asking respondents whether they think that their 'national government should do more to fight global warming' (answered yes or no). I use the national percentages of affirmative answers, as reported in Table S4 of Andre et al. (2024).

The data on the 10-year annual average temperature, *Temperature* (in degrees Celsius) were taken from World Bank Group's Climate Change Knowledge Portal (World Bank 2024a). The data on national GDP per capita (*GDP_pc*) in one thousand constant US dollars, adjusted for differences in purchasing power, were taken from the World Bank's World Development Indicators database (World Bank 2024b). The data used refer to 2019.[6]

The overall sample for which data on the variables *PRP, WTC*, *GAD*, *Temperature*, *GDP_pc* and *Emissions_pc* are jointly available includes 123 countries.[7] They account for 95 percent of the world's greenhouse gas (GHG) emissions and 91 percent of the global population.

[6] For Venezuela, the World Bank does not provide GDP estimates. Instead, I used data from the International Monetary Fund World Economic Outlook Database (https://www.imf.org/en/Publications/WEO/weo-database/2022/October).
[7] Two of the 125 countries for which Andre et al. (2024) provide data on WTC and GAD (Kosovo and Taiwan) have a controversial international status and are not members of the United Nations. Hence, Meinshausen et al. (2022)

The data on satisfaction with democracy (*SWD*) are taken from the Eurobarometer social surveys, which are regularly conducted semi-annually in the member states of the EU. SWD data are elicited using the following question: "On the whole, are you very satisfied, fairly satisfied, not very satisfied or not at all satisfied with the way democracy works in your country?" I used the national percentages of those who are very satisfied or fairly satisfied. The data used refer to 2016-2017 and 2022-2023 and were computed as averages across the respective semi-annual surveys. They refer to the EU27 plus the UK, where separate data for East and West Germany were used.[8] Since no *WTC* and *GAD* data are available for Luxembourg, the EU subsample includes 26 countries and two regions (East and West Germany).

The control variables used in the analysis of SWD (COVID-19-related excess deaths per million in 2020-2021 and the average annual rates of growth, unemployment and inflation in 2022-2023) were taken from WHO (2023) and Eurostat, respectively.

3. Results

3.1 A First Look at the Data

Summary statistics for all variables of interest are reported in Table A1 in the Appendix; Tables A2 and A3 provide correlations. The percentage reduction pledges vary between -48.2 and 66.6 percent, with a mean of 5.8 percent. The pledges are negative for 48 countries, that is, their target emissions in 2030 are larger than their emissions in 2019. National average willingness to contribute 1% of income varies between 30.5 and 92.8 percent, with a mean of 69.9 percent.

Figure 1 shows the distributions of *PRP* and *WTC*. The distribution of *PRP* is two-peaked with one peak at expansions between 2 and 14 percent and another at reductions between 9 and 32 percent. The distribution of *WTC* is skewed to the right with most countries having *WTC*s between 70 and 87 percent.

Figure 2 shows the percentage reduction pledges plotted against the willingness to contribute and suggests a negative relationship. The slope of the regression line is -0.476 (p = 0.015), which suggests that the percentage reduction pledge decreases by close to one half percentage point as the willingness to contribute increases by one percentage point. However, to preempt results reported below, the relationship disappears when the full model (equation 3) is considered.

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provide no official emission targets for them. Together they account for about 0.6 percent of global greenhouse gas emissions and 0.3 percent of the world population.

[8] Treating East and West Germany as separate units is of advantage given that their SWD levels differ substantially and respond differently to relevant predictors (Welsch 2022b).

Figure 3, shows countries' target percentage reductions of greenhouse gas emissions per capita (left) and country-level percentages of citizens willing to contribute 1% of their income to fight climate change (right) plotted against average annual temperatures, GDP per capita, and greenhouse gas emissions per capita, respectively. It stands out that the signs of the relationships between the emission reduction pledges and temperature, per capita GDP, and per capita emissions, respectively, are opposite to the signs of the respective relationships between the willingness to contribute and temperature, GDP, and emissions. Specifically, percentage reduction pledges are more ambitious in cold and wealthy countries with high per capita emissions than in hot and poor countries with low per capita emissions. Conversely, citizens' willingness to contribute is smaller in cold and wealthy countries with high emissions than in hot and poor countries with low emissions.

The next subsection will scrutinize the relationships shown in Figures 2 and 3 in a multivariate regression framework based on equations 3 and 4.

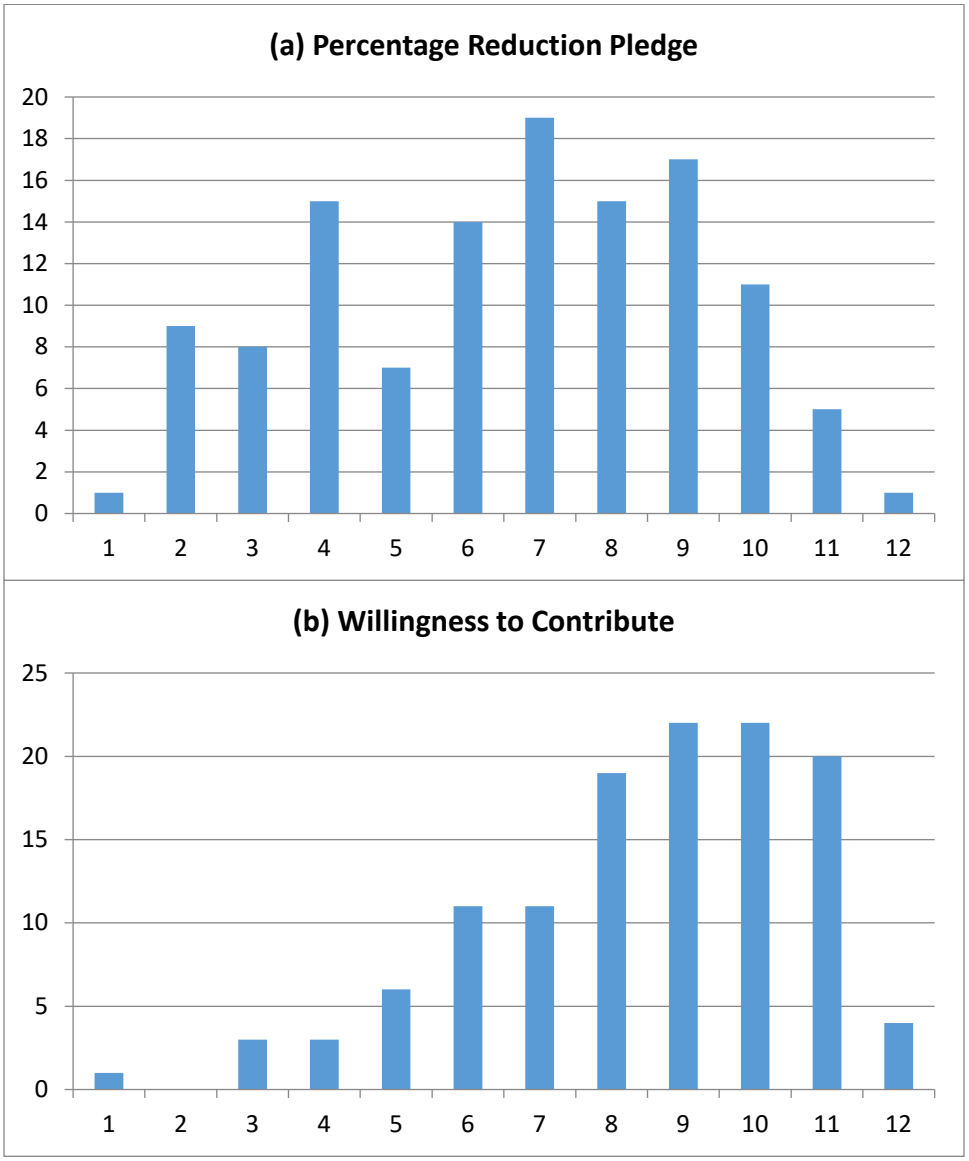

Figure 1. This figure shows the distributions of countries' target percentage reductions of greenhouse gas emissions per capita (2019 to 2030) and country-level percentages of citizens willing to contribute 1% of their income to fight climate change.

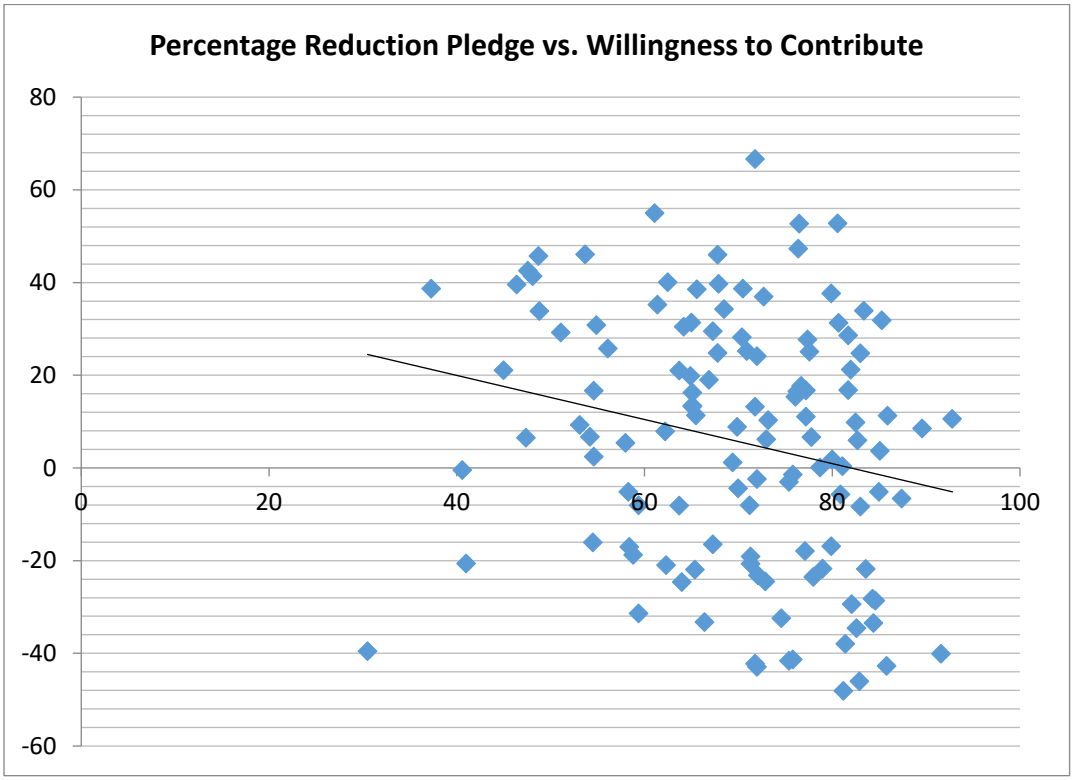

Figure 2. This figure shows countries' target percentage reductions of greenhouse gas emissions per capita (2019 to 2030) vs. country-level percentages of citizens willing to contribute 1% of their income to fight climate change. Negative reductions indicate targeted expansions. The slope of the regression line is -0.476 (p = 0.015).

Figure 3. This figure shows country-level percentages of citizens' willing to contribute 1% of their income to fight climate change (left) and countries' target percentage reductions of greenhouse gas emissions per capita (right) vs. average annual temperatures, GDP per capita and greenhouse gas emissions per capita.

3.2 Baseline Results

I estimated linear versions of equations 3 and 4, using the method of seemingly unrelated regressions (SUR) to account for cross-equation correlation of errors.[9] In order to fully exploit the large and globally representative data base described above, I started by disregarding additional (institutional and cultural) control variables that are available for a limited set of countries only; estimates that involve such controls will be considered later.

Table 1. Baseline Results

A	(1) PRP	(2) WTC	(3) PRP	(4) PRP-WTC
WTC	0.095 (0.51)			
Temperature	-0.525* (1.80)	0.332** (2.38)	-0.493* (1.73)	-0.825*** (2.65)
GDP_pc	0.646*** (5.31)	-0.200*** (3.54)	0.627*** (5.43)	0,827*** (6.56)
Constant	-6.357 (0.43)	68.571*** (20.04)	0.182 (0.003)	-68.389*** (8.94)
Observations	123	123	123	123
Adjusted R^2	0.290	0.205	0.294	0.404
B	(1) PRP	(2) WTC	(3) PRP	(4) PRP-WTC
WTC	-0.057 (0.76)			
Temperature	-0.716** (2.33)	0.403*** (2.87)	-0.739** (2.49)	-1.142*** (3.44)
Emissions_pc	1.693*** (3.46)	-0.577*** (2.58)	1.726*** (3.64)	2.303*** (4.36)
Constant	11.365 (0.76)	66.501*** (18.77)	7.601 (1.00)	-58.901*** (7.03)
Observations	123	123	123	123
Adjusted R^2	0.202	0.168	0.208	0.301

Note: *p<0.10, **p<0.05, ***p<0.01. t-statistics in parentheses.

Since a country's GDP per capita is strongly related to its greenhouse gas emissions per capita (the correlation coefficient in the present data is 0.65), *GDP_pc* and *Emissions_pc* cannot be included simultaneously in one regression. Accordingly panel A of Table 1 shows regressions that include *GDP_pc*, whereas panel B shows regressions that include *Emissions-pc*.

A striking finding is that *WTC* is insignificant in the *PRP* equation (regression 1) no matter whether *GDP_pc* (panel A) or *Emissions_pc* (panel B) are included (along with *Temperature*). Focusing on panel A, *Temperature* attracts a marginally significant negative coefficient in the *PRP*

[9] SUR is appropriate since the equation system is recursive (Gatignon 2014).

equation (regression 1) and a significantly positive coefficient in the *WTC* equation (regression 2). *GDP_pc* attracts a significantly positive coefficient in the *PRP* equation and a significantly negative coefficient in the *WTC* equation. Turning to panel B, *Temperature* continues to attract a negative coefficient in the *PRP* equation (significant on the 5-percent level) and a positive coefficient in the *WTC* equation (significant on the 1-percent level). *Emissions_pc* attracts a significantly positive coefficient in the *PRP* equation and a significantly negative coefficient in the *WTC* equation. When *WTC* is deleted from the *PRP* equation (which yields the reduced form of the system of equations 3 and 4), the results concerning *Temperature*, *GDP_pc* and *Emissions_pc* are almost unchanged in comparison with regression 1 (see regression 3).

The coefficients indicate that for every increase in average temperature by one ºC the percentage reduction pledge decreases by about 0.53 (panel A) to 0.72 (panel B) percentage points whereas the country-level willingness to contribute 1% of one's income increases by 0.33 (panel A) to 0.40 percentage points (panel B). Furthermore, an increase of GDP per capita by 1000 dollars is associated with an increase in *PRP* by 0.65 percentage points and a decrease in *WTC* by 0.20 percentage points. Finally, an increase of emissions per capita by one ton of carbon equivalent is associated with an increase in *PRP* by 1.69 percentage points and a decease in *WTP* by 0.58 percentage points.

Together, these results suggest that the *PRP*s of rich and high-carbon countries with a cold climate are large, whereas the *WTC* of the respective citizens is low – and conversely for poor and low-carbon countries with hot climates. This entails a divergence between *PRP*s and *WTC* that increases with wealth and carbon-intensity and decreases with temperature. Regression 4 considers this relationship more explicitly by using the difference *PRP*-*WTC* as the dependent variable. The regression yields highly significant coefficients of the expected sign. Hence, *PRP*-*WTC* is large in wealthy, carbon-intensive countries with cold climates and small in less wealthy, less carbon intensive countries with warm climates.

Turning to the issue of control variables, Andre et al (2024) found a positive relationship between *WTC* and vulnerability indicators and a negative relationship between *WTC* and mitigation costs, similar to what is reported in regression 2 of Table 1, and they showed that these relationships are robust to including an array of institutional and cultural country characteristics. Therefore, I checked robustness to including control variables only with respect to the *PRP* equation (column 1 in Table 1). The results can be found in Table A4 in the appendix.

The control variables (described in the note to Table A4) are institutional country characteristics (indicators of the degree of democracy, the rule of law, and freedom from corruption)

and cultural country characteristics (educational outcomes and an indicator of individualism). The sample for which all required variables are jointly available includes 84 countries. Estimates on the restricted sample that disregard the controls (columns 1 and 2 of Table A4) are very similar to their counterparts in the full sample (column 1 in Table 1): *PRP* is not significantly related to *WTC* and significantly positively related to both *GDP_pc* and *Emissions_pc*. These relationships are preserved when including the institutional variables (columns 3 and 4) and the cultural variables (columns (5 and 6).[10] *Temperature* turns out to be insignificant in the model that includes *GDP_pc* even in the absence of controls (column 1 of Table A4). When the controls are included, *Temperature* is insignificant in all pertinent specifications (columns 3 to 6). Regarding the controls themselves, the rule of law and freedom from corruption are always insignificant. Democracy attracts a marginally significant positive coefficient in all pertinent specifications whereas individualism attracts a highly significantly positive coefficient in the model that includes *Emissions_pc* and a marginally significant coefficient in the model that includes *GDP_pc*. The educational outcome attracts a marginally significantly positive coefficient in the model that includes *Emissions_pc* but insignificant coefficients in the models that include *GDP_pc*. The tendency of the cultural variables to be insignificant or less significant when combined with *GDP_pc* than when combines with *Emissions_pc* is consistent with their being more strongly correlated with the former than the latter.[11]

3.3 Alternative Preference Measure

An alternative measure of people's preference for climate action is the demand that their 'national government should do more to fight global warming'. The mean of the country-level percentages of individuals who express this demand is 88.5 percent (compared to 69.9 percent for *WTC*), with a minimum of 61.9 percent (compared to 30.5 percent for *WTC*). Government-action demand (*GAD*) is thus considerably larger than *WTC* 1% of one's income. The correlation coefficient between the two measures is 0.47. The demand that the government should do more to fight global warming may arguably shape governments' mitigation targets more strongly than citizens' willingness to contribute their own resources.

[10] In the specification that includes emissions and the institutional controls, willingness to contribute is significant at the lowest sensible margin (p = 0.094).

[11] The correlation coefficients are r(democracy, GDP_pc) = 0.645, r(democracy, Emissions_pc) = 0.262, r(individualism, GDP_pc) = 0.706 and r(individualism, Emissions_pc) = 0.417.

Table 2. Estimation Results for Alternative Preference Measure (*GAD*)

	(1) PRP	(2) GAD	(3) PRP-GAD	(4) PRP	(5) GAD	(6) PRP-GAD
GAD	0.346 (1.13)			0.291 (0.89)		
Temperature	-0.584** (1.98)	0.263*** (3.10)	-0.706*** (2.60)	-0.816*** (2.64)	0.269*** (3.23)	-1.008*** (3.34)
GDP_pc	0.640*** (5.52)	-0.037 (1.09)	0.664*** (5.68)			
Emissions_pc				1.764*** (3.70)	-0.132 (0.99)	1.858*** (3.85)
Constant	-29.121 (1.08)	84.654*** (40.72)	-84.472*** (11.92)	-16.707 (0.59)	84.548*** (40.1)7)	-74.947*** (10.10)
Observations	123	123	123	123	123	123
Adjusted R^2	0.296	0.115	0.350	0.201	0.114	0.267

Note: *p<0.10, **p<0.05, ***p<0.01. t-statistics in parentheses.

Table 2 shows the analogs to regressions 1, 2 and 4 in Table 1, where *WTC* is replaced with *GAD*. As is the case with *WTC*, *GAD* is not significantly related to *PRP* no matter whether *GDP_pc* or *Emissions_pc* is included (regressions 1 and 4). *Temperature* continues to be significantly negatively related to *PRP* (regressions 1 and 4), and it is significantly positively related to *GAD* (regressions 2 and 5). While *GDP_pc* and *Emissions_pc* continue to attract significantly positive coefficients in the *PRP* equations (regressions 1 and 4), there is no significant relationship between either *GDP_pc* or *Emissions_pc* and *GAD* (regressions 2 and 5).

The coefficients indicate that for every increase in average temperature by one ºC the percentage reduction pledge decreases by about 0.58 (regression 1) to 0.82 (regression 4) percentage points whereas the country-level demand for government action increases by 0.26 (regression 2) to 0.27 percentage points (regression 5). The dependence of *GAD* to climate sensitivity (temperature) is thus somewhat less than that of *WTC*. Furthermore, an increase of GDP per capita by 1000 dollars is associated with an increase in PRP by 0.64 percentage points whereas an increase of emissions per capita by one ton of carbon equivalents is associated with an increase in PRP by 1.76 percentage points. As noted above, there is no significant association of *GAD* to GDP per capita and emissions per capita. In contrast to the willingness to contribute (*WTC)*, citizens' demand for government action (*GAD*) is thus only related to country-specific sensitivity to climate damage (captured by *Temperature*), but not to adaptive capacity and mitigation costs (captured by *GDP_pc* and *Emissions_pc*, respectively).

When the difference between *PRP* and *GAD* is used as the dependent variable (regressions 3 and 6), it is seen that it is significantly negatively related to *Temperature* and significantly positively

related to *GDP_pc* and *Emissions_pc*. Similar to the divergence between *PRP* and *WTC*, the divergence between *PRP* and *GAD* increases in wealth and carbon-intensity and decreases in temperature.

3.4 Policy-Preference Divergence and Satisfaction with Democracy

The preceding subsections have documented that the difference between governments' *PRP*s and measures of citizens' preference for climate action (*WTC*, *GAD*) is greater in wealthy and carbon-intensive countries with cold climates than in less wealthy and less carbon-intensive countries with warmer climates (regression 4 in panels A and B of Table 1 and regressions 3 and 6 in Table 2). A large numerical difference between *PRP*s and the preference measures cannot, of course, be interpreted as implying that government targets 'exceed' citizen preferences since the two measures are not commensurable with each other. Nevertheless, it is meaningful to compare the respective differences across countries and to ask for possible consequences of the pertinent cross-country variation. One hypothetical consequence is that citizens of countries with greater policy-preference 'divergence' are less satisfied with democracy than are citizens of countries with a smaller 'divergence'.

For the reasons discussed in subsection 2.2, the analysis of the relationship between policy-preference divergence and satisfaction with democracy focuses on the member states of the EU. For the EU countries, average *PRP* is much larger than the global average (22.00 percent versus 5.57 percent) whereas the averages of country-level *WTC* and *GAD* are smaller in the EU than globally (64.35 percent versus 69.86 percent in the case of *WTC* and 85.95 versus 88.46 percent in the case of *GAD*). As Table A5 in the appendix shows, the *PRP-WTC* and *PRP-GAD* differences in the EU subsample are significantly positively related to income per capita and emissions per capita (as is the case in the overall sample), but they are not significantly related to temperature. The coefficients on *GDP_pc* are of a similar magnitude as in the overall sample, but the coefficient on *Emissions_pc* is at least twice as large as in the overall sample. With respect to the *WTC* and *GAD* components of the policy-preference differences, this suggests a lower preference for climate action in those EU countries that have greater capacity for adaptation and, in particular, higher mitigation costs – consistent with the findings for the overall sample.

Table 3 shows the regression results for satisfaction with democracy in 2022-23 (*SWD22_23)* as the dependent variable (controlling for satisfaction with democracy in 2016-17, *SWD16_16*). In all specifications considered, *SWD22_23* is significantly positively related to *SWD16_17*. According to regression 1, *SWD22_23* is significantly negatively related to *PRP-WTC*, and the significantly

negative relationship is preserved when controls (COVID-19-related excess deaths per million in 2020-2021 and the rates of growth, unemployment, and inflation in 2022-2023) are included (regression 2).[12] The controls themselves are insignificant. The same is true when *PRP-WTC* is replaced with *PRP-GAD*: *SWD22_23* is significantly negatively related to *PRP-GAD*, no matter whether controls are included or not (regression 3 and 4). The coefficient in regression 1 implies that an increase in *PRP-WTC* by one standard deviation (3.68) is associated with a decrease in *SWD* by 0.65 percentage points (0.24 standard deviations). Likewise, the coefficient in regression 3 implies that an increase in *PRP-GAD* by one standard deviation (3.49) is associated with a decrease in *SWD* by 0.63 percentage points (0.23 standard deviations). These are non-negligible magnitudes according to common standards in the social sciences (Cohen 1988).

Table 3: Satisfaction with Democracy and Policy-Preference Divergence

	(1)	(2)	(3)	(4)
SWD16_17	0.749*** (11.74)	0.743*** (7.58)	0.793*** (10.27)	0.781*** (7.77)
PRP-WTC	-0.176*** (2.92)	-0.168** (2.47)		
PRP-GAD			-0.179** (2.31)	-0.201** (2.12)
Excess deaths		-0.570 (0.30)		-0.890 (0.45)
Growth		-0.641 (0.73)		-0.939 (0.97)
Unemployment		0.723 (1.12)		0.670 (0.98)
Inflation		-0.160 (0.25)		-0.270 (0.41)
Constant	8.55* (1.74)	8.89 (0.74)	2.12 (0.26)	3.76 (0.31
Observations	28	28	28	28
Adjusted R^2	0.834	0.833	0.817	0.822

Note: The dependent variable is the country-level percentage of citizens of EU27 plus UK who stated in 2022-2023 that they were very satisfied or fairly satisfied (as opposed to not very satisfied or not at all satisfied) with the way democracy works in their respective countries .*Excess deaths* is the number of COVID-19-related excess deaths per thousand in 2020-2021. The rates of *growth*, *unemployment* and *inflation* are average annual rates 2022-2023. OLS estimates. *p<0.10, **p<0.05, ***p<0.01. t-statistics in parentheses.

The relationships established are correlations. The finding that both *PRP-WTC* and *PRP-GAD* are significantly related to *GDP_pc* and *Emissions_pc* may suggest attempting causal identification by using the latter variables in instrumental variable (IV) estimation, but the sample size is insufficient to permit reliable IV inference (e.g., Stock and Watson 2015). Some additional

[12] Disease epidemics and economic recessions shine an unfavorable light on perceived government effectiveness ((e.g., Eichengreen et al. 2024, Hibbs et al. 1982, Lewis-Beck and Stegmaier 2013).

light can, however, be shed on the results presented in Table 3 by using *PRP*, *WTC* and *GAD* as separate explanatory variables in regressions for *SWD22_23*. As Table A6 in the appendix shows, *SWD22_23* is significantly negatively related to *PRP* when controlling for *WTC* and *GAD*, whereas the latter are insignificant. The estimated coefficients suggest that a one-percentage-point increase in *PRP* is associated with a decrease in *SWD22_23* by about 0.2 percentage points. This is a considerable magnitude given that *PRP* varies between -16 percent (expansion) and 47 percent (reduction).

Possible interpretations of the relationships established will be discussed in the next section.

4. Discussion and Conclusion

In democracies the implementation of effective climate policies relies on popular support, and even in non-democratic societies leaders cannot entirely ignore prevailing political preferences and demands. Therefore, the relationship between governments' climate change mitigation targets and citizens' climate action preferences is an issue of both academic and practical importance. In addition, it is important to understand which drivers of governments' climate policy targets on the one hand and citizens' climate action preferences on the other operate at the international and domestic levels, respectively, and how government targets and citizen preferences are related to them.

This paper has studied these issues in a large sample of countries using globally representative preference measures. The empirical analysis has drawn on a conceptual framework that involves two rationales for the formation of government targets and citizen preferences. One is cost-benefit calculus, which suggests that greater sensitivity to climate change implies more ambitious climate protection being sought, whereas greater adaptive capacity and higher mitigation costs imply less ambitious climate protection. The other involves ethical norms of equity and fairness, which suggest that greater wealth and higher emission levels imply greater responsibilities for climate change mitigation.

The empirical analysis performed within this framework has revealed that the national climate change mitigation pledges submitted by 123 countries – which account for 95 percent of the world's greenhouse gas emissions – are statistically unrelated to the respective citizens' climate action preferences. In addition, the cross-national pattern of citizens' preferences is consistent with cost-benefit calculus and inconsistent with norms of equity and fairness, whereas the pattern of governments' mitigation pledges is consistent with equity/fairness norms and inconsistent with cost-benefit considerations.

In terms of the indicators used to measure climate sensitivity, adaptive capacity and mitigation costs on the one hand and equity/fairness-based responsibilities on the other, the prevalence of cost-benefit considerations at the level of the citizens and equity-fairness considerations at the level of the governments manifests itself in empirical relationships at the two levels that are diametrically opposed to each other. Citizens of wealthy and carbon-intensive countries in colder locations are less willing to contribute to climate change mitigation and demand less government action than citizens of less wealthy and less carbon-intensive countries in warmer locations, whereas the opposite applies to their governments: Governments of wealthy and carbon-intensive countries in colder locations have supplied more ambitious mitigation pledges than governments of less wealthy and less carbon-intensive countries in warmer locations.

The latter results were found to be robust to including a set of institutional and cultural country characteristics that were considered in previous studies of the factors that explain governments' mitigation targets. The results pertaining to those additional factors are consistent with previous findings, a circumstance that provides further support for the validity of the empirical analysis. The result that governments' targets are unrelated to citizens' preferences is robust to using several measures of the latter (willingness to contribute financial resources and demand for government action).

With respect to citizens' support of governments' mitigation targets, the paper most closely comparable to the present one is Drummond et al. (2018), who found a positive association between the proportions of a country's population that are aware of climate change and the emissions reduction targets set by that country. While that paper focused on the first round of pledges submitted by 71 countries shortly after the 2015 Paris Agreement, the present study refers to the pledges as of late 2021 submitted by 123 countries. In addition, the globally representative measures of citizen preferences used in the present paper can be assumed to represent citizens' support for governments' mitigation targets more closely than does the measure of awareness of climate change considered by Drummond et al. (2018). With respect to comparing the factors that shape governments' targets with those that shape citizens' preferences, I am unaware of comparable previous research.

Given the finding that key country characteristics shape governments' mitigation targets and citizens' climate action preferences in opposite ways, a second stage of the analysis investigated whether a divergence between government policies and citizen preferences is associated with less satisfaction with democracy. The analysis showed that in cold, rich and carbon intensive democratic countries (European Union plus UK) satisfaction with democracy is significantly negatively related

to measures of divergence between governments' targets and citizens' climate action preferences in those countries.

While the sample size prevents a rigorous causal analysis of this relationship, it can be considered as unlikely that a divergence between government climate policy and citizens' climate action preferences *causes* low satisfaction with democracy. The main reason for this assessment is that climate action preferences are not exogenous, but rather influenced by similar factors as satisfaction with democracy. Specifically, right-wing political parties' fuelling of climate skepticism and discrediting of climate policy as an "elitist" project, jointly with their general delegitimizing of established democratic institutions and procedures, is a case in point (Forchtner 2019, Gardiner 2019, Lockwood and Lockwood 2022). Overall, this political strategy undermines both the preference for climate action and the satisfaction with democracy. In addition, the rise of those parties itself may in part be triggered by dissatisfaction with democracy stemming from various sources, of which pre-existing climate skepticism may be one.

While the complex interplay between such mechanisms is an important avenue for future research, these relationships seem to suggest the existence of what may be called a political-economy tragedy of the commons. The tragedy consists of the possibility that effective climate policy may be hampered not only by a lack of ambition on the part of the governments, but by the risk that ambitious climate policy may bring explicitly anti-climate political actors into power. The presence of such actors in legislatures or governments has been shown to weaken climate policy (Lockwood and Lockwood 2018). The probably most prominent example is the United States' withdrawal from the Paris Agreement under President Trump.[13]

To attenuate such risks, it is important – though probably not sufficient – that ambitious climate policies use instruments that minimize the associated economic and social repercussions. Climate policy instruments should therefore be cost-effective, and they should permit to compensate the economically most vulnerable segments of the population for climate-policy-related losses. Carbon pricing combined with appropriately differentiated rebating of revenues is an approach that may satisfy these demands.

[13] More recently, the outcome of the 2024 European elections, which saw a noticeable shift towards the right, is expected to involve challenges to the current climate policies (known as the European Green Deal). For example, the combustion engine ban envisaged to take effect in 2035 has come under attack immediately after the election (Mathiesen et al. 2024).

References

Alvi, S., Nawaz, S.M.N., Khayyam, U. (2020). How does one motivate climate mitigation? Examining energy conservation, climate change, and personal perceptions in Bangladesh and Pakistan. Energy Res. Soc. Sci. 70, 101645.

Andre, P., Boneva, T., Chopra, F., Falk, A. (2022), Misperceived Social Norms and Willingness to Act Against Climate Change ECONtribute Discussion Paper No. 101.

Andre, P., Boneva, T., Chopra, F., Falk, A. (2024), Globally representative evidence on the actual and perceived support for climate action, Nature Climate Change, https://doi.org/10.1038/s41558-024-01925-3.

Andreoni, J. (1988), Privately Provided Public Goods in a Large Economy: The Limits of Altruism, *Journal of Public Economics*35, 57-73.

Andreoni, J.(1990), Impure Altruism and Donations to Public Goods: A Theory of Warm-Glow Giving, *Economic Journal*100, 464-477.

Beugelsdijk, S., Welzel, C., 2018. Dimensions and dynamics of national culture: synthesizing Hofstede with Inglehart. J. Cross-Cult. Psychol. 49, 1469–1505.

Böhmelt, T. (2021). Populism and Environmental Performance. Global Environmental Politics 21 (3): 97–123.

Ćetković, Stefan, and Christian Hagemann. 2020. Changing Climate for Populists? Examining the Influence of Radical-Right Political Parties on Low-Carbon Energy Transitions in Western Europe. Energy Research and Social Science 66: 101571.

Chunark, P., Limmeechokchai, B., Fujimori, S.,Masui, T., 2017. Renewable energy achievements in CO_2 mitigation in Thailand's NDCs. Renew. Energy 114, 1294–1305.

Claassen, C., Magalhães, P.C. (2022), Effective Governments and Evaluations of Democracy, Comparative Political Studies 43, 1258-1285.

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Lawrence Erlbaum Associates.

Dash, R., Gim, T.-H.T., 2019. Drivers of nationally determined contributions: an exploratory look at several developing countries. Int. Rev. Spat. Plann. Sustain. Dev. 7, 4–20.

Day, T., Röser, F., Tewari, R., Kurdziel,M., Höhne, N., 2015. Preparation of Intended Nationally Determined Contributions (INDCs) as a Catalyst for National Climate Action. International Partnership on Mitigation and MRV. New Climate Institute

Drummond, A., Hall, L.C., Sauer, J.D., Palmer,M.A., 2018. Is public awareness and perceived threat of climate change associated with governmental mitigation targets? Clim. Chang. 149, 159–171.

Ebert, U., Welsch, H. (2012), Mitigation and Adaptation in Global Pollution Problems: Economic Impacts of Productivity, Sensitivity, and Adaptive Capacity, *Environmental* and *Resource Economics*, 52, 49-64.

Economist Intelligence Unit (2024), Democracy Index 2023: Age of Conflict, EIU, United Kingdom.

Eichengreen, B., Saka, O., Aksoy, C. G. (2024). The political scar of epidemics. The Economic Journal 134, 1683-1700.

Farrow, K., Grolleau, G., Ibanez, L. (2017), Social Norms and Pro-Environmental Behavior: A Review of the Evidence, *Ecological Economics* 140, 1-13.

Forchtner, Bernhard. 2019. Climate Change and the Far Right. WIREs Climate Change 10: e604. https://doi.org/10.1002/wcc.604

Fraune, Cornelia, and Michèle Knodt. 2018. Sustainable Energy Transformations in an Age of Populism, Post-truth Politics, and Local Resistance. Energy Research and Social Science 43: 1–7.

Gardiner, B. (2019), For Europe's Far-Right Political Parties, Climate Is a New Battleground, Yale Environment 360, October 29, 2019.

Gatignon, H. (2014), Statistical Analysis of Management Data, 3rd ed., New York/Berlin: Springer.

Harris, P.G., 2004. Global Warming and East Asia: The Domestic and International Politics of Climate Change. Taylor & Francis.

Hibbs, D. A., Rivers, R. D., Vasilatos, N. (1982). On the demand for economic outcomes: Macroeconomic performance and mass political support in the United States, Great Britain, and Germany. The Journal of Politics, 44, 426-462.

Hornsey, M. J., Harris, E. A., Bain, P. G., & Fielding, K. S. (2016). Meta-analyses of the determinants and outcomes of belief in climate change. Nature Climate Change, 6(6), 622-626.

Huber, Robert A. 2020. The Role of Populist Attitudes in Explaining Climate Change Skepticism and Support for Environmental Protection. Environmental Politics 29 (6): 959–982.

Huber, Robert A., Lukas Fesenfeld, and Thomas Bernauer. 2020. Political Populism, Responsiveness, and Public Support for Climate Mitigation. Climate Policy 20: 373–386.

IPCC (2007), Intergovernmental Panel on Climate Change: *Climate Change 2007- Fourth Assessment Report*, Cambridge: Cambridge University Press.

IPCC (2022), Intergovernmental Panel on Climate Change: *Climate Change 2022: Impacts, Adaptation and Vulnerability* (eds Pörtner, H.-O. et al.), Cambridge: Cambridge University Press.

Jahn, Detlef. 2021. Quick and Dirty: How Populist Parties in Government Affect Greenhouse Gas Emissions in EU Member States. Journal of European Public Policy 28 (7): 980–997.

Kartha, S., Athanasiou, T., Caney, S., Cripps, E., Dooley, K., Dubash, N.K., Fei, T., Harris, P.G. Holz, C., Lahn, B., Moellendorf, D., Müller, B., Roberts, J.T., Sagar, A., Shue, H., Singer, P., Winkler, H., 2018. Cascading biases against poorer countries. Nat. Clim. Chang. 8,348–349.

Lewis-Beck, M., Stegmaier, M. (2013). The vp-function revisited: A survey of the literature on vote and popularity functions after over 40 years. Public Choice, 157, 367-385.

Lockwood, B., Lockwood, M. (2022), How Do Right-Wing Populist Parties Influence Climate and Renewable Energy Policies? Evidence from OECD Countries, Global Environmental Politics 22:3, August 2022.

Lockwood, M. (2018). Right-Wing Populism and the Climate Change Agenda: Exploring the Linkages. Environmental Politics 27 (4): 712–732.

Mathiesen, K., Weise, Z., Guillot, L. (2024), A triumphant right's first post-election target: Overturning Green Deal car ban, Politico, 10 June.

Meinshausen, M., Lewis, J., McGlade, C., Gütschow, J., Nicholls, Z., Burdon, R. Cozzi, L., Hackmann, B. (2022), Realization of Paris Agreement pledges may limit warming just below 2 °C, Nature 604, 14 April.

Michalena, E., Kouloumpis, V., Hills, J.M., 2018. Challenges for Pacific small island developing states in achieving their nationally determined contributions (NDC). Energy Policy 114, 508–518

Nyborg, K. (2018), Social Norms and the Environment, *Annual Review of Resource Economics* 10, 405-423.

Pan, X., Elzen, M.d., Höhne, N., Teng, F.,Wang, L., 2017. Exploring fair and ambitious mitigation contributions under the Paris Agreement goals. Environ. Sci. Pol. 74, 49–56.

Pauw, P., Mbeva, K., van Asselt, H., 2019. Subtle differentiation of countries' responsibilities under the Paris agreement. Palgr. Commun. 5, 86.

Robiou du Pont, Y., Jeffery, M.L., Gütschow, J., Rogelj, J., Christoff, P., Meinshausen, M., (2016). Equitable mitigation to achieve the Paris Agreement goals. Nat. Clim. Chang 7, 38–43.

Röser, F., Widerberg, O., Höhne, N., Day, T. (2019). Ambition in the making: analysing the preparation and implementation process of the Nationally Determined Contributions under the Paris Agreement. Clim. Pol. 20, 415–429.

Samuelson, P. A. (1954). *The Pure Theory of Public Expenditure*. Review of Economics and Statistics, 36(4), 387-389.

Welsch, H. (2020), Moral Foundations and Voluntary Public Good Provision: The Case of Climate Change, *Ecological Economics* 175, 106696.

Welsch, H. (2022a), Do Social Norms Trump Rational Choice in Voluntary Climate Change Mitigation?, Ecological Economics 200, 107509.

Welsch, H. (2022b), What Shapes Satisfaction with Democracy? Interests, Morals, and the German East-West Divide, Social Indicators Research 163, 197–217.

WHO (2023), Estimates of Excess Mortality Associated with COVID-19 Pandemic (as of 5 April 2023), Geneva: World Health Organization.

World Bank (2024a), Climate Change Knowledge Portal, (https://climateknowledgeportal.worldbank.org/download-data)

World Bank (2024b), World Development Indicators (https://databank.worldbank.org/source/world-development-indicators/Series/NY.GDP.PCAP.PP.KD)

Van Valkengoed, A. M., & Steg, L. (2019). Meta-analyses of factors motivating climate change adaptation behaviour. *Nature Climate Change, 9*(2), 158-163.

Vona, F., 2019. Job losses and political acceptability of climate policies: why the 'job-killing' argument is so persistent and how to overturn it. Clim. Pol. 19, 524–532.

Willis, R., 2017. Taming the climate? Corpus analysis of politicians' speech on climate change. Environ. Pol. 26, 212–231.

Zheng, X., Guo, K., Luo, H., Pan, X, Hertwich, E., Jin, L., Wang, C. (2021), Individualism and nationally determined contributions to climate change, Science of the Total Environment 777, 146076.

APPENDIX

Table A1: Description of Variables and Summary Statistics

Variable name	Variable description	Data source	Mean	Standard deviation	Minimum	Maximum
Overall sample (N = 123)						
PRP	Percentage reduction pledge 2019-2030 (percent)	Meinshausen et al. (2022)	5.750	2.445	-48.150	66.637
WTC	Willingness to contribute 1% of income (percent)	Andre et al. (2024)	69.880	1.127	30.5	92.8
GAD	Government action demanded (percent)	Andre et al. (2024)	88.451	0.649	61.9	98.2
Temperature	10-year avg. annual temperature (°C)	World Bank (2024a)	17.702	0.740	-4.0	29.5
GDP_pc	GDP per capita in 2019 (1000 PPP dollars)	World Bank (2024b)	22.805	1.823	1.290	98.455
Emissions_pc	Carbon emissions per capita in 2019 (tons CO_2 equivalents)	Meinshausen et al. (2022)	6.509	0.463	0.766	26.730
EU sample (N = 28)						
PRP	Percentage reduction pledge (percent)	Meinshausen et al. (2022)	22.00	3.11	-16.07	47.26
WTC	Willingness to contribute 1% of income (percent)	Andre et al. (2024)	64.35	1.76	40.60	77.8
GAD	Government action demanded (percent)	Andre et al. (2024)	85.95	1.47	61.9	96.1
SWD22_23	Satisfied with the way democracy works in 2022-23 (percent)	Eurobarometer	56.18	2.72	36.00	88.50
SWD16_17	Satisfied with the way democracy works in 2016-17 (percent)	Eurobarometer	53.61	3.48	19.75	9.05
PRP-WTC	Difference between PRP and WTC	See above	-42.32	3.68	-74.90	-5.10
PRP-GAD	Difference between PRP and GAD	See above	-63.04	3.46	-92.81	-24.09
Excess deaths	Covid-19 related excess deaths per million in 2020-2021	WHO 2023	1424.77	192.97	109.02	4728.05
Growth	Growth rate 2022-23 (percent)	Eurostat	2.34	0.32	-2.0	7.2
Unemployment	Unemployment rate 2022-23 (percent)	Eurostat	5.68	0.46	2.4	12.6
Inflation	Inflation rate 2022-23 (percent)	Eurostat	8.95	0.59	5.8	16.3

Table A2. Correlations Overall Sample (N = 123)

	PRP	WTC	GAD	Temperature	GDP_pc
WTC	-0.219				
GAD	-0.086	0.471			
Temperature	-0.368	0.369	0.348		
GDP_pc	0.537	-0.425	-0.244	-0.468	
Emissions:pc	0.425	-0.354	-0.229	-0.441	0.652

Table A3. Correlations EU Subsample (N = 28)

	SWD22_23	SWD16_17	PRP-WTC	PRP-GAD	Excess deaths	Growth	Unemployment
SWD16_17	0.891						
PRP-WTC	0.026	0.277					
PRP-GAD	0.339	0.557	0.766				
Excess deaths	-0.618	-0.628	-0.225	-0.467			
Growth	-0.164	-0.190	-0.278	-0.387	0.028		
Unemployment	-0.164	-0.385	-0.347	-0.401	-0.060	0.140	
Inflation	-0.362	-0.329	-0.064	-0.202	-0.650	-0.410	-0.279

Table A4. Accounting for Institutional and Cultural Controls (N = 84)

	No controls		Institutional controls		Cultural Controls	
	(1)	(2)	(3)	(4)	(5)	(6)
WTC	0.223 (1.11)	0.191 (0.87)	0.230 (1.17)	0.322* (1.69)	0.148 (0.74)	0.151 (0.76)
Temperature	-0.528 (1.63)	-0.797** (2.33)	-0.413 (1.25)	-0.181 (0.56)	0.128 (0.29)	0.384 (0.92)
GDP_pc	0.724*** (5.67)		0.488** (2.53)		0.436** (2.44)	
Emissions_pc		2.304*** (4.03)		1.993*** (3.88)		1.480** (2.60)
Democracy			4.121* (1.67)	3.925* (1.67)		
Rule of Law			0.611 (0.14)	3.392 (0.79)		
Freedom from Corruption			-0.549 (0.19)	-0.111 (0.04)		
Education Outcomes					3.329 (1.37)	3.895* (1.70)
Individualism					0.287* (1.73	0.471*** (3.34)
Constant	-18.347 (1.21)	-9.524 (0.57)	-40.678** (2.22)	-71.716*** (3.77)	-52.707** (2.11)	-67.039*** (2.76)
Observations	84	84	84	84	84	84
Adjusted R^2	0.374	0.270	0.420	0.475	0.398	0.404

Note: *p<0.10, **p<0.05, ***p<0.01. t-statistics in parentheses. *Democracy* is the Economist Democracy Index 2021, a continuous variable ranging from 0 to 10; source: Economist Intelligence Unit, *Democracy Index 2021*, https://www.eiu.com/n/campaigns/democracy-index-2021). *Freedom from Corruption* is the Transparency International Corruption Perceptions Index 2021, an integer-number variable ranging from 0 (very corrupt to 100 (very clean); source: Transparency International, https://www.transparency.org/en/cpi/2021. *Rule of Law* and *Education Outcomes* are continuous variables ranging from 0 to 10; source: Fund for Peace, State Resilience Index Annual Report 2022, https://fundforpeace.org/SRI/global-data.html. Individualism is the individualism-collectivism scale from Beugelstijk and Welzel (2018), a continuous variable ranging from 0 (collectivism) to 100 (individualism).

Table A5. Predictors of Policy-Preference Divergence in EU Countries

	PRP-WTC		PRP-GAD	
	(1)	(2)	(3)	(4)
Temperature	0.049 (0.05)	0.723 (0.82)	-0.553 (0.66)	0.052 (0.07)
GDP_pc	0.510* (1.77)		0.670** (2.68)	
Emissions_pc		5.013*** (3.38)		5.177*** (3.99)
Constant	-64.92*** (3.57)	-91.81*** (5.02)	-85.99*** (5.45)	-106.56*** (6.65)
Observations	28	28	28	28
Adjusted R^2	0.043	0.262	0.191	0.368
F-statistic	1.61	5.78	4.29	8.85

Note: *p<0.10, **p<0.05, ***p<0.01. t-statistics in parentheses.

Table A6: Satisfaction with Democracy and Percentage Reduction Pledges

	(1)	(2)	(3)	(4)
SWD16_17	0.777*** (11.34)	0.765*** (9.18)	0.762*** (9.26)	0.763*** (11.17)
PRP	-0.205** (2.70)	-0.195** (2.45)	-0.200** (2.54)	-0.194** (2.54)
WTC	0.156 (1.24)		0.169 (1.26)	
GAD		0.009 (0.05)	-0.061 (0.33)	
Constant	9.229 (1.00)	18.879 (1.04)	14.33 (0.79)	19.74*** (5.42)
Observations	28	28	28	28
Adjusted R^2	0.827	0.816	0.820	0.823

Note: The dependent variable is the country-level percentage of citizens of EU27 plus UK who stated in 2022-2023 that they were very satisfied or fairly satisfied (as opposed to not very satisfied or not at all satisfied) with the way democracy works in their respective countries. OLS estimates. *p<0.10, **p<0.05, ***p<0.01. t-statistics in parentheses.

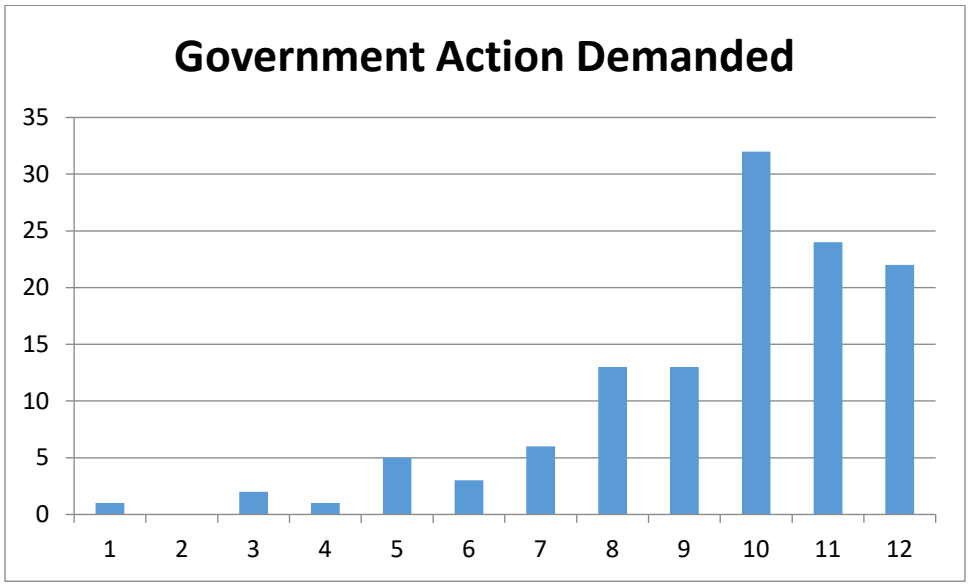

Figure A1. This figure shows the distribution of country-level percentages of citizens demanding more government action to fight climate change.

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