Revenue use and public support for a carbon tax

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Abstract

Many experts see carbon pricing as an effective way to reduce emissions of greenhouse gases; however, political and public support for carbon pricing has faltered. Recent research indicates that revenue recycling and policy design options may induce public support for carbon pricing, but does not examine change in support as a result of revenue use or possible heterogeneity in these inducements across partisan groups. Does support for a carbon tax shift significantly once revenue uses are discussed? Do conservatives and Republicans and liberals and Democrats respond to different revenue reuse options when formulating opinions about carbon taxation? This study employs a survey experiment to examine these questions. Key results indicate that support shifts are largest when the revenue would be refunded and conservatives and Republicans are responsive to different revenue usage options. Specifically, conservatives and Republicans are more supportive of a carbon tax when revenues go towards a tax rebate or deficit reduction. While the differences are relatively small and variable (uncertain), these results provide suggestive insight into the policy design options that may induce a bipartisan basis of public support for carbon taxation policies.

1. Introduction

Scientists agree that climate change poses significant risks and the window to keep warming within the Paris Agreement goals is rapidly closing. In the US, partisan polarization on climate change has impeded progress on policies designed to mitigate a changing climate. Much of the polarization is likely driven by conservative and Republican opposition to command-and-control style regulations (Campbell and Kay 2014) coupled with well-funded and well-documented attempts to undermine climate science by industry and conservative groups (Brulle 2014, Brulle 2018). Elite cues allow the public to align themselves with those with which they agree, driving climate change polarization among the public (Gustafson et al 2019, Krosnick et al 2000).

Attempts by the US federal government to address climate change, such as through the Clean Power Plan, a cap-and-trade program, and with international agreements (e.g. the Kyoto Protocol) have been unsuccessful largely due to both institutional and political factors (Nowlin 2019). Beginning in the early 1980s, regulatory approaches to environmental problems became less popular and market-based approaches became more accepted. Many economists and policy scholars agree that market-based carbon pricing policies, such as a carbon tax, are potentially the most effective and efficient set of policy tools available to address climate change (Aldy and Stavins 2012, Andrew 2008, Avi-Yonah and Uhlmann 2009, Nordhaus 2010). Approaches to price carbon have become increasingly discussed and applied in the US and around the world, despite political and implementation challenges (Rabe 2018).

Among these challenges are the asymmetric costs and benefits of carbon pricing and the politics that stem from this asymmetry. The costs of carbon taxes are concentrated on well-organized energy and energy-intensive manufacturing firms that pressure politicians to oppose them. The benefits are diffused across the broader public, creating a collective action dilemma wherein individual members of the public have little incentive to organize and/or pressure...
politicians to support carbon pricing policies. As a result, many initiatives fail and those that succeed are relatively weak (Meckling 2011). Despite these generally negative dynamics, some carbon pricing initiatives have been successful. In these cases, success appears to follow a specific path that begins with green industrial policies that generate favorable conditions and coalitions of support for other green policies including carbon pricing (Meckling et al 2015). These coalitions, in combination with broad public support, can generate the pressure necessary to pass and implement carbon taxes.

There are 56 carbon pricing initiatives that have been implemented in the world; 29 of these initiatives are carbon taxes that have been implemented in 25 countries and 4 sub-national jurisdictions (Ramstein et al 2019). These statistics clearly indicate that implementation is possible, but, for the reasons described above, it is exceedingly difficult in countries like the US, where interest groups are well-organized and well-connected and public views about climate change are sharply divided along partisan and ideological lines. Previous research has shown that, among the public, support for climate policies are just as polarized as other climate change views (Drews and Bergh 2016). However, policy design elements can increase support for some climate policies (Baranzini and Carattini 2017) and a market-based approach to climate change could attract support from conservatives and others that reject command-and-control regulations. Yet, market-based approaches, in general, tend to have less public support, overall, than traditional regulatory approaches (Harring et al 2019, Nowlin 2019, Rabe and Mills 2017, Rhodes et al 2017). With regard to a carbon tax, public support can vary along several dimensions. For example, framing is likely to be important, with policies that are labeled as a ‘tax’ or explicitly connected to climate are not likely to receive support (Bramlund and Persson 2012, Feldman and Hart 2018, Kallbekken et al 2011, Parag et al 2011, Rabe and Borick 2012). In addition, Baranzini and Carattini (2017) found that, among residents of Switzerland, a tax that was labeled a ‘climate contribution’ received more public support than the same policy labeled as a ‘carbon tax.’

Another factor is the perceived fairness of the tax (Maestre-Andres et al 2019). A carbon tax, as with related taxes on energy consumption, is regressive because those with lower incomes are likely to pay a higher proportion of their income towards the tax. Therefore, those with lower incomes bear a disproportionate share of the cost of the policy. This can make a carbon tax less popular, and this effect is particularly strong in rural areas (Beck et al 2016).

Perhaps the most important factor is revenue recycling, which is how the revenue generated from the carbon tax is to be used (Carattini et al 2019, Lachapelle 2017, Maestre-Andres et al 2019). In general, revenue uses that provide a tangible benefit to offset the costs of the tax can increase public support. A 2014 survey by scholars from Muhlenberg College and the University of Michigan found that overall support for a carbon tax was low at 34%, but that support increased in subsequent questions that specified the use of revenue to 56% support with a tax rebate and 60% support when the revenue was used toward the development of renewable energy (Amdur et al 2014). Additionally, Kotchen et al (2017) asked US respondents whether they supported or opposed ten possible uses of revenue generated by a carbon tax and found that support for clean energy received the highest level of support at nearly 80%. Other work has shown similar findings when considering a cap-and-trade policy. For example, Mills et al (2015) found that support for cap-and-trade increased when revenues were said to go towards energy efficiency, renewable energy, and a reduction of other taxes.

A recent study by Beiser-McGrath and Bernauer (2019) adds to this literature with a conjoint experiment that examines the impact of revenue recycling information on public support for carbon taxation. Consistent with past work, the experiment indicates that providing information about revenue reuse significantly increases public support (and willingness to pay) for a carbon tax in the US and Germany. It also finds that support depends on how the revenue is to be used. In slight contrast to previous work, the study indicates that tax rebates have a more positive effect on support for carbon taxation than revenue uses that provide less direct benefits to individuals, such as reducing the budget deficit and funding renewable energy development, though the difference between tax rebates and renewable energy funding is very small. Finally, the experiment adds important nuance to the literature, showing that revenue recycling programs can help achieve majority support for carbon taxation, but only if other industrialized counties adopt similar policies. If people do not believe that other countries are going to implement comparable taxes on carbon, public support falls considerably, even if the programs make use of popular revenue recycling mechanisms.

Overall, the literature suggests that a carbon tax does not receive broad support from the public, but policy design elements such as revenue recycling can increase support. Here, we add to this literature by a) examining change in carbon tax support following mentions of revenue use and b) addressing whether the impact of policy design on public support for carbon tax programs is uniform across partisan and ideological lines. Does support for a carbon tax change after revenue use is specified? What policy designs are most attractive to people on different ends of the political spectrum? These questions are imperative because they provide insight into the types of programs and policy designs that are attractive to the
general public as well as conservatives and Republicans that are typically skeptical of climate change. As noted, supportive coalitions and favorable public opinion are essential elements for building the broad basis of support necessary to enact a carbon tax in countries like the US.

We address the above questions by testing several hypotheses about how political beliefs and revenue use can impact carbon tax support overall as well as relative to other climate policy options. To test the following hypotheses, we use a survey experiment that asks respondents their initial support for a carbon tax and then randomly assigns respondents into one of five treatment conditions that discuss how the revenue from the tax is to be spent. The uses of revenue include a tax rebate, investment in renewable energy technology, deficit reduction, the federal government’s general fund, and a control group that includes no discussion of revenue use. We are then able to examine shifts in support for the tax post-treatment for the entire sample as well as subsets of respondents based on ideological and partisan beliefs.

Next, we test the impacts of the treatments on how all respondents rank—from most to least preferred—the uses of revenues generated from the tax. Finally, we examine the effects of the revenue treatments on how respondents—the overall sample as well as subsets based on political beliefs—rank their support for a carbon tax relative to other potential climate policies including Environmental Protection Agency regulations; international agreements; state and local government action; cap-and-trade; and no action.

Drawing on past literature, we posit the following hypotheses about overall support for a carbon tax:

**H1:** Support for a carbon tax will increase among respondents in the renewable energy condition compared to those in the control group

**H2:** Support for a carbon tax will increase among respondents in the tax rebate condition compared to those in the control group

In addition, we expect there to be ideological and partisan differences in the extent to which these conditions impact support, particularly with conservatives and Republicans. In general, conservatives and Republicans oppose policies aimed at addressing climate change; however, support for a revenue-neutral carbon tax, where the revenue is refunded to taxpayers, has received public support from some conservatives (Taylor 2015) and some prominent Republicans, such as former Secretaries of State James Baker and George Shultz and former Treasury secretary Henry Paulson (Schwartz 2017). This elite support has the potential to increase support among conservatives and Republicans in the general public, therefore we posit that:

**H3:** Support for a carbon tax will increase among conservative respondents in the tax rebate condition as opposed to those in the control group

**H4:** Support for a carbon tax will increase among Republican respondents in the tax rebate condition as opposed to those in the control group

Additionally, conservative and Republican elites have long raised concerns about budget deficits and debt therefore, we expect conservatives and Republicans to be more responsive to the deficit reduction condition. We hypothesize that:

**H5:** Support for a carbon tax will increase among conservative respondents in the deficit reduction condition as opposed to those in the control group

**H6:** Support for a carbon tax will increase among Republican respondents in the deficit reduction condition as opposed to those in the control group

Next, we examine how respondents rank—from most to least preferred—the uses of revenues generated from the tax. Based on previous research, we expect renewable energy spending and a tax rebate to be the most preferred. Additionally, we expect that once respondents are able to choose from all available revenue use options, the revenue use condition in which they were placed will have little impact. We posit the following hypothesis:

**H7:** A tax rebate and renewable energy investments will be ranked higher than deficit reduction or the general fund regardless of revenue use condition

Finally, we examine the effects of the revenue treatments on how respondents—the overall sample as well as subsets based on political beliefs—rank their support for a carbon tax relative to other potential climate policies. We posit that:

**H8:** Respondents in the tax rebate condition will rank a carbon tax higher, relative to other climate policies, than those in the control group

**H9:** Respondents in the renewable energy condition will rank a carbon tax higher, relative to other climate policies, than those in the control group
H10: Conservative and Republican respondents in the tax rebate and deficit reduction conditions will rank a carbon tax higher, relative to other climate policies, than those in the control group

2. Data and variables

To examine support for a carbon tax, we use data from a representative, quota-based sample of US adults (age 18+) provided by Qualtrics. Quotas were based on US Census estimates for age, gender, and race/ethnicity. The data were collected through a survey that was administered online in June and July, 2018. Overall, data were obtained from 1655 respondents.

As noted, we used a survey experiment that varied how the revenues generated from the tax would be used. All respondents were given the following prompt, which introduced a carbon tax and provided support and oppose arguments:

As you may know, governments at all levels are considering various policy options to reduce the amount of greenhouse gases in the atmosphere in an effort to mitigate the possible impacts of climate change. One policy option is a carbon tax. A carbon tax places a tax on the amount of carbon dioxide, a potent greenhouse gas, that businesses emit in an effort to motivate businesses and consumers to reduce their overall carbon emissions.

[support and oppose arguments were given in random order]

Supporters argue that a carbon tax is a way to include the costs to society of the use of carbon dioxide that isn’t currently covered in the price of goods and services. In addition, supporters argue that a carbon tax is inexpensive to administer, and would motivate businesses and consumers to use practices and technologies that would emit less carbon.

Opponents of a carbon tax argue that it would increase the price of goods and services, which would hurt economic growth and development. In addition, opponents argue the proper amount of the tax is difficult to determine, and the increased costs would disproportionately impact those with less income.

Following the prompt, respondents were asked their support for a carbon tax on a 1 to 7 scale, with 1 being strongly oppose and 7 being strongly support. The pre-treatment mean level of support was 3.98, $sd = 1.86$. This establishes a baseline for carbon tax support that can measured against support following mentions of revenue use.

Next, respondents were randomly placed into one of five experimental conditions for revenue use, including a control group with no mention of revenue use. Below are the revenue use treatments as well the number of respondents in each group. Each treatment started with the prompt: The tax would be administered by the …

**General Fund** (n = 334): … federal government, and the revenue generated from the tax would be placed into the federal government’s general fund to be appropriated, just like the income tax.

**Reduce Budget Deficit** (n = 325): … federal government, and the revenue generated from the tax would be used by the federal government to reduce the budget deficit.

**Renewable Energy Technology** (n = 328): … federal government, and the revenue generated from the tax would be used by the federal government to support research and development of renewable energy technology.

**Tax Rebate** (n = 342): … federal government, and the revenue generated from the tax would be refunded to the public with each adult in the United States receiving a rebate of the same amount.

**Control** (n = 326): … federal government.

Following the experiment, respondents were again asked their support for a carbon tax on a 1 to 7 scale. The post-treatment mean was 4.01, $sd = 1.89$.

In the following analysis we examine the change in support for a carbon tax after discussion of how the revenue would be used by using the difference between pre- and post-support (T2-T1) as the dependent variable. Figure 1 plots the distribution of this variable among respondents.

As the plot indicates, differences in support range from -6 to 6, but a majority of respondents (60.79%) gave the same response before and after the treatment. A roughly equivalent proportion of respondents increased support (19.64%) as decreased support (19.58%). This resulted in an aggregate mean

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1 More information about data collection and survey design as well as descriptive statistics and supplemental analysis are available at stacks.iop.org/ERL/15/084032/mmedia. Partial funding for the collection of this data came from the Center for Public Choice and Market Process at the College of Charleston.

2 OLS models predicting pre-treatment support are shown in the appendix. Of note, liberals and Democrats were more supportive of a carbon tax than moderates and independents and conservatives were slightly less supportive than moderates (at p<.10) of the carbon tax prior to the introduction of revenue uses.
difference of 0.03 in the sample, indicating slight favorably towards a carbon tax following the treatment conditions. In aggregate, this difference is small, but as outlined above, we expect that there are significant differences across conditions and political beliefs that may underlie the aggregate pattern. We measured these beliefs with fairly standard indicators of political ideology and partisanship. Ideology was measured by asking respondents to place themselves on a 1 (strongly liberal) to 7 (strongly conservative) scale. For the analysis, we created dummy variables for liberals and conservatives with those that selected a 3 or less coded as liberal = 1, all else 0, and those that selected a 5 or more on the ideology scale were considered conservative = 1, all else 0. To measure partisanship, respondents were asked their party affiliation and dummy variables were created for Democrats = 1, all else 0 and Republicans = 1, all else 0.

### 3. Analysis and results

To test our hypotheses, we use OLS regression to estimate the pre- and post-treatment difference in support for a carbon tax across each revenue use condition. The revenue conditions are dummy variables with a 1 if the respondent received that treatment and a 0 otherwise and the control condition of no revenue use mentioned is the excluded referent\(^3\). Our first (H1) and second (H2) hypotheses posited that those in the renewable energy and tax rebate conditions would express higher levels of support than those in the control group. Hypotheses H3-H6 considered political beliefs and posited that conservatives and Republicans that received the tax rebate or deficit reduction treatment would be more supportive of a carbon tax than those in the control group. To test the hypotheses regarding political beliefs we estimated the regression using only respondents that were coded as liberal (n = 581), conservative (n = 571), Democratic (n = 641), and Republican (n = 470). Figure 2 plots the estimated model coefficients and the 95% confidence intervals for the entire sample as well as subsets for conservatives and liberals and Republicans and Democrats.

As shown and as expected, those in the tax rebate condition were significantly more likely to increase their support for a carbon tax relative to those in the control group with a change in support of 0.363 on the -6 to 6 scale. While statistically significant, the results indicate a relatively small with those presented here. In addition to the OLS analysis, we collapsed the difference distribution shown in figure 1 to a dichotomous variable (decrease support vs. no change or increase support) and estimated the same models using logistic regression to examine those whose support decreased (see Appendix for details). Consistent with the main findings from the OLS models, the results indicate statistically significant but substantively modest positive shifts in support among those in the tax rebate condition vs. those in the control condition. In addition, the models suggest that the dynamics driving negative shifts in support are roughly comparable to the dynamics that drive positive shifts in support for a carbon tax in this experiment.

\(^3\)Given that these are randomly assigned experimental treatments, the analysis and the results in the paper do not include controls. However, results using control variables are in the appendix and, as shown in the appendix, the estimated coefficients for the revenue use treatments in the models with control variables are consistent with the main results. The Appendix contains additional details on the methodology and results.
shift in support. However and contrary to H1, those in the renewable energy control were no more likely to increase support than those in the control group. With regard to political beliefs, in support of H3 and H5 conservatives in the tax rebate and reduce budget deficit conditions saw a larger and significant shift in support for a carbon tax than conservatives in the control group. Specifically, for conservatives in the tax rebate group support shifted by 0.609 and for the deficit reduction group support shifted 0.461 on the -6 to 6 scale. These results suggest modest changes in support. Additionally, liberals in the tax rebate condition showed increased support for a carbon tax—at the $p < .10$ level—over liberals in the control group. For partisanship, as expected (H4) Republicans in the tax rebate group showed a significant increase in support of 0.609 over Republicans in the control group. For H6, Republicans in the deficit reduction group showed an increase in support with significance at the $p < .10$ level, lending only tentative support for our hypothesis. Finally, there were no significant shifts among Democrats in any of the revenue use conditions.

Next, we examine how respondents rank their preferred use of the carbon tax revenue. All respondents, including those in the control group, were asked to rank revenue use from 1 most preferred to 4 least preferred. We expected (H7) that respondents would rank a tax rebate and renewable energy highest and that is what we found. Respondents ranked a tax rebate first with an average ranking of 2.11, followed closely by renewable energy investments with an average ranking of 2.17. On average, deficit reduction was ranked third at 2.54, and general fund was ranked last with an average ranking of 3.17.

In addition, we also posited that the revenue use ranking would not be impacted by the revenue use conditions. To test this hypothesis, we use OLS regression to predict the impact of each revenue use on the rankings. Figure 2 shows the estimated regression coefficients and 95% confidence intervals for the rankings across each treatment condition. Note that for the purposes of analysis the rankings were reverse-coded so that a higher number indicates a higher ranking.

Contrary to our expectations, we see that revenue use treatments had some impacts on how respondents ranked revenue use. Specifically, those in the tax rebate condition showed a significant increase in support of 0.609 over those in the control group. For H6, Republicans in the deficit reduction group showed an increase in support with significance at the $p < .10$ level, lending only tentative support for our hypothesis. Finally, there were no significant shifts among Democrats in any of the revenue use conditions.

![Figure 2. Shifts in Support for a Carbon Tax by Revenue Use Overall and by Political Beliefs.](image-url)
rebate and deficit reduction results and indicate that those primed by renewable energy investments were less willing than those in the control group to support a tax rebate.

Finally, we examine support for a carbon tax relative to other climate policies. Respondents were asked to indicate their support for other climate policies on a 1 (strongly oppose) to 7 (strongly support) scale. The policy options were randomized and included:

Cap-and-Trade: A national cap-and-trade program administered by the federal government, where the government sets limits on the overall amount of greenhouse gases that business can emit and issues emission permits to businesses that they can use or sell to other businesses.

EPA Regulations: Federal government regulations administered by the Environmental Protection Agency that limit the amount of greenhouse gases that power plants can emit.

International Agreement: An international agreement that sets binding limits on the amount of greenhouse gases that the United States can emit.

State and Local Governments: Policies developed and decided by state and local governments to address climate change, with limited federal government action or involvement.

All respondents were also asked to rank their preferred policy option—from 1 (most preferred) to 6 (least preferred). Figure 4 shows the average support and standard deviations as well as average ranking and standard deviations for each policy option.

Overall, EPA regulations received the highest average support as well as the highest average ranking, followed by an international agreement and state and local government action. The carbon pricing options of cap-and-trade and a carbon tax were lowest, yet no action was ranked lowest among the policy options. The fact that no action ranked last seems to reflect the growing concern about climate change among the US public (see Goldberg et al. [2020]).

We hypothesized (H8-H10) that revenue use would impact support relative to other climate policies. Specifically, we expected that a tax refund and renewable energy investments would increase relative support for a carbon tax and that a tax refund and deficit reduction would increase relative support among conservatives and Republicans. We use OLS regression to estimate the climate policy rankings. The results are shown in figure 5 and, as before, the rankings were reverse-coded.

As expected, overall those in the tax rebate condition ranked a carbon tax higher than those in the control group by 0.249 on average, on the 1 to 6 scale. However, no significant differences were found
between the renewable energy group and the control group. Additionally, conservatives in the tax rebate condition ranked a carbon tax higher than those in the control group by 0.45, on average. For Republicans the average ranking increased by nearly a point at 0.93. However, there were no differences for those in the deficit reduction condition. Finally, there were no differences in how liberals and Democrats ranked a carbon tax based on revenue use, relative to the control group.

4. Discussion

Previous research suggests that policy design elements, particularly revenue recycling, can increase public support for a carbon tax. We build on this
past work by explicitly examining change in support for a carbon tax by exploring support for a tax before and after exposure to experimentally manipulated revenue use conditions. We believe this allows for a better understanding of the importance of revenue use for carbon tax support, particularly with regard to how certain revenue uses might increase support. We found that a tax rebate motivated the most noticeable shift in pre- and post-treatment support; however, that shift in support was relatively modest. The lack of a finding in a shift of support among those that received the renewable energy treatment, which is typically found to be the most popular revenue use, may be because this study is unique in examining change in support based on experimentally manipulated revenue uses. This finding may indicate that, absent specific information, people assume that carbon tax revenues would be recycled into public programs like renewable energy development, so telling them that this is the case does not change their views about the policy. By contrast, some people may not have considered the idea of a personal refund, so providing this information can induce a shift in support.

Additionally, we add to previous work by exploring differences in support across political beliefs. Notably, we found that support among conservatives and Republicans increased when the revenues would be used toward a tax rebate or toward deficit reduction. However, Democrats were consistent in their support, regardless of revenue use treatment. Liberals were largely consistent in their support as well; however, they did show a modest increase in support, at \( p<.10 \), in the tax rebate condition. These findings suggest that support for a carbon tax among conservatives and Republicans is responsive to how the revenue would be used, whereas, liberals and Democrats are broadly supportive of carbon tax regardless of revenue use. The stability in support among Democrats and liberals (to a slightly lesser extent) may also be another reason that renewable energy investments did not induce a change in carbon tax support overall, yet a tax rebate did induce a significant change in support. A tax rebate is likely to be more appealing to conservatives, moderates, Republicans, and independents than renewable energy investments by the federal government, and it may be that those groups are driving the observed shifts in support in the tax rebate condition. Unlike the tax rebate, the appeal of deficit reduction was found to be limited to only conservatives and Republicans. The differential impact across political beliefs is an important finding because it is conservatives and Republicans that are likely to be those most opposed to a tax increase and/or any policy to address climate change, therefore, policy designs elements that could increase their support is likely necessary to build a successful coalition to develop and implement a carbon tax.

Apart from overall support for a carbon tax, we also add to previous research by examining how respondents ranked their preferred use for the revenue. We expected that the options that presented a tangible benefit would be ranked highest, and that is what we found as a tax rebate and renewable energy investments were ranked, on average, a very close 1st and 2nd respectively. Deficit reduction and the general fund were ranked 3rd and 4th. We did not expect the revenue use treatments to have an impact on ranking because we assumed that once presented with all options respondents would likely not be influenced by the treatments. However, we did find statistically significant treatment effects with those in the tax rebate condition and modest effects (significant at \( p<.10 \)) with those in the deficit reduction condition as respondents in those groups ranked those options higher than those in the control group. Perhaps more interestingly, we found that those in the renewable energy condition ranked a tax rebate lower than those in the control group, indicating that those that received the renewable energy investment condition were less favorable towards a tax rebate. These findings suggest a possible priming effect with those primed with a rebate or deficit reductions, perhaps options they had not considered before, became more favorable of those options, whereas, those primed with renewable energy become less supportive of a tax rebate. These findings imply that those given the possibility of increased investments in renewable energy seem to prefer those investments over the tax being rebated. More work is needed to understand the potential priming effects in both experimental settings and real-world settings where debates over carbon tax policies occur. Additionally, the way that respondents view the trade-offs associated with the uses of carbon tax revenues needs to be explored further in future research.

Finally, we add to previous work by examining the effects of revenue treatment on support for a carbon tax relative to other climate policies. We found that regulations received the highest average support and were ranked highest, whereas carbon pricing policies received the lowest average support and were ranked lowest, above only no action. However, we found that those in the tax rebate condition ranked a carbon tax higher, on average, than those in the control group. With regard to ideological and partisan differences, we found that conservatives and Republicans in the tax rebate condition were more likely than conservatives and Republicans in the control group to rank a carbon tax higher relative to other climate policy options. These findings suggest that in addition to overall support for a carbon tax being influenced by revenue use, so is support relative to other potential climate policies.
5. Conclusion

As countries consider various policies to mitigate the impacts of climate change, what the public will or will not support is likely in the forefront of the minds of elected officials. While many experts agree that a carbon tax is likely an efficient and effective policy instrument to reduce carbon dioxide emissions, a carbon tax is one of the least popular climate policy options among the public. Policy actors looking to build support for climate policy should note that policy design can help or hinder the process of coalition building. In this paper, we examined how policy design elements, particularly revenue use, might influence support for a carbon tax across the partisan and ideological spectrum.

Overall, we contribute to understandings of public support for a carbon tax by a) being among the first studies to examine changes in support once revenue use options are given in an experimental setting and b) exploring differences in support across political beliefs. Our findings suggest that support shifts most when the revenues would be refunded back to the people and that conservatives and Republicans, those most likely to be opposed to climate policy in general, are those most responsive to how carbon tax revenues are used. Yet, even as revenue use can increase support for a carbon tax, the impacts are modest and a carbon tax remains less popular than other policy approaches to climate change. Therefore, climate policy designs that have the potential to be politically successful may need to look beyond just a carbon tax. Future research should examine other potential factors that are associated with support (opposition) for a carbon tax. Our focus was exclusively on revenue use; however, other potential factors may include framing effects, media, climate change knowledge, personal impacts from climate change, and/or other policy design elements such as international agreements that assuage concerns about a level economic playing field.

Data availability

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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