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A survey experiment on trade-offs between decarbonization ambitions and socioeconomic costs

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Original research article

Climate at what cost? A survey experiment on trade-offs between decarbonization ambitions and socioeconomic costs

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ABSTRACT

Survey research typically suggests strong support for climate and decarbonization policies. These findings contrast with anecdotal and observational evidence suggesting that individuals are sensitive to personal and collective losses incurred from climate policies. To address this, we field an experiment in five Western European countries, where respondents are asked to trade-off personal and collective income losses expected with different decarbonization paths. Our results show that, while respondents support ambitious decarbonization strategies *ceteris paribus*, this support softens in the face of possible individual and collective income losses associated with a given decarbonization path. Next, we explore the moderating role of income, profession, education, green values, and climate and inflation concerns. The experimental focus on different distributional consequences at different levels of citizen experience contribute to a growing literature focusing on the socioeconomic implications of climate change policies, offering a sobering look at the actual level of political support these policies enjoy in western Europe, suggesting that existing compensation policies are likely insufficient.

1. Introduction

European public opinion broadly favours ambitious measures to tackle global warming. This has been found in observational data [1], consistently revealing climate change to be a high priority for European public opinion. This support seemed corroborated by the strong performances of Green parties in the 2018 European elections and in a number of national elections since. However, more recent electoral patterns suggest a different story. The energy crisis in the context of Russia's invasion of Ukraine marked a shift in Green parties' electoral showing, with growing discussion amidst the recent energy inflation being a "wake up call" on the individual costs of climate policies. Populist political parties have profiled themselves with opposition to green policies, with the Dutch radical right and farmer's parties enjoying major electoral success in the November 2023 elections on campaigns hostile to climate action. In Germany, meanwhile, support for the Green Party fell from a 23% vote share in 2022 to about 11% in 2025. Consistent with these recent electoral setbacks for climate-friendly agendas is anecdotal evidence suggesting that individuals are very sensitive to personal and collective losses incurred by fighting-off climate change, even in geographical areas expected to disproportionately suffer from climate change [2].

The discrepancy between the ostensible pro-climate support found in typical surveys and the real-world political fragility of such support amidst high energy prices represents a puzzle worth exploring. Yet, the observational character and question-wording of most existing surveys on climate change are ill-suited to addressing that puzzle – because such surveys do not systematically identify possible trade-offs between decarbonization ambitions and income losses and gains that decarbonization may entail.

To better explore political support for climate policies, we fielded a novel conjoint experiment in five Western European countries, France, Germany, Italy, the Netherlands, and Spain, where a total of 7678 respondents were asked to judge different decarbonization plans but also confronted with personal and collective income losses or gains expected from a given decarbonization plan. Our results show that, even though ambitious decarbonization strategies are strongly supported *ceteris paribus*, this support tends to disappear or even turn to opposition once expected individual and collective income losses from a given decarbonization path are accounted for. The experimental results hold even

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after controlling for respondent characteristics like income, education and ideology. But our analysis also shows how the general results are moderated by such characteristics, including income, profession, sector, education, green ideology, and climate and inflation concerns. These results are sobering for those seeking political support for robust climate action. Yet, our results possibly overestimate the support for climate policy, given then social desirability bias inherent with more ambitious targets, and the intangibility bias associated with the immaterial nature of the costs, even though other elements of our experiment- for instance the choice of not presenting the status quo as inherently costly- may work in the opposite direction. Altogether, our study contributes to a growing literature considering the socioeconomic implications of climate change policies [3], and clarifies the actual level of political support these policies enjoy in western Europe, suggesting that existing compensation policies are likely insufficient.

2. Literature and conceptual framework

The climate policies of the European Union introduced as part of the green transition are set to impact more and more the lives of Europeans. For instance, the EU Emissions Trading System (ETS) has applied the 'pollutor pays' principle to energy and industrial production and to air-and-sea transportation. The existing ETS is slated to be complemented in coming years by an additional mechanism (ETS2) including, among others, road transport and additional classes of buildings, broadening the populations touched directly by EU climate policy. While the EU has ambitious goals, the policies to reach them are not yet fully developed, and therefore political pushback has been limited, albeit not absent. Support for climate policies significantly diminishes when policies result in increased inequality and inadequate social insurance mechanisms [4]; similarly, in Italy income reductions associated with environmental regulations significantly increased voter support for populist, right-wing parties such as Lega [5]. Economic actors in regions that are disproportionally affected by climate change, such as Tyrol, not only do not consider climate change a problem *per se*, but also that they identify "the real risk" to their economic well-being as rather stemming from climate-related discourse negatively affecting public attitudes vis à vis winter tourism [2]. Such patterns show that the political economy of climate policies in Europe may not be so different than the polarized climate political economy visible in the United States [6].

The empirical sensitivity of Europeans to the financial implications of climate actions becomes particularly salient during crises. In 2022, the Russian invasion of Ukraine and the consequent spike in energy prices brought this sensitivity into focus, significantly affecting public support for climate and energy transition policies. For instance, at times of crisis, support for stringent energy and climate policies is limited to low-income, young or the most educated citizens, and average support substantially fades when climate action ceases to be a voluntary effort [7]. This resonates with studies suggesting that public preferences lean towards voluntary or informational climate measures over regulatory ones [8], or that non-coercive policy measures (*e.g.*, informational campaigns) receive higher public approval due to perceptions of autonomy and less intrusion [9,10]. Further, self-interest and concerns over fairness and distribution significantly influence support for environmental taxes [11]. These findings align with indirect evidence that the stringency and obligations of a policy (proxying for perceived losses) shape public preferences towards a range of regulatory policies in Western Europe [12].

There are also observational and experimental studies that explicitly assess the role played by (expected) income losses. Experiments, in particular, consistently find that support for policies decreases when such policies are framed as (potentially) costly to individuals. In France citizens largely rejected a carbon tax even when paired with uniform rebates, due to pessimistic beliefs about its economic effects [13]. A vignette-based survey experiment in Germany found that support for more ambitious climate targets fell when policies were associated with higher personal costs [14]. In the United States, a survey experiment including coal-dependent Appalachian regions, found that support for clean energy policies rose sharply when 'just transition assistance' was included [15]. Moreover, research based on combined panel surveys and information treatments in Canada and Switzerland found that public awareness of carbon-rebate programs was low and that providing personalized rebate information had only modest effects, particularly among ideologically opposed respondents [16]. In Germany, conjoint experiment on support for EU climate policy designs showed that preferences strongly favored options minimizing personal costs and using progressive financing mechanisms [17]. Finally, a 20-country survey experiment found that even when a global carbon price policy entailed net losses for citizens in wealthy countries, support remained high if the policy was seen as fair and redistributive [18].

Despite these findings, a key limitation of the current literature is that income losses and gains from climate policy are typically framed in individual terms, neglecting the fact that many people form their preferences based on matching individual-level effects with sociotropic considerations. We define as sociotropic considerations a set of concerns about the economic well-being of their broader social group or community [19,20]. Substantial evidence shows that citizens often evaluate policy not solely by how it affects them personally, but by how it impacts their perceived reference group. For example, support for carbon taxes increases when revenues are allocated to vulnerable groups, even among individuals who do not benefit personally [21]. Similarly, Americans' support for renewable energy policies is strongly shaped by perceptions of community-level economic benefits, such as job creation or local investment [22].

However, these studies – in turn – do not comparatively assess private and sociotropic advantages and losses from climate mitigation policies. We remedy this gap in the literature by building on and combining the literature's insights about political sensitivity to losses or gains, and incorporating these into a dedicated conjoint experiment, fielded in five European countries in late 2022. The experiment, as discussed in Section 3, allows us to assess the impact of certain climate policy targets on individual as well as community well-being, allowing us to determine with some precision what levels of individual and collective gains and losses are seen as acceptable for climate-change mitigation.

3. Empirical strategy

The survey was fielded in the last week of November and the first two weeks of December 2022, during the peak of the European energy crisis triggered by the Russian invasion of Ukraine. It covered five Western European countries—France, Germany, Italy, the Netherlands, and Spain—and included a total of 7678 respondents. The survey is part of a multi-annual panel study on public attitudes towards multiple EU-policy objectives. Hence, country selection aims to cover both a substantial portion of the EU economy as well as a wide range of country-level characteristics. This implies that the selection of countries for this study is somewhat limited by the overarching rationale that drove the selection of countries for the overall panel study. Notably, the countries selected cover 81% of Euro area GDP and 73% of its population at the time of selection. Nonetheless, for the purposes of this research, the country selection is appropriate, because along with macroeconomic and population coverage, the selection also guarantees good coverage in terms of variation across energy (policy) characteristics. In this regard, the sampled countries vary in the size of fossil fuel dependent industries and natural fossil fuel recourse availability (see Table A3 in Appendix).

Sampling was conducted by IPSOS using nationally representative quota samples in each country. Quotas were applied to ensure representativeness across key demographic and socioeconomic characteristics, including age (three categories), gender (two categories), education level (three categories), region (based on national NUTS-1 classifications), household income (three categories based on equivalized

income), and profession (ten categories). This quota structure ensured that the samples closely reflected the demographic structure of each national population, enabling robust cross-national and subgroup analyses.

The conjoint experiment was administered in the first module of the survey, and presented respondents with pairs of hypothetical climate policy packages. Each package varied randomly across five key attributes (Table 1): the ambition of the decarbonization target, the level of individual income loss or gain associated with the policy, and positive or negative impacts for one's region, country, and Europe as a whole.

This design yields a total number of 324 different combinations, and it allows estimation of the marginal impact of each attribute on support or opposition for climate action, as well as the relative weight respondents assign to private *versus* sociotropic costs. Every respondent is asked to compare two randomly constructed packages side by side, and then indicate which policy option they prefer, and how much they are in favor or against each policy option independently from the other.

The experiment is introduced by a framing designed to be neutral with respect to cuing positive or negative judgments of climate policies or income impacts of such, and to avoid overwhelming respondents with information and complexity.[1] The full frame reads as follows (italic not present in the original):

> "*The European Union and its Member States have set the goal of reducing CO_2 emissions with 55% by 2030 compared to 1990 to mitigate climate change. Currently, European citizens and leaders are discussing whether these goal need to be changed. The proposals differ in how much they impact the reduction of CO_2 emissions. Regardless of such proposed changes in the goal, the proposals also differ in the way the reduction goal is met. For example, they might differ in the way taxes and subsidies are used to achieve the CO_2 emissions reductions goal.*
> *Such changes in CO_2 emissions, and the measures taken to achieve them, can have an effect on the income of yourself and that of other groups of people. And it is possible that these income effects go in different directions.*
> *We would like to hear your opinion on proposals for changing the CO_2 emissions reductions goal, considering the size and direction of this change, and the effects that these changes and the measures taken to achieve them would have, on average, for yourself, for the people in your province/region, for the people in your country, and/or for people in the whole EU. In the next pages, you will be asked to evaluate policy proposals that differ with respect to these possible effects.*"

Table 1
Experimental dimensions.

How big will the change in CO2 emissions be by 2030?	• An **additional reduction of 20%**, hence a total reduction of **75%** • An **additional reduction of 10%**, hence a total reduction of **65%** • **No change**, the current goal of reducing emissions by **55%** remains in place • A **10% smaller** reduction than the current goal, hence a total reduction of **45%**
Dimension 2: household effect What will the effect of the measures taken be on the *yearly* income of your **household**?	• A **decrease** by the equivalent of two weeks of your income • No effect • An **increase** by the equivalent of two weeks of your income
Dimension 3: region effect What will the effect of the measures taken be on the average income earned *per year* by people in **your region**, the province of [*name of respondent's region*]?	• A **decrease** by the equivalent of two weeks of average income in the region • No effect • An **increase** by the equivalent of two weeks of average income in the region
Dimension 4: country effect What will the effect of the measures taken be on the average income earned *per year* by people in your **country**?	• A **decrease** by the equivalent of two weeks of average income in your country • No effect • An **increase** by the equivalent of two weeks of average income in your country
Dimension 5: EU effect What will the effect of the measures taken be on the average income earned *per year* by people in the **European Union**?	• A **decrease** by the equivalent of two weeks of average income in the EU • No effect • An **increase** by the equivalent of two weeks of average income in the EU

Fig. A1 in the Appendix provides a screenshot of how, in practice, the experiment looked for respondents in the survey environment. In total, respondents analysed 46,068 designs. In order to simplify the presentation of the analytical results, the baseline models presented in this paper combine the three sociotropic dimensions into a single seven-point ordinal scale, which varies from a minimum of 3 (where all community levels are negatively impacted) to a maximum of 9 points (where all community levels are positively impacted). The results of the models clarify how support for climate policies is affected by expected general socio-tropic income consequences (at the regional, country, and EU levels), as opposed to being affected by individual household income consequences or by the ambition (emissions target) of the policy.[2]

4. Results

We organize our results section as follows. First, we introduce broader descriptive results on the conjoint experiment, which help drawing a picture of the overall trends in the data. Next, we engage with our primary experimental results, both in the aggregate and by country. Finally, we explore a number of heterogeneous treatment effects, discussing how individual level, non-experimental features such as income, education and climate attitudes affect the magnitude and direction of the experimental treatments.

4.1. Descriptive results

We begin by first discussing the overall levels of support and opposition across the policy variation spectrum. Fig. 1 shows the overall distribution of support for climate policy packages, grouped by the ambition of the emissions reduction target while ignoring the associated income effects. The figure suggests that respondents clearly favor more ambitious climate targets, even if some of the packages might be associated with income losses. Specifically, support increases substantially as the ambition of the policy increases: the lowest level of support is observed for policies that reduce emissions by only 45%, followed by policies that maintain the current 55% target. Support increases notably for packages proposing a 65% reduction, and peaks for those targeting a 75% reduction in emissions. This monotonic relationship suggests that, when income effects are not considered, public opinion aligns strongly with more aggressive climate action.

These trends remain largely confirmed by country (Appendix Figs. A2–A6). Fig. 2 shows the level of support for packages with more ambitious emission reduction targets, by levels of group income losses described in these packages, which vary from totally negative to totally positive. Note that while support for packages with positive climate

[1] Hence, our framing simplifies matters considerably for respondents. For instance, it focuses on carbon dioxide (CO_2) reduction, even though EU and other policy objectives focus on all greenhouse gases, because CO_2 reduction features more prominently in public debate than 'greenhouse gases' and is by far the most emitted and relevant greenhouse gas (compared to, say, N_2O).

[2] Robustness checks of instead disaggregating the various sociotropic levels of impact are available upon request.

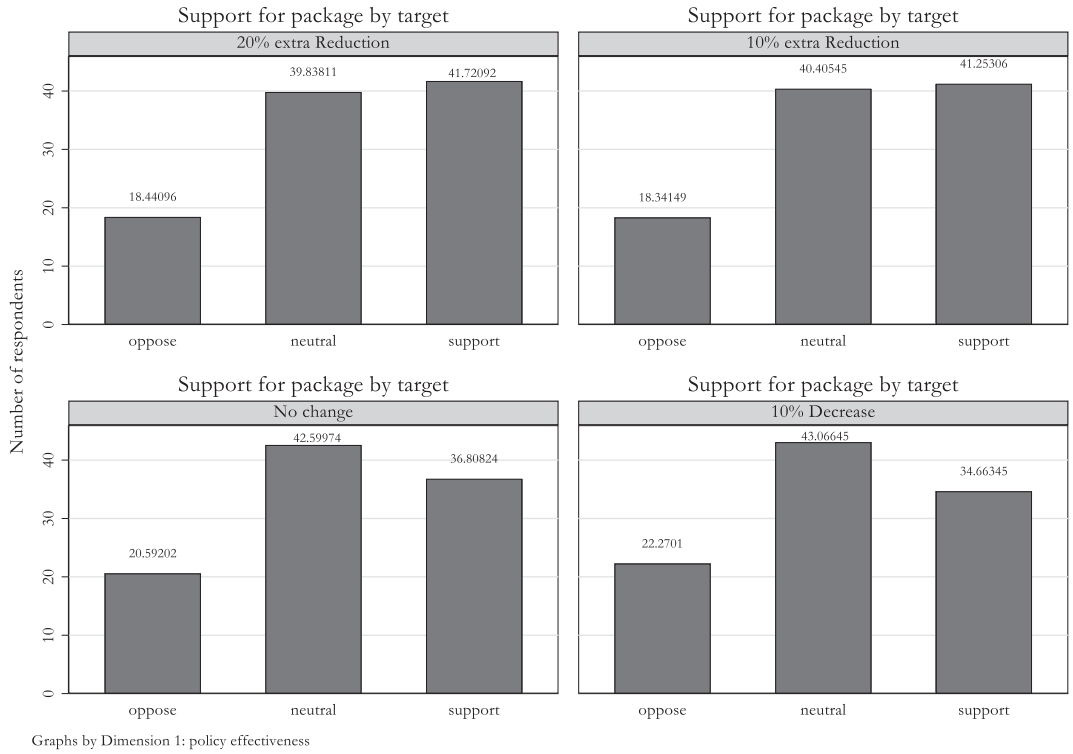

Fig. 1. Support for packages, by type of target, regardless of income effects.

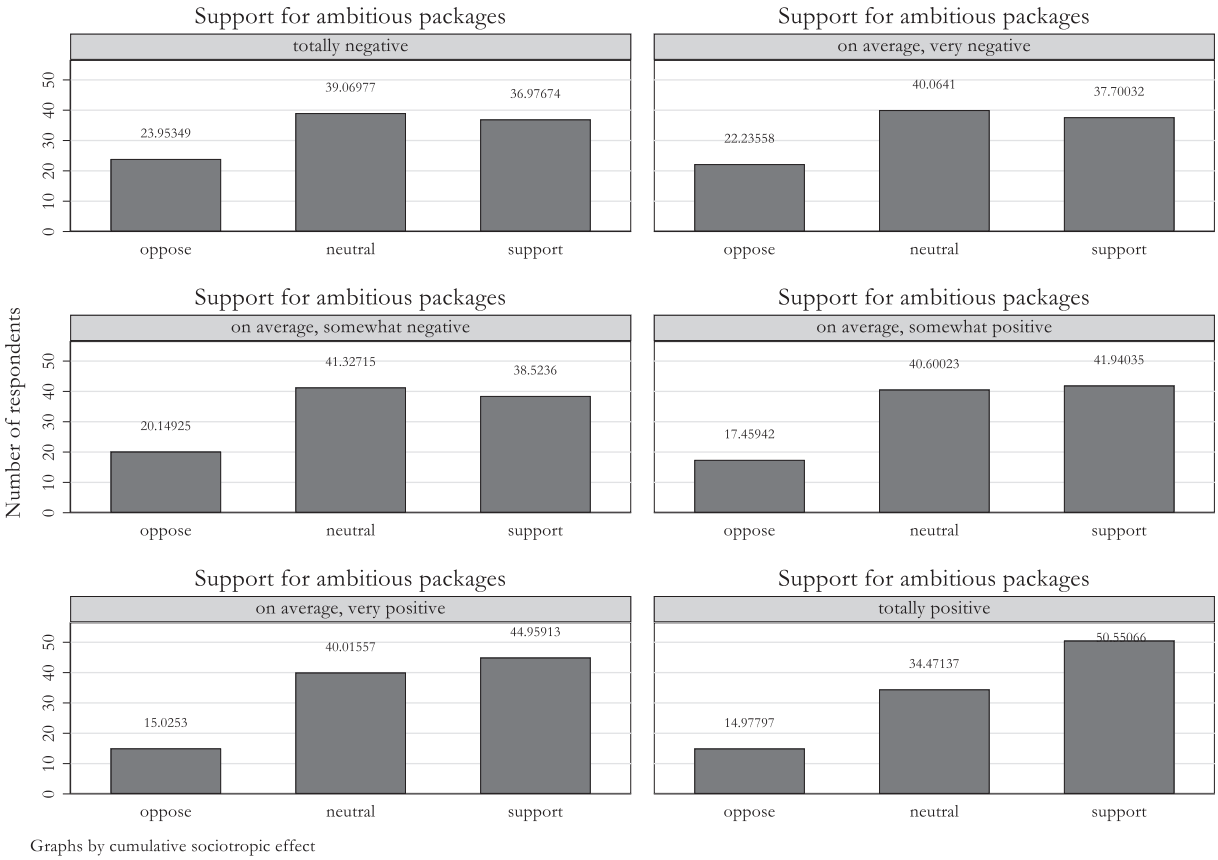

Fig. 2. Support for packages with target increase, by cumulative sociotropic effect.

targets remains higher than opposition even when group-level income effects administered in the packages are negative, the negative drawbacks on support associated with these income effects are quite large (Fig. 2). As displayed, even in the descriptive results, a clear linear

relationship between package support and income effects is identified.

4.2. Main results

We now move to the main results. Fig. 3 displays the average marginal component effect (AMCE) on package support associated with certain package characteristics. Package support is a conservative, binary transformation of the package rating variable that codes negative and neutral evaluations of a given packages as 0, and positive ones as 1. Therefore, the AMCEs displayed in Figs. 3 and 4 capture the change in probability of supporting a package (rather than rating it neutrally or negatively) causally associated with the given dimensions. The results for each of the three shown dimensions are the predicted changes in the probability of supporting a package if the expected emissions target is more or less ambitious (relative to the status-quo ante target of 55%); if the expected socio-tropic aggregate income effects are more or less negative or positive (relative to no expected socio-tropic income effect); and if the expected household income effects are more or less negative (relative to no expected household income effect).

As expected, increments in the emission targets (regardless of the level of ambition) are associated with a 5% increment in the probability of supporting a package. However, these effects are relatively small, and they are more than off-set by both individual and collective income losses, which both command a similar negative effect of around 5%. The importance of income effects in support for packages is even clearer if we look at specific combinations of policies and their income effects. In Fig. 4, we predict the level of support for the most ambitious climate policy, at certain combinations of individual and collective income effects. Scenario 2 is the most negative income scenario (where the person individually, as well as all levels of community, lose out); in this scenario, the share of respondents supporting an ambitious climate target is below 35%. However, even in a situation where climate targets are associated with no income effects whatsoever (scenario 1), support remains below 45%. Only when economic effects are positive across the board, both individually and collectively (scenario 5) does support exceed 50% of respondents. Put differently, interviewees are willing to increase climate target ambition only under the condition that there are some economic gains to be made along the way; losses associated with climate policy are likely to represent a major roadblock in the political legitimacy of such programmes.

It is important to note that these are conservative estimates, since they assume that all respondents who are neutral about a package (the relative majority of packages evaluated are typically evaluated neutrally) would in fact end up being against them. In a scenario where we simply drop all neutrally evaluated packages from the analysis, focusing only on packages evaluated positively or negatively, we identify much higher levels of support (even if the overall distribution remains the same). In such models, even the packages with the most negative economic effects (scenario 2) still receive about 50% of support.

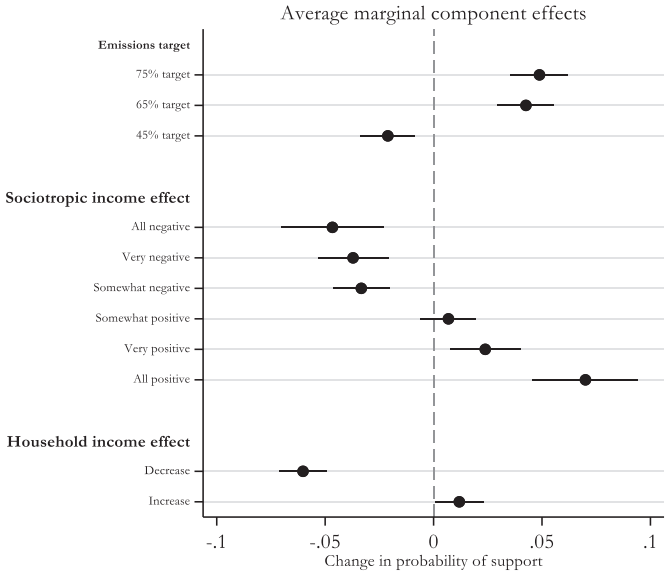

Fig. 3. Average marginal component effects.

These results are fairly stable across countries (Fig. 5). No major differences in preferences stand out across countries with respect to responses to expected negative income effects: all polities tend to be significantly more negative about policies expected to pose negative income effects at either the individual or the aggregate/socio-tropic levels of such effects. That said, the patterns of support differ across the countries in three notable respects. First, French respondents are somewhat indifferent to whether a package includes a target *reduction* in emission target relative to the status quo reduction (with respondents in other countries clearly more negative about such scaled back climate reductions). Second, while Germans track the attitudes of the other country respondents in being likely to be less supportive of policies expected to reduce aggregate incomes, they do not share the tendency of other country populations to be more positive about policies expected to yield more favourable aggregate income effects. Third, while Italians share the tendency of other sample polities to be more negative about policies expected to yield individual income losses, they do *not* share the tendency to be more significantly positive about policies expected to yield individual income gains.

Fully explaining such exceptions is beyond the scope of this paper, as there are several possible explanations for which we have little leverage to provide empirical tests. For instance, the (statistically insignificant) Italian exception might reflect Italian respondents discounting household-level gains because the mechanism through which climate policy would increase disposable income is less immediately credible than the mechanism through which it could result in costs, requiring, all else equal, a higher level of trust in politicians and policy processes.[3] An alternative explanation could be that, in 2022, economic issues might have been less salient for Italians than for citizens of other countries: in fact, when asked whether the government should prioritize climate policy, economic growth, or assign equal importance, only 6.8% of the Italian respondents indicated economic growth as a priority, the lowest level among the five countries surveyed (followed by France with 8.5% and Spain with 9.3%). These are possible explanations worth pursuing in follow-on research. For now, the country-specific patterns should be interpreted primarily as suggestive of potential trends, rather than solid evidence of diverging country paths. And most importantly, country differences do not alter the principal pattern captured by the pooled sample: that more ambitious emissions targets tend to spur support while expected negative income effects at both the individual-household *and* socio-tropic levels tend to dampen support for the climate policies.

4.3. Heterogeneous treatment effects

Finally, we move to assess Heterogeneous Treatment Effects (HTEs), that is how and whether the sample-average effects identified in the previous section are significantly modulated by individual-level characteristics. Importantly, working in a HTE setup means that we no longer can provide a fully causal interpretation of our results, since individual level characteristics are not randomly assigned. However, within subgroups, the assignment is still random, affording us a far stronger degree of inference than within standard nonexperimental regression setups.

[3] While we do not have multidimensional trust data in our dataset beyond trust in government, a 2023 OECD survey found that Italians have, on average, overall trust in public institutions generally below the OECD average.

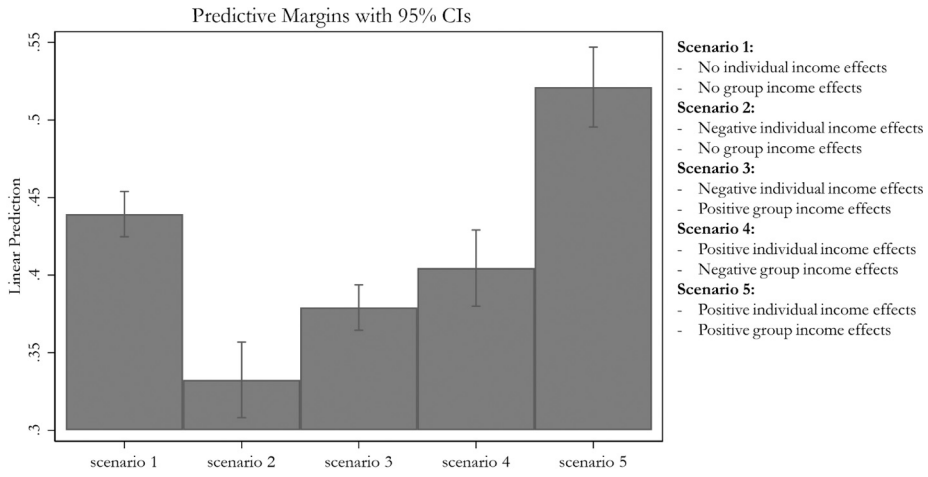

Fig. 4. Predicted level of support at certain policy/scenario combinations.

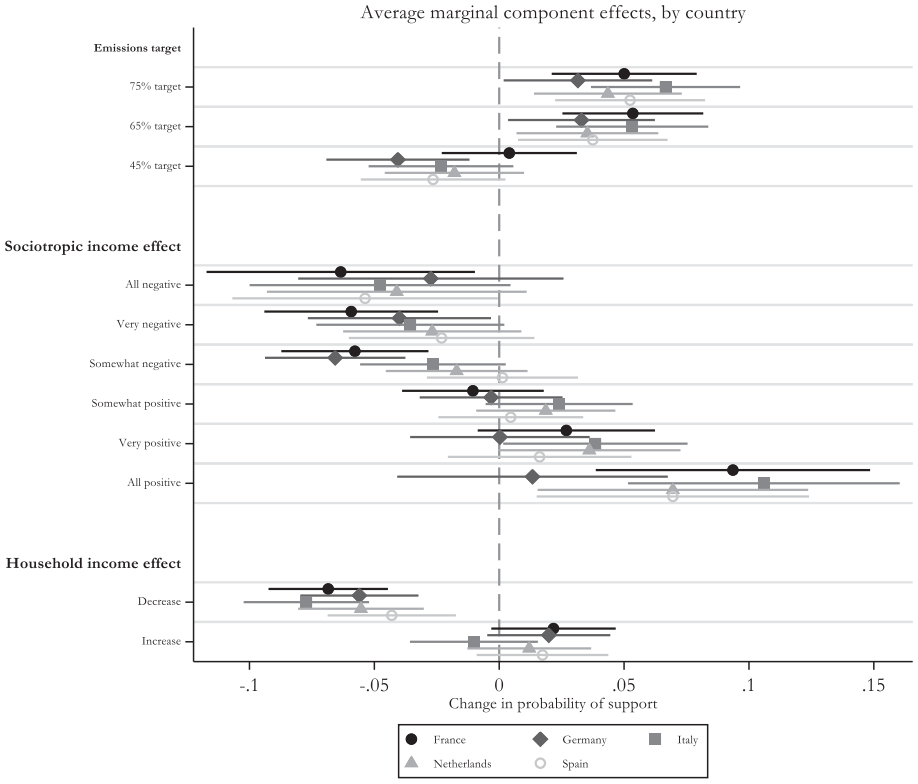

Fig. 5. AMCEs, by country.

We focus, in particular, on attitudes towards climate change, on economic background, and on education level. To start with, we discuss the impact of attitudes towards climate change. We assess climate attitudes by means of three variables: a more generic "climate worry" measure, whereby respondents have to indicate on a scale of 0 to 10 how concerned they are about climate, and a more focused measure that asks respondents how urgent it is for them to address climate change, in general and *relative* to economic growth. It is reasonable to expect that individuals who are more concerned with climate change would be more supportive of more ambitious climate goals, while at the same time be less sensitive to personal and collective climate losses.

Next, we explore the effect of the economic background of respondents by focusing primarily on income, but also a number of related variables. Income is a natural heterogenous variable of interest for this study, because it is plausible to expect that income losses would be perceived very differently by respondents who are differently placed in the income distribution. We measure household income by asking respondents to report household-wide net yearly income, then adjusting this for family composition to obtain the OECD's Equivalized Household Income (EHI); we further cluster respondents into low, middle or high income households, depending on their decile placement in the EHI income distribution of their country. We also explore in more detail the role played by profession (in general), focusing especially on agriculture and farming sectors, which are typically idiosyncratic when it comes to climate attitudes, and how the financial robustness of households – measured by available savings- impacts attitudes.

Finally, we look at education. Education is measured at individual level on a 9 ISCED categories scale, from "no formal education" to "PhD"

or equivalent, using national diploma names which are then translated into the equivalent ISCED category. Like with income, we expect education to significantly affect the way people perceive climate targets; however, a wide literature [23,24] suggests that highly educated people tend to display more solidaristic behaviour towards others, and tend to embed others' interests in their own. Hence, it is also plausible that highly educated individuals might be more concerned for the sociotropic effects of climate policies than their less-educated peers, making them relatively more sensitive to the potential collective losses associated with climate policies.

4.3.1. Climate attitudes

The first notable effect is the very strong moderating effect of concerns with the consequences of climate change on the effect exerted by strong climate targets (Fig. 6). For respondents wo are not concerned at all with climate change, ambitious targets actually play a detrimental role, and are associated with nearly 8 percentage point lower level of support in respect to current goals. On the contrary, for respondents who are highly concerned about climate change, the level of support is nearly 10 percentage points higher than current goals. This means that climate concerns are associated with a swing of nearly 18 percentage points, an effect that dwarves any other variable we explored.

When put in context of the known relationship between climate concern and exposure to natural events [25,26], these results suggest that there might be an element of self-adjustment at play in the public opinion. Simply put, escalating natural disasters are poised to increase average concern on climate change, which in turn is clearly associated with much stronger political support for ambitious climate targets. A similar pattern can be found when looking at whether individuals believe that, in general, climate action is urgent or not (Fig. 7a), and whether climate action is a priority *relative* to economic growth (Fig. 7b). In Fig. 7a, we depict, side by side, the coefficients of the experimental treatments for those who believe climate change is not happening or that climate action is not urgent at all, and those who believe that climate action is very or extremely urgent. In Fig. 7b, we compare three groups: those who believe climate action should take priority over economic growth, those who believe that economic growth should be prioritized, and those who believe that the two carry the same importance.

The status quo is supported by those who believe that economic growth is more important, and by those who think there is absolutely no urgency in climate action; for both of these groups, ambitious climate goals are detrimental. It should be noted, however, that neither of these groups supports a scaling back of climate ambition, suggesting that the status quo is widely seen as acceptable – all else equal – even among those who are generally sceptical of climate change.

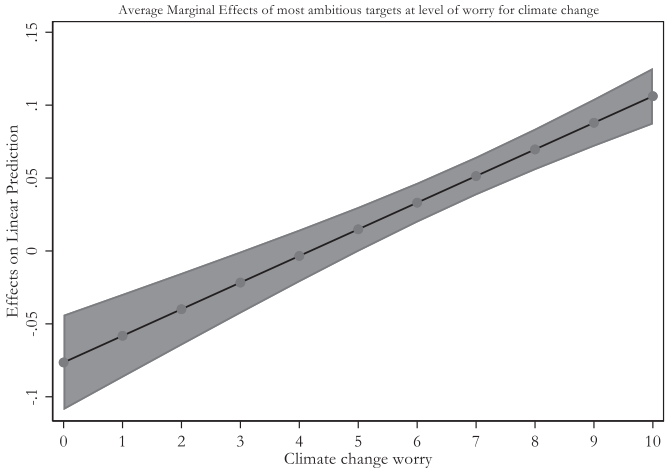

Fig. 6. Effect of ambitious targets, at level of climate concern.

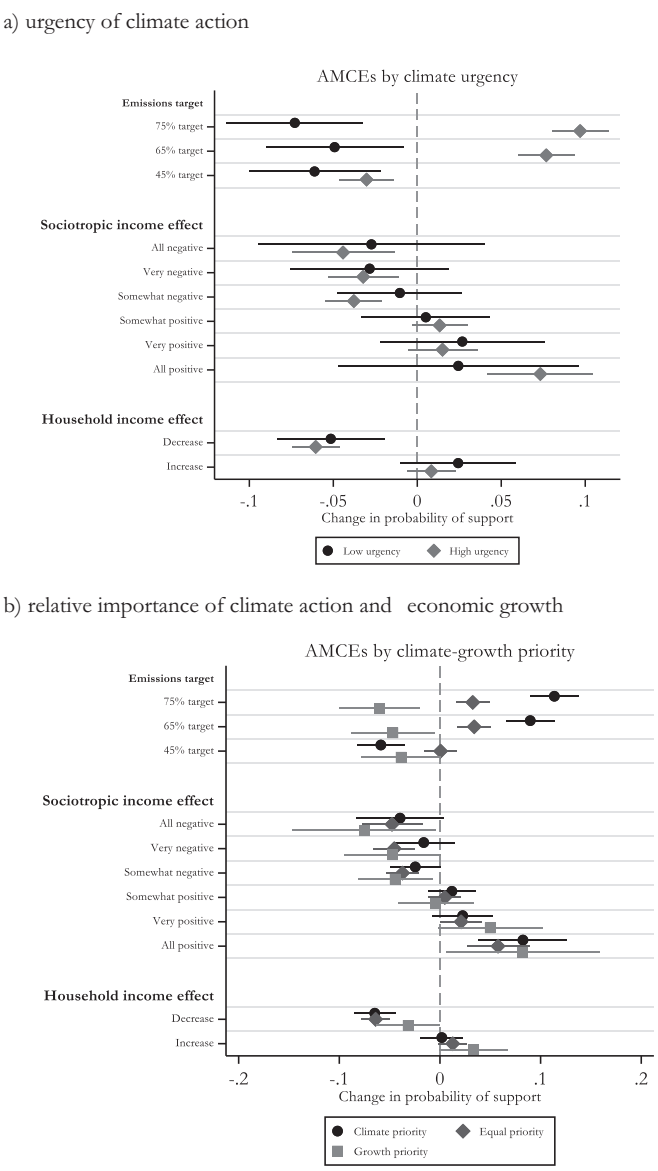

Fig. 7. AMCEs across respondents' background climate attitudes.
a: Urgency of climate action.
b: Relative importance of climate action and economic growth.

Moreover, we do not find any substantial difference between subgroups when it comes to economic gains or losses produced by climate policies. All subgroups move, generally, in the same direction, with losses associated with lower support, and gains with higher support. One interesting element is, however, the generally weaker effect that income gains or losses have for respondents who believe that fighting climate change should take priority over economic growth (7b).[4] These respondents are not sensitive to personal positive income effects of climate policies, and substantially less sensitive to negative collective income losses than their peers believing economic growth should take priority.

4.3.2. Economic affluence effects

Next, we move to study effects associated with economic affluence

[4] In fact, this measure yields more precise results than both generic climate worries and generic climate urgency questions, suggesting that by embedding a tradeoff directly in the body of the question we can identify those respondents who not only worry about climate, but worry about it *relatively more* than about other issues.

and professional background (Fig. 8a–c). In Fig. 8a, we display the effect of policy scenarios inclusive of individual income losses, at level of Equivalized Household Income (EHI). While, generally, income effects follow a similar pattern, surprisingly (and against our registered priors) low-earning households are in fact relatively less negative about scenarios inclusive of personal income losses than their middle- and high-income peers. This is unexpected, and might be the result of spurious relationships between low-income households and other unobserved factors which might help decreasing the negative effect of individual climate losses.

In Fig. 8b, we expand the discussion pertaining affluence by looking at the impact that household savings have. A rich literature looks at the effects played by assets stranding on political preferences. While we do not measure directly asset ownership, we ask respondents both to report the overall amount of savings they have (from none, to four months or more equivalent of their wages) (Fig. 8b). We also ask respondents to report whether their primary income source comes from assets ownership, along with other sources (Fig. 8c). While savings availability seems not to play an important role – the only exception being that respondents reporting high savings are more sensitive to negative personal income effects – analysing the sources of income yields some interesting results.

For simplicity of presentation, we clustered together respondents whose income comes from wages, self-employment, and various types of social benefits, since their patterns are by and large similar, and we pitch these against respondents who primarily rely on agriculture as a source of income, and on assets (both financial assets and rents). These two groups display some interesting features (Fig. 8c- displayed with 90% confidence intervals as some of these subgroups are not very populated). Respondents whose primary source of income comes from farming or from assets and rents are differently sensitive to sociotropic impacts than are other wage-and-salary earners or the broader population. Both groups tend not to be more supportive of climate policies with sociotropic effects that are more positive (in the case of agricultural respondents) or less negative (in the case of asset-owner respondents). These patterns may well reflect the modest-sample properties of the subsamples, making the issue ripe for further research. But they do support the view that income-source heterogeneity in a polity may well render support for decarbonization more fragile.

4.3.3. *Education*

Finally, it is worth looking at education effects, especially in the context of willingness to accept collective income losses (Fig. 9). Here, the effect is clearly negative as we move from lower to higher education, which – differently from the income effect- is indeed a result that is consistent with theory. All else equal, more educated people are more sensitive to group effects, with people with higher education (categories 5 to 8) seeing a 10 to 15 percentage point decrease in support for policies in such scenarios, while lower educated people displaying only 0 to 3 percentage point decreases.

5. Conclusions

This paper examined the political sensitivity of European publics to income losses and gains resulting from climate policy across five Western European countries, using a large-scale conjoint experiment. Our findings confirm that while citizens broadly support ambitious climate targets in principle, this support erodes sharply when such policies entail either individual or collective economic sacrifices. Income effects—both private and sociotropic—exert a strong and negative influence on public support for climate action, frequently offsetting the positive impact of more ambitious decarbonization goals. These effects are not uniform, however, with two patterns being most important. On the one hand, support is more resilient – that is, less sensitive to policies' expected income effects – among respondents more concerned about climate change. On the other hand, support is more sensitive to expected income effects among individuals with *higher* levels of education or income.

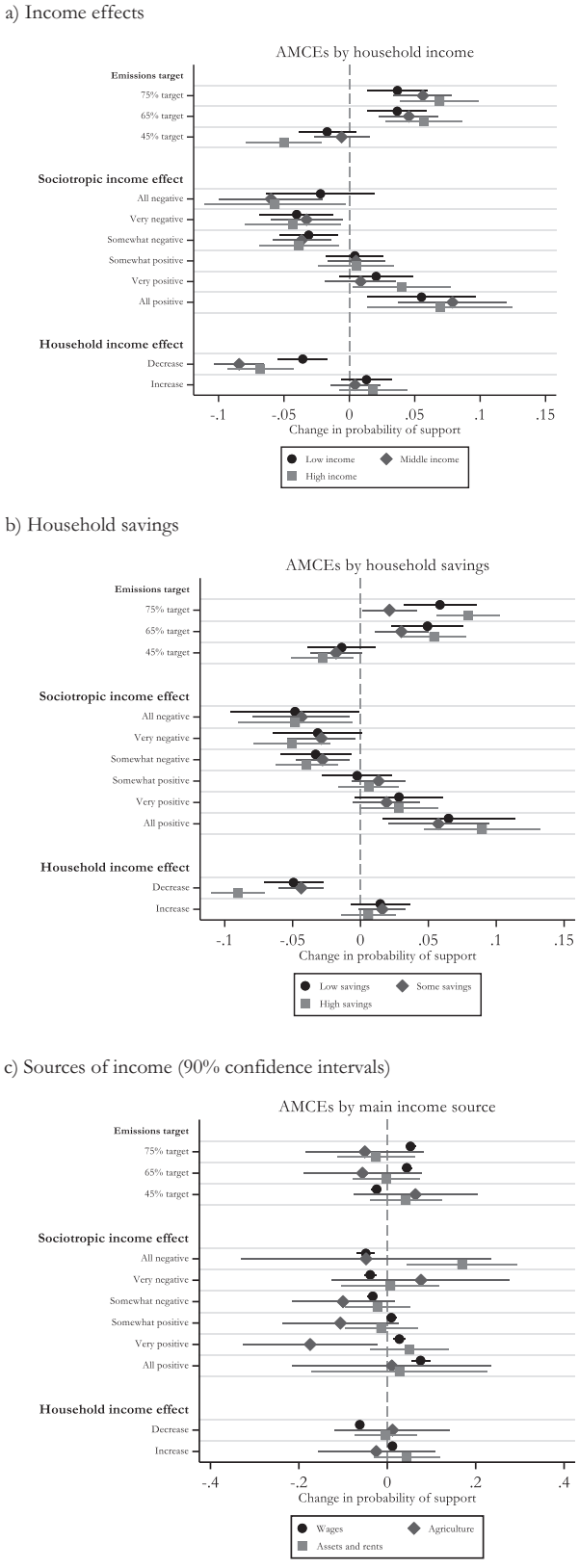

Fig. 8. AMCEs, by respondent income, savings, and source of income.
a: Income effects.
b: Household savings.
c: Sources of income (90% confidence intervals).

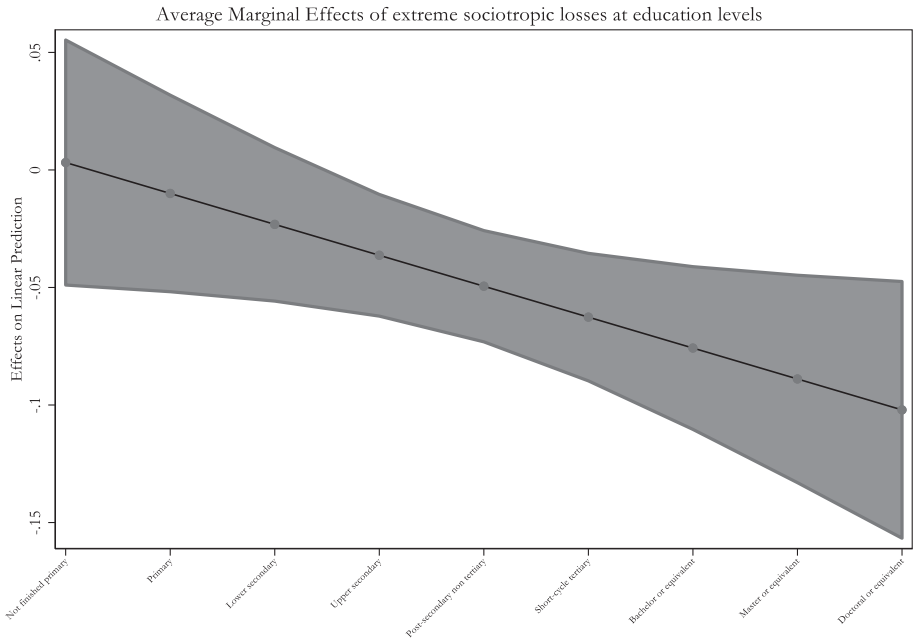

Fig. 9. Average marginal effects of extreme sociotropic losses at education levels.

Our study avoids some limitations of previous survey research, which has tended to conceptualize economic losses in narrowly individualistic terms and all but ignored trade-offs between climate policy goals and income effects on the community as a whole. By explicitly including not only individual-level income effects but also sociotropic dimensions of such effects —regional, national, and EU-wide income effects—we reveal that many citizens care not only about their own pocketbook, but also about the perceived well-being of broader reference groups. We also find some heterogenous treatment effects, particularly across degrees of environmental concern, that further nuance our understanding of support for climate policies. This multidimensional and heterogeneous sensitivity comports with other research emphasizing the fragility of support for climate policies and the importance of interventions that can address policies' potential economic downsides [27,28]. Our findings suggest, in particular, that climate policy should be accompanied by credible compensation strategies, especially in political contexts where distributional fairness is politically salient. Moreover, our findings regarding the sensitivity of individuals towards collective wellbeing suggest that policymakers can increase the durability and resilience of support for climate policy by emphasizing more the societal-level benefits of taking action and the collective costs of inaction.

Our experimental design features a number of design choices that might have impacted the outcomes in ways that cannot be accounted for. First, our survey's framing of the experiment to respondents presents the status quo in a way that may imply "neutral" income implications, not itself producing clear positive or negative impacts. This is a limitation to the extent that failing to address climate change has strong income effects on its own, regardless of the policies adopted. Our survey's neutral framing might plausibly yield lower levels of support in respect to a hypothetical scenario where we instead presented respondents with a "negative" status quo in which failure to act would have also foreseeable income effects. Our present study, however, did not aim to test the role that information on the effects of climate change *per sé* produces. We focus instead on the effects of plausible income effects of climate policy for individuals and groups on climate policy attitudes. And including a treatment (in the vignette or experiment itself) for the income effects of climate change itself would likely have obscured the results about policy or increased the cognitive burden on respondents. We therefore rely on the natural fallout in the sample of pre-existing knowledge on the effects of climate change. It should however be noted that this negative effect on support may well be partly offset by desirability bias militating towards support for more ambitious climate policy.

Concerning the role of pre-existing knowledge on the effects of climate change, it should be noted that individuals more concerned with climate change are likely also more knowledgeable on the negative climate outcomes of the "neutral" status quo, and the implications of such outcomes for the wellbeing of their community and themselves. Moreover, knowledge/salience of climate change might have impacted how respondents perceived the overall experiment: for instance, while we clearly stated in the introductory text that the greenhouse reductions are vis à vis the 1990 levels, inattentive or less knowledgeable respondents might not have paid enough attention and, when responding to the following experiment, interpreted the proposed variations in target vis à vis existing 2022 levels rather than 1990 levels. We proxy such knowledge by climate urgency and climate concerns in Section 4.3.1, which suggests that it plays a major role in shaping support for climate change mitigation policies. While this relationship has to be studied in more detail in the future, a likely implication is that increasing such knowledge through general education and campaigns can play a major role in engendering socially robust climate policy, and that this role could be further strengthened.

In addition, while official EU policy objectives aim to reduce all greenhouse gas emissions, the wording of our experiment simplified these objectives by featuring "carbon dioxide" only; we opted to maintain the wording of the experiment as simple as possible to reduce cognitive load and to ensure that the text remained accessible. We are aware that the policy objectives focus on all greenhouse gasses, and indeed focusing on carbon dioxide emissions in the text of the experiment simplifies the hypothetical policy. The reason is that the term "carbon dioxide" or CO_2 features more prominently in the public debate than the term general term greenhouse gases. Hence, we argue that, ironically, the name of this specific greenhouse gas will have resonated more with respondents. It is possible that some knowledgeable respondents will have weighed the relative importance of CO_2 *versus* other greenhouse gases in their response. However, we argue that attentiveness to this detail requires a level of knowledge of the subject which the vast majority of respondents will not have possessed. Hence, the effects of this design choice on the analysis outcomes should be negligible.

Finally, the reader should be mindful the results are contextual to the specific time (a major energy crisis) and geographical location (western and southern Europe) of the survey fieldwork. It is possible that attitudes might display different patterns in different contexts, especially outside of moments of crisis, even though our results align well with existing empirical evidence.

Overall, our results offer a sobering assessment of the challenge ahead. Ambitious climate action will not be politically sustainable without widespread public buy-in, and that buy-in depends critically on whether voters expect to lose or gain, individually and collectively, from the transition.

CRediT authorship contribution statement

David van der Duin: Writing – review & editing, Writing – original draft, Visualization, Validation, Resources, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Francesco Nicoli:** Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Software, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization. **Brian Burgoon:** Writing – review & editing, Writing – original draft, Validation, Supervision, Project administration, Methodology, Investigation, Formal analysis, Conceptualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.erss.2026.104877.

Data availability

Data will be made available on request.

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