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Combining climate, economic, and social policy builds public support for climate action in the US

Parrish Bergquist^{1,3,4}, Matto Mildenberger² and Leah C Stokes²

School of Forestry and Environmental Studies, Yale University, 195 Prospect Street, New Haven, CT 06511, United States of America

² Department of Political Science, University of California Santa Barbara, Santa Barbara, CA 93106-9420, United States of America

³ Authors contributed equally and are listed in alphabetical order.

⁴ Author to whom any correspondence should be addressed.

E-mail: parrish.bergquist@yale.edu

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Abstract

Despite the gravity of the climate threat, governments around the world have struggled to pass and implement climate policies. Today, politicians and advocates are championing a new idea: linking climate policy to other economic and social reforms. Will this approach generate greater public support for climate action? Here, we test this coalition-building strategy. Using two conjoint experiments on a representative sample of 2,476 Americans, we evaluate the marginal impact of 40 different climate, social, and economic policies on support for climate reforms. Overall, we find climate policy bundles that include social and economic reforms such as affordable housing, a \$15 minimum wage, or a job guarantee increase US public support for climate mitigation. Clean energy standards, regardless of which technologies are included, also make climate policy more popular. Linking climate policy to economic and social issues is particularly effective at expanding climate policy support among people of color.

1. New strategies for building support for climate policy

The impacts of climate change are already being felt around the world (IPCC 2014, USGCRP 2018). Yet, governments have struggled to enact climate policies at the scale of the crisis and are not on track to keep warming below 2 °C (Raftery et al 2017). As the world's largest economy, the United States plays a pivotal role in the global effort to reduce emissions. But the U.S. has thus far failed to enact federal climate policy, and even state-level efforts to address climate change are being rolled back in some cases (Mildenberger 2020, Stokes 2020). Global efforts to combat climate change require the emergence of domestic US political coalitions in favor of ambitious climate reforms. And yet, despite apparently strong public support for action to address climate change (Bergquist and Warshaw 2019, Mildenberger et al 2017), a bipartisan support coalition has proven elusive.

To break policy gridlock, US climate advocates have begun to champion a new strategy: linking climate policy to social and economic reforms. These advocates view climate change as one of several inter-linked crises that amplify poverty, inequality, and social vulnerability (Brulle and Pellow 2006, Mohai et al 2009). Some federal, state, and local politicians have embraced this policy bundling approach. Federal politicians have proposed a 'Green New Deal' that combines investments to transition carbon-intensive sectors-such as electricity, transportation, and industry-with reforms to economic and social policies-including healthcare, the minimum wage, and housing. New York's Climate Leadership and Community Protection Act, passed in June 2019, combined aggressive climate policies with targeted investments in disadvantaged communities. The two largest cities in the United States-Los Angeles and New York City-have also adopted policies that would dramatically reduce carbon emissions while creating new jobs. These debates have also found new relevance in the context of the COVID-19 health and economic crisis. Governments around the world are debating whether and how to leverage stimulus packages to simultaneously manage climate risks and support economic recovery.

This bundling effort represents a fundamental shift in political strategy. Instead of building an elite bipartisan coalition as prior federal efforts did (Skocpol 2013), these advocates seek to mobilize massive public support, including constituencies who may not consider themselves 'environmentalists'. As such, bundling climate policy with progressive social and economic programs reflects an effort to expand the scope of political conflict (Schattschneider 1975) to engage new voters. These efforts view social movements as central to enactment. Conversely, this strategy moves away away from bipartisanship as the central feature of federal climate policymaking (Layzer 2012, Mildenberger 2020) and could even alienate centrists or conservatives.

Will combining climate, economic, and social policy increase public support for climate action relative to previous climate advocacy strategies? Prior research suggests that emphasizing co-benefits such as economic development and public health can expand support for climate policy (Rabe 2004, Myers et al 2012, Stokes and Warshaw 2017). The policy bundling strategy exemplified in the Green New Deal goes a step further, by synthesizing across seemingly distinct policy areas. To date, we have lacked empirical evidence to assess advocates' claims that bundling climate policy with economic and social programs can deliver broader support coalitions. Here, we offer a rigorous empirical test of this new coalition-building strategy. First, we use a conjoint survey experiment to evaluate whether integrating climate policy with economic and social policy reforms expands or shrinks public support for climate action. Next, we use a second conjoint experiment to examine how specific climate policies-including carbon pricing, clean energy standards, technology investments, and transportation policies-change the size of support coalitions. This analysis builds on work assessing variation in support for different policy instruments (e.g. Lachapelle et al (2012)). Our conjoint design allows us to examine public preferences in a choice setting that mirrors the tradeoffs inherent to real policy debates. Finally, we explore the composition of a potential coalition by analyzing differences in support by partisanship, race, and income. Overall, we find climate policy bundles that include social and economic reforms such as affordable housing, a \$15 minimum wage, or a job guarantee increase US public support for climate mitigation. Clean energy standards, regardless of what technologies are included, also make climate policies more popular. Linking climate policy to economic and social issues is particularly effective at expanding support among people of color. This is notable, since these are the communities most vulnerable to the impacts of climate change and to the costs of climate policy (Harlan et al 2015).

2. Methods

We use two conjoint survey experiments, which capture the dynamics of multi-dimensional decisionmaking by asking respondents to choose between two choice bundles with randomly generated policy content. Conjoint experiments are used across the social sciences to measure preferences and assess how different choice dimensions vary in relative importance (Hainmueller et al 2014, Bansak, Hainmueller and Hangartner 2016). We evaluate the marginal impact of 40 climate, social, and economic policies on support for a policy package⁵. We also evaluate the impact of other features including costs to households, government expenditures associated with the policies, and partisan sponsors in the legislature. We include the latter group of attributes to avoid 'masking' their influence. Providing information about costs, expenditures, and sponsorship ensures that respondents are not evaluating policy alternatives based on implicit assumptions about these attributes.

2.1. Experimental Design

Previous research demonstrates that the conjoint experimental design is a robust way to evaluate public preferences for different choice bundles with high external validity (Hainmueller et al 2014, Bansak, Hainmueller and Hangartner 2016). The design approximates a real-world policy setting in which people are asked to make tradeoffs across multiple dimensions, rather than simply stating preferences for different attributes as if they were independent. In a conjoint experiment, individual respondents are asked to choose between two randomly generated bundles, indicating which bundle they prefer. The researcher can then calculate Average Marginal Component-Specific Effects (AMCEs) for each element of each policy bundle (Hainmueller et al 2014). The AMCE measures the average causal effect of a given element on support for the policy package. In other words, holding all other elements constant, how much would a given policy element increase or decrease public support for a climate policy package at the margin.

In our survey, respondents received two different conjoint experiments. Each respondent was asked to evaluate three distinct pairs of policy packages for each experiment. In other words, a given respondent received three randomly generated pairs of policy packages to evaluate during Experiment 1. They then received three randomly generated pairs of policy packages to evaluate during Experiment 2.

In Experiment 1, we asked individuals to choose between two climate policy packages that varied with respect to six dimensions: the presence and content of an economic program, the presence and content of

⁵ This count tallies the number of policy alternatives for each policy dimension assessed in our experiments, including the absence of an alternative for a given dimension. The Supplementary Information details the policy dimensions and alternatives we assess in both experiments.

a social program, the presence and structure of a carbon tax, household energy cost increases, annual government spending, and political sponsorship⁶. Note that we hold the climate policy instrument stable as a carbon tax and only vary the distribution of revenues from this tax. The experiment thus focuses on the implications for public support of, first, policy bundling and, second, the distribution of revenues generated by a carbon price. We include cost and partisan sponsorship in part to assess the effect that these elements have on policy support. Perhaps more importantly, though, we include these attributes to prevent respondents from making assumptions about them. Without explicitly stating these attributes, we would not be able to disentangle the marginal effect of different policy elements from cost or partisan cues that respondents assume. Supplementary figure A1 (stacks.iop.org/ERL/15/054019/mmedia) provides an example of the conjoint choices for Experiment 1 as seen by one survey respondent. Experiment 1 tests support across a total of 1,440 potential policy packages.

Of course, there are myriad alternatives for addressing climate change through many sectors. In Experiment 2, we zoom in to explore variation in support for some of the most prominent alternatives that have been proposed. Policy bundles in Experiment 2 varied over seven dimensions: the presence of a carbon tax (and its structure), legal strategies against fossil fuel companies, policies to require lowcarbon electricity generation, investments in lowcarbon technologies, investments in transportation, household energy costs, and annual government spending. As in Experiment 1, we include cost to households and spending associated with the bill partially to avoid masking the effect of these features. This experiment complements the first by assessing whether the public prefers certain climate policy alternatives. Supplementary figure A2 provides an example of the conjoint choices for Experiment 2 as seen by one survey respondent. Experiment 2 tests support across a total of 8,640 potential policy packages.

2.2. Sample and Sample Weights

A representative sample of 2,476 Americans participated in our experiments, which were embedded in an online survey instrument. Respondents were recruited by the survey firm Qualtrics, drawing from existing Qualtrics survey panel participants. All respondents completed the survey between June 7 2019 and July 15 2019⁷. We screened our sample to ensure high-quality responses and based on gender, age, and race quotas⁸. We then constructed weights for every survey respondent to account for demographic imbalances that remained in our sample. We used iterative proportional fitting, also known as raking, to reweight our sample to match the joint distribution of race, age, and gender within the US population. We provide full details about our sampling and weighting procedures in the Supplementary Information.

2.3. Statistical Analysis

We conduct the analysis at the level of the policy package, using the standard method popularized by Hainmueller *et al* (2014). Since each respondent chose between three pairs of policy packages, our effective sample size is 14,856. Our dependent variable is a binary indicator for whether each policy bundle was preferred (Y = 1) or not preferred (Y = 0). We then use Weighted Least Squares (WLS) regression to calculate the AMCE for each policy element, weighting each observation by the raked weights. We incorporate a fixed effect to control for the order in which the policy bundles were presented⁹. In Experiment 1, we use the model:

$$Y_p = \alpha + \beta C_p + \gamma S_p + \eta E_p + \zeta H_p + \theta G_p + \lambda D_p + \omega O_i + \epsilon_p$$
(1)

Y represents the indicator for whether policy package p was selected. C, S, E, H, G, and D are indicators for the carbon, social and economic policy dimensions; household-level energy costs; size of government expenditure; and sponsorship levels for package p, respectively. O is an indicator for whether policy package p was provided as an option in the 1st, 2nd, or 3rd choice task. ε is an error term. We cluster standard errors at the respondent level. We use an analogous model for Conjoint 2, including the order fixed effect and clustering standard errors by respondent. We repeat this analysis within subgroups defined by race, political party, and income, to examine heterogeneous effects.

⁸ Broadly, these screeners all worked to maximize result validity, but could introduce some uncertain effects on generalizability if individuals who pass our screeners are different than the general population. As with all survey research conducted by a commercial survey firm, our respondents may also have completed other surveys in the recent past. This means that they may be more skilled at survey work than the general population. In the supplementary information, we show that results are robust to the exclusion or inclusion of respondents screened out by the attention checks. Our balance tables and weighting strategy also show that screening out cell-phone users does not impact the composition of our sample. ⁹Angrist and Pischke (2008) note that, in the regions of common support, OLS will return the same estimates as a model using a limited dependent variable such as logit or probit. We found this to be true when we analyzed our results with logit models and, for their greater interpretability, we report results from the WLS model.

⁶ Note that a real-world policy package might include more than one of the alternatives presented within a given policy dimension. ⁷ 72% of the sample was collected within the first two weeks of the survey period, but the survey was kept open to ensure robust representation of certain subpopulations.



Figure 1. How social, economic, and climate programs shape support for bundled climate policy. The left panel shows average effects of each policy element (colored by policy dimension) on support for the policy bundle, while the right panel shows party-specific effects (red = Republican, blue = Democrat). Policy dimensions include carbon taxes, social programs, economic programs, energy costs, government spending levels, and party sponsorship. Point estimates are average marginal component effects (AMCEs) with 95% confidence intervals for each policy level. Each AMCE estimates how inclusion of the listed program affects support for the bundled climate package. Each element is compared against a base category for each policy dimension, denoted by an open circle.

3. Results

Figure 1 summarizes results from Experiment 1, which tests how including social and economic reforms shapes support for climate policy. We examine both the aggregate effects (left panel) and subgroup effects by partisanship (right panel). Overall, we find strong evidence that issue bundling increases support.

Including social policies increases overall program support (figure 1, left panel). Compared to a climate package without social policy, support increases by 11 percentage points (pp) (t(14, 838) = 7.46, p < 0.01), 7 pp (t(14, 838) = 5.881, p < 0.01), 9 pp (t(14, 838) = 7.46p < 0.01), and8 pp (t(14, 838) = 6.388, p < 0.01) with the inclusion of affordable housing, health insurance, a \$15minimum wage, and free college tuition, respectively. All effects are significant (two-tailed). However, the choice of social policies substantially affects the partisan distribution of support. Climate policy bundles that include government-run health insurance and free college tuition generate increased support among Democrats (t(6, 240) = 10,88, 10.11, p < 0.01) (figure 1, right panel), while reducing Republican support (t(3,918) = -5.2, -3.8, p < 0.01). By contrast, Republicans appear indifferent to the inclusion of affordable housing and minimum wage policies (t(3,918) = 0.20, -0.98, p = 0.3, 0.8).

Including economic policies unambiguously expands support for the package. Compared to no economic policy, the proposals to include a job guarantee, retrain fossil fuel workers, or provide unionized clean energy jobs increases support by 12 pp (t(14, 838) = 10.4, p < 0.01), 6 pp (t(14, 838) = 5.2, p < 0.01), and 10 pp (t(14, 838) = 8.9, p < 0.01),

respectively. While Democrats view these policies more favorably, we do not find strong evidence that their inclusion reduces support among Republicans. (t(3,918) = 1.3, 1.3, 1.4; p = 0.06, 0.07, 0.2).

We also compare different carbon tax revenue allocation mechanisms, to empirically examine active debates over public support for carbon pricing (Amdur *et al* 2014, Klenert *et al* 2018). Overall, including a carbon tax has a moderately positive impact on public support (4-6pp) (t(14, 838) = 4.0, 5.3, 5.7; p < 0.01). However, we do not find significant differences between the various revenue allocation plans. Further, while Democrats are more supportive of climate reforms when a carbon tax is included carbon tax (t(6, 240) = 10.9, 5.4, 5.1; p < 0.01), we do not find evidence that a carbon tax causes a significant decrease in support among Republicans (t(3, 918) = -0.69, 0.47, -0.47; p = 0.49, 0.64, 0.64).

Unsurprisingly, emphasizing either aggregate or individual costs reduces support (Ansolabehere and Konisky 2014, Stokes and Warshaw 2017). Still, the results from the cost attributes do tell us something about how program costs influence support. As government spending and household costs increase, support falls. A climate program that costs \$250 billion or \$500 billion annually is 4 pp (t(14, 838) = -4.37, p < 0.01) and 9 pp (t(14,838) = -9.9, p < 0.01) less popular, respectively, than a package that costs \$100 billion. For reference, the annual US budget is typically around \$4 trillion. Household-level costs cause greater declines in support than government expenditures, suggesting that how costs are imposed is crucial for support. Increasing monthly household energy costs by \$35 or \$55 reduces support by 12 pp (t(14, 838) = -437, p < 0.01) and 21 pp (t(14, 838) = -9.90, p < 0.01), respectively, compared to an increase of \$10. These figures correspond to carbon prices of \$50, \$75, and \$15 per tonne, respectively (Fremstad and Paul 2019). These are the biggest marginal effects in our experiment. Given US income inequality and wage stagnation, pushing costs onto households would be extremely unpopular. Republicans and Democrats do not respond differently to either household-level costs or total government expenditures-although Democrats appear to be more comfortable with large government spending. Finally, the public prefers a bill with bipartisan sponsors instead of a bill sponsored only by Democrats, though this effect is entirely driven by Republicans.

4. Support for climate policy alternatives

In Experiment 2, we explore how specific climate policy alternatives affect public support. Figure 2 shows the marginal effect of different climate policy options—carbon pricing, energy policies, investments, fossil fuel infrastructure, transportation policies, and policy costs—on package support. Results for carbon pricing, program costs, and household costs replicate Experiment 1 results.

We test how technology eligibility under a clean electricity standard (CES) shapes support. Conflict over different energy sources stems from variation in energy production across the country, concerns from environmental justice groups, and local public preferences (Stokes 2016, Mohai et al 2009). Nuclear energy and carbon capture with sequestration (CCS) are particularly controversial, and we assess whether including these technologies influences support. Surprisingly, among the full sample we do not find that package support depends on the energy sources that are considered eligible for a CES. Instead, we find that all CES policies increase package support by 10-11 pp (t(14, 540) = 7.7, 8.9, 8.6; p < 0.01)on average. Again, Democrats are more supportive than Republicans, and for Republicans, only a CES with CCS technology has a positive marginal effect on policy support (t(3, 836) = 3.32, p < 0.01). By contrast, preferences for shutting down coal plants by 2030 are highly polarized. While a coal plant shut down increases package support among Democrats by 9 pp (t(6, 110) = 4.46, p < 0.01), it decreases support among Republicans by about the same amount (t(3, 836) = -3.79, p < 0.01).

We also examine public preferences for climate policy bundles when we vary government investments, fossil fuel infrastructure, and transportation policies. The public supports packages that include investments in building retrofits (t(14, 540) =4.9, p < 0.01) and direct air capture technology (t(14, 540) = 6.3, p > 0.01). The public is agnostic about natural carbon storage (t(14, 540) =-0.50, p = 0.62). Regarding how to deal with existing fossil fuel infrastructure, only the elimination of fossil fuel subsidies amplifies support (t(14, 540) = 4.07, p = 0.048), with Democrats driving the effect (t(6, 110) = 3.66, p < 0.01). By contrast, the requirements to eliminate gas-powered cars reduce public support for climate policy (t(14, 540) = -8.89, p < 0.01). This is true among both Democrats (t(6, 110) = -2.26, p < 0.01) and Republicans (t(3, 836) = -8.11, p < 0.01).

5. Variation in support between race and income groups

We also investigate heterogeneity by race and income. Figure 3 shows these subgroup analyses for Experiment 1. Bundling strategies promise to create benefits for frontline communities that bear disproportionate environmental risks. Consistent with this intent, we find that including social policies particularly health insurance and free college builds support for climate policy among African



Figure 2. How policy details shape support for climate packages. Point estimates are average marginal component effects (AMCEs) with 95% confidence intervals for the policy levels included in conjoint Experiment 2. These policy dimensions include carbon taxes, electricity standards, investments in low-carbon technologies, transportation policies, fossil fuel policies, energy costs, and government spending levels. Overall AMCEs are on left (colored by level type), while party-specific AMCEs are on right (red = Republican, blue = Democrat).

Americans (t(1, 452) = 3.63, 5.32; p < 0.01) and Hispanic Americans (t(2,070) = 6.4, 4.3; p < 0.01) as compared with white, non-Hispanic Americans (t(10, 230) = 1.12, 1.85; p = 0.026, 0.064). We find differences between black (t(1, 452) = 5.11, p < 0.01)and white (t(10, 230) = 4.02, p < 0.01) or Hispanic (t(2,070) = 2.9, p < 0.01) Americans' levels of support for climate policy if the reform package includes a \$15 minimum wage. We also find some differences by income. For all but the affordable housing program, the impact of social policy items on package support is strongest among low-income Americans (t(7, 434) = 5.04, 5.12, 6.24; p < 0.01)as compared with the other income groups. Still, including these social policy elements in a climate program may not cause a net loss of support among middle-income (t(2,904) =1.28, -0.41, 0.72; p = 0.2, 0.68, 0.47) and highincome (t(2, 196) = 1.84, 1.98, 1.58; p = 0.066, 0.048,0.11) Americans, since they are indifferent or

marginally supportive rather than adverse to these policy items. In figure 4, we repeat this analysis for Experiment 2. There are few differences by race or income. Notably, we do not find significant differences between income groups in the effect of increased costs on climate reform support.

6. Discussion

Overall, our results emphasize that including social and economic programs expands support for climate policies. While we do find heterogeneity in support—particularly as a function of partisanship the net effect is positive. We also find that climate policy support is strongest among African Americans when social policies are included, but that Hispanic and non-Hispanic Whites are also broadly supportive of these programs. While the presence of a carbon tax increases Democratic support for policy packages, the way that tax revenues are used does



levels included in conjoint Experiment 1, for groups defined by race (left) and income (right).

not have a marginal impact on overall support. While some have argued that a revenue-neutral carbon tax might garner more support among Republicans than other carbon tax designs, we do not find evidence for this claim.

While our results provide empirical support for climate policy bundling, they also highlight some potential political pitfalls. For instance, reformers in some jurisdictions have embraced electric vehicle mandates which may reduce public support. Some social commitments (government-run health insurance and free college tuition) are polarizing, while others (affordable housing and a \$15 minimum wage) are neutral or even unifying. Technological investments (e.g. direct air capture) are popular, despite apparent resistance to certain forms of technological investments by leading advocates (McGrath 2019). Political optimization is, of course, a separate issue from whether current proposals will effectively mitigate climate risks. The experiment also highlights the stiff penalty that cost imposes on support for a climate policy bundle. The cost (in support) of cost (in dollars) is substantial for the overall package. Still, the overall and group-level AMCE's suggest the

policy elements that policy makers should emphasize to build enough support to overcome the loss of support associated with rising costs.

Of course, while anticipatory attitudes are important to consider, policy debate, enactment, and implementation can influence public opinion. While the public may not express strong ex ante preferences for how climate policies are constructed, policies might distribute costs and benefits in ways that reinforce (Campbell 2012) or undermine (Stokes 2020) public support. Still, our results provide reasons for optimism about a new climate advocacy tactic. Bundling climate, social, and economic policies has the potential to expand the pool of citizens who support climate reforms and unlock public coalitions in support of ambitious climate policymaking.

This evaluation of an influential new climate policymaking strategy offers an important empirical perspective on current climate politics debates, including in the context of stimulus debates associated with the COVID-19 health and economic crisis. Backlash to carbon pricing schemes in France, Australia, and Canada reflect increasingly salient concerns about the inequitable incidence of climate policy costs.



Bundling initiatives reflect efforts to address these concerns directly. We build on work suggesting that bundling different types of policy interventions can expand support for policies to reduce emissions in the transportation sector (Wicki et al 2019a, Wicki et al 2019b). But omnibus proposals like the Green New Deal are distinct from these narrower sector-specific proposals. We offer the first empirical test of the implications of bundling a sweeping, economy-wide carbon tax with broad-ranging social and economic programs. This contribution is substantial, since the bundling strategy has generated heated debate in the United States, a country that has repeatedly been an obstacle to global climate cooperation. Any effective global climate crisis response will require the emergence of a pro-climate reform coalition in the United States. Moreover, these results are relevant beyond the US federal context; they may speak to climate policy debates in other parts of the world and in American cities and states. In April 2019, Spain's government won re-election on an ambitious platform that combined social, economic, and climate reforms, and cities and states in the US are considering similar comprehensive approaches. Moreover, governments

around the world are increasingly debating stimulus measures to respond to the COVID-19 crisis. They are evaluating whether these economic recovery packages should also push energy, transportation, and industrial systems towards a lower carbon future. To further develop our understanding of the political viability of the bundling strategy, future research should assess public support for bundling climate, social, and economic policy around the world; at the subnational level in the US; and in contexts like the COVID-19 crisis where economic recovery packages provide an opportunity to decarbonize society.

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Data availability

The data and code that support the findings from this study are available at https://doi.org/10.7910/DVN/FYQWMS.

ORCID iD

Parrish Bergquist b https://orcid.org/0000-0003-0572-4764

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