Understanding Support for Inefficient Environmental Policy Instruments

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Abstract

Many governments utilize environmental policies like emissions standards rather than more cost-effective market-based instruments like pollution taxes or cap-and-trade. We conduct survey experiments to study if misunderstanding or non-standard preferences over policy instruments could help explain why. Respondents to a nationally representative survey prefer standards over market-based policies. Surprisingly, respondents believe standards lead to lower consumer energy prices than market-based policies do; environmental economists believe the opposite. Respondent preference for standards over market-based instruments may force trade-offs between policy stringency and cost effectiveness. Short informational videos about tax incidence and allocative efficiency close some of the gap between respondents' preferences and beliefs and standard textbook guidance corrective policies. We provide suggestive evidence that some of the effects are due to persuasion rather than information.

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1 Introduction

The development of market-based environmental policies like cap-and-trade and pollution taxes is one of economists' most important contributions to environmental policy. Standards (also known as command-and-control regulation) represent an alternative form of regulation that mandates levels of emission rates, total emissions, required technologies, or ambient environmental quality. Theoretically, market-based instruments are cost effective, i.e., they minimize the cost of achieving a given level of pollution reduction, because they equate marginal abatement costs across pollution sources. Standards are not cost effective. Economists overwhelmingly emphasize this advantage of market-based instruments. In a University of Chicago poll of leading economists (Clark Center, 2011), for example, 90 percent agreed that a carbon tax would save costs relative to alternatives, while only 2 percent disagreed.[1]

In practice, however, environmental laws often involve standards rather than market-based instruments. This includes many components of the US Clean Air Act, Clean Water Act, Endangered Species Act, National Environmental Policy Act, Safe Drinking Water Act, and most other major environmental laws. Environmental standards also have central roles in environmental policy in China, the EU, India, and many other regions. Countries are spending trillions of dollars to advance the energy transition and address climate change (International Energy Agency 2024). With such large sums of money involved, it is important to maximize the environmental benefit per dollar of spending. One possibility for why governments appear averse to market-based instruments could be political constraints that arise from the citizens' preferences.

We study people's preferences over environmental policies, whether people have an aversion to market-based instruments, and whether incomplete economic literacy or other underlying mechanisms help explain such preferences. We use a representative survey of Americans to elicit support for and beliefs about standards and market-based environmental policies. We benchmark these preferences and beliefs to those of expert environmental economists. To better understand the role of economic literacy and the consequences of attempting to increase it, we study how informational videos about allocative efficiency and the economic incidence of taxes impact respondents' support for and beliefs about various environmental policy. We examine the extent to which these videos operate through education, expert persuasion, or experimenter demand effects.

Our main analysis uses AmeriSpeak, a nationally-representative probability-based survey.

[1] The poll asked respondents to agree or disagree with the following statement:

> A tax on the carbon content of fuels would be a less expensive way to reduce carbon-dioxide emissions than would a collection of policies such as "corporate average fuel economy" requirements for automobiles.

We simultaneously ran an identical survey on a Prolific convenience sample to investigate how selection into surveys on observables and unobservables relates to support for and beliefs about environmental policy.

We begin by documenting that Americans support standards more than they support market-based policy instruments. While such patterns occur in other surveys (Leiserowitz, 2006; Rabe and Borick, 2012; Dechezleprêtre et al., forthcoming), our surveys involve a more controlled elicitation that holds the effect of each policy instrument on pollution constant. We thus establish that individuals' preference for standards stem from the instrument used, and not only from its perceived impact on pollution.

Consistent with this gap in support, we find the surprising pattern that holding environmental outcomes constant across policy instruments, Americans believe that environmental standards lead to *lower* consumer energy bills than market-based policies do. Participants in our expert survey do not share these beliefs. We focus on consumer bills because respondents indicate that they care more about the effect of policy instruments on consumer bills than about other considerations like fairness, inequality, enforceability, effects on industry, or effects on tax revenue. We also analyze beliefs about policies' impacts on inequality, and find that Americans also believe that standards will have less adverse effects on inequality than market-based instruments.

Participants also prefer weaker regulation under market-based instruments and stricter regulation under standards. We measure preference for policy stringency by asking respondents about the pollution reduction they prefer for a given policy instrument, in a specific setting we describe (greenhouse gas emissions from US power plants). Respondent preferences therefore generate a tradeoff between policy stringency and cost-effectiveness. This tradeoff may explain why some environmental organizations prefer standards—using standards increases support for strict regulation. This is also relevant because climate change research suggests that optimal climate policy should be far more stringent than current climate policy.[2] Because of people's preferences, standards therefore may be able to move government policy closer to optimal levels of stringency, but in a cost-ineffective way.

Another approach to move closer to optimal policy may be to leverage greater economic education. Our survey finds that educational videos can increase support for market-based environmental policies relative to standards. Our videos increase understanding of both allocative efficiency and incidence. The video on allocative efficiency moderately increases support for market-based instruments relative to standards. Similarly, the video on statutory versus economic incidence helps equalize support for consumer versus producer taxes and moves participants' responses closer to those of environmental economists.

[2]Climate change research suggests that the optimal tax on carbon (the "social cost of carbon") is around $200, with estimates ranging up to $1,000 (Rennert et al. 2022; Bilal and Känzig 2024), while the current global mean carbon price across all countries is around an order of magnitude lower (World Bank 2024).

We consider three possible mechanisms for the treatment effects of our educational videos—economic literacy, expert persuasion, and experimenter demand. An auxiliary survey on Prolific casts doubt on the importance of experimenter demand effects. We tell a random set of respondents at the outset that the researchers may closely scrutinize their results, which we find to have a large effect on perceived scrutiny. This increase in scrutiny, however, does not alter the video's effects. Instead, our results suggest that the videos function both through increasing economic literacy and through expert persuasion or salience.

Our analysis of support for inefficient environmental policy instruments echoes broader analysis of behavioral biases in voters' preference for inefficient policies. Dal Bó et al. (2018) use a variant of a prisoner's dilemma style lab experiment to suggest that voters may support bad policies because they underappreciate how policies lead to new equilibrium behavior. Bisin et al. (2015) explain how voters' self-control problems can rationalize policies that restrain the government's response to voters, such as balanced budget requirements. Millner and Ollivier (2016) summarize further.

This paper builds on a recent and rapidly growing literature using customized survey experiments to better understand people's perceptions of, responses to, and preferences over public policies. Large survey experiments have helped study support for redistribution (Kuziemko et al. 2015; Fehr et al. 2020), knowledge and attitudes toward immigration (Alesina et al. 2023), understanding of trade (Alesina et al., 2018), and heuristic perceptions of complex tax systems (Rees-Jones and Taubinsky 2020). Most related is Dechezleprêtre et al. (forthcoming), who collect global evidence on support for subsidies to low-carbon technology adoption and infrastructure policies; bans on polluting vehicles; carbon taxes; and agriculture-related policies. They focus on overall support for fighting climate change, the policies they study operate on different margins of behavior and emissions, and their informational treatments focus on the negative effects of climate change. By contrast, we focus on which policy instruments people prefer and why, holding constant the domain of behavior and emissions that they affect and even their quantitative effects on emissions. Our informational videos focus on the economics of the incidence and efficiency of different instruments. In short, while Dechezleprêtre et al. (forthcoming) can help understand how to motivate people to combat climate change, our complementary work instead helps understand which policy instruments are most politically tractable and why.[3]

We contribute to a related literature analyzing the design of environmental policies by establishing when and which voters prefer market-based policies over standards, and by

[3]A broader literature uses survey, lab experiments, and related methods to study preferences around climate change and associated policies, though generally does not focus on the choice between market-based instruments and standards. Keohane et al. (1998); Stavins (2007); Cherry et al. (2012); Bisin et al. (2015); Millner and Ollivier (2016); Carattini et al. (2018); Dal Bó et al. (2018); Sallee (2019); Austen-Smith et al. (2019); Goulder (2018); Douenne and Fabre (2020b); Tarduno (2020)

evaluating explanations for this preference. The review in Carattini et al. (2018) finds that while individuals prefer subsidies over carbon taxes, the preference for regulation over taxes is less clear. Several lab experiments test how the design of a policy affects its support (Cherry et al. 2012). These papers find that policy support depend on the policy's impact, its language, and its framing (Kallbekken et al. 2011), which suggests that analysis of support for policy should focus both on consumer preferences and on misperceptions.

The paper proceeds as follows. Section 2 describes the experimental design. Section 3 discusses support for environmental policy instruments. Section 4 analyzes the experimental interventions. Section 4.3 analyzes mechanisms. Section 5 concludes.

2 Experimental Design

This subsection describes our main survey experiment, along with two additional surveys we conducted.

2.1 Sample

Our main results are based on the AmeriSpeak sample, where we fielded our survey from March 28 to May 22, 2023. The National Opinion Research Corporation (NORC) designs AmeriSpeak to represent the US population. The probability-based AmeriSpeak panel primarily recruits participants by randomly selecting household from the NORC National Frame. To reduce selection bias, AmeriSpeak recruits the participants using mailings, telephone contact, and in-person visits offering enhanced incentives. Furthermore, participants are provided with the option to complete survey online or by phone. To reduce attrition and fatigue, AmeriSpeak invites the mean panelist to participate in only two to three studies per month.[4] AmeriSpeak is used in selected economics papers (e,.g., Haaland and Roth, 2017; Ferey et al., 2024; Allcott et al., 2024; Mui and Schoefer, 2024) and the NORC National Frame it is based on is used in landmark studies, such as the General Social Survey.

We simultaneously ran a survey on Prolific.co between April 3 and April 24, 2023. Prolific is an online platform that connects researchers with participants for online research studies. The rapidly growing set of survey experiment papers in economics (e.g., Enke et al., 2023; Delfino, 2024; Engelmann et al., 2024) often use Prolific or similar online platforms like MTurk, given their low cost and flexibility. However, these advantages come with the possible tradeoff of lower representativeness; which we use the two simultaneous AmeriSpeak and

[4] Technical Overview of the Amerispeak Panel. NORC'S Probability-based Household Panel. Available online: https://amerispeak.norc.org/content/dam/amerispeak/about-amerispeak/pdf/amerispeak-technical-overview.pdf

Prolific surveys to analyze.[5] We focus specifically on Prolific because participants on the platform are more likely to provide meaningful high-quality answers compared to other online panels and platforms (Eyal et al., 2021; Douglas et al., 2023).

For both AmeriSpeak and Prolific, we recruited participants aged 18 or older, living in the US. These filters produced a final analysis sample of 1,817 AmeriSpeak and 1,899 Prolific participants. The cost of the AmeriSpeak survey was approximately $20 per respondent and the Prolific survey cost was approximately $3.50 per respondent. Table 1 provides demographic summaries of our samples and of benchmarks from the Current Population Survey (CPS) and Gallup. Both the unweighted and weighted AmeriSpeak means are near those of the CPS and Gallup. For example, 29 percent of AmeriSpeak respondents and 30 percent of CPS respondents are older than 60. Similarly, 61 percent of AmeriSpeak respondents and 62 percent of Gallup respondents believe that human activity causes climate change. Like other online platforms, our Prolific sample is younger and more liberal than either AmeriSpeak or the CPS. Only 12 percent of Prolific participants are older than 60, and 77 percent of Prolific participants believe human activity causes climate change. These shares differ from AmeriSpeak, the CPS, and Gallup by over 15 percentage points. While we can parametrically control for observed demographics, unobserved sample selection may drive differences between AmeriSpeak and Prolific, a possibility we analyze later.

Expert Survey

We also obtained responses of expert environmental economists. On June 2, 2024, we emailed 195 environmental economists, selected primarily from environmental economists in NBER and CEPR, inviting them to take a shortened version of the AmeriSpeak and Prolific survey. The invitation used text similar to that shown in Appendix B. On July 16, 2024, we emailed 683 additional experts who had recently published relevant articles on environmental economics in top general-interest or field journals.

We obtained 292 complete responses, implying a response rate of 33%. A question at the end of the survey found that 98% of respondents had published at least one paper in environmental economics. The first survey included 42 NBER affiliates and 7 CEPR affiliates.[6] The second survey asked experts to indicate their type of position (government, industry, academia, etc.), and 90% of respondents indicated that they held academic appointments.[7]

[5]For instance, recruitment of Prolific participants is not done in a way to ensure representativeness, relying on methods such as online advertising and referrals (e.g. via word-of-mouth, friends, and university partnerships). Participants receive monetary payments for their participation. The platform does not provide weights to guarantee representativeness.

[6]To provide some insight on the survey composition, our email invitations provided separate survey links to some groups (e.g., NBER or CEPR affiliates).

[7]In the second expert survey, we also randomized the format of the survey. For our main analysis, we focus on 181 experts who saw the expert survey in the same format as in our main sample to make the

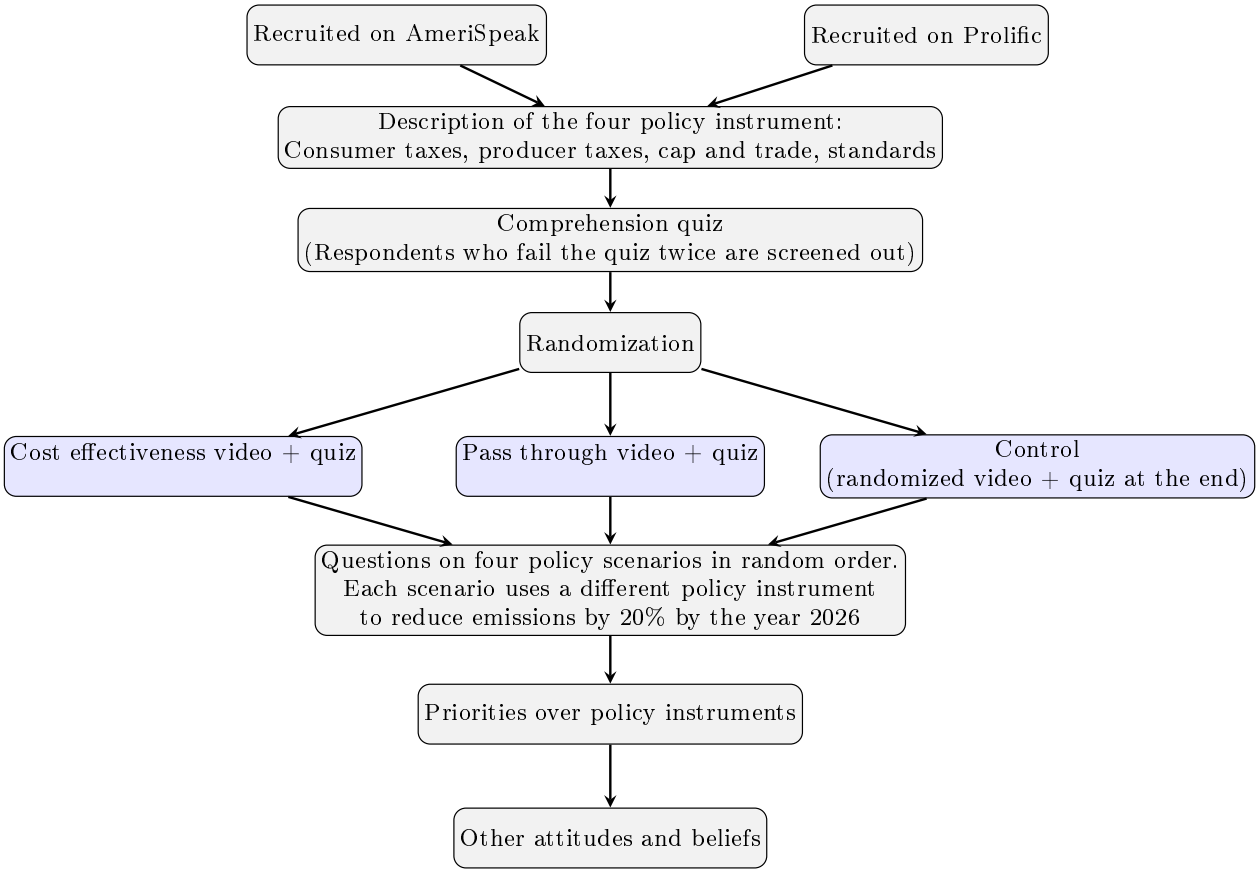
Auxiliary Survey

We conducted an additional survey on Prolific between April 30 and May 8, 2024. 1914 participants completed the survey. The purpose of the survey was to study the mechanisms underlying our treatment effect. The survey asked the same questions that we include in our original survey but also randomized a cue that altered the degree to which participants felt that the researchers were observing them.

2.2 Survey Design and Randomization

This subsection overviews the survey design. Figure 1 present a CONSORT diagram summarizing the design, and Appendix C contains the detailed survey instructions and prompts.

Figure 1: Consort Diagram



2.2.1 Policy descriptions

After participants consented to participate, the survey described the following four environmental policy instruments:

survey comparable.

(i) **A tax on power plants** requires power plants to pay for each unit of greenhouse gas emissions they emit.

(ii) A **tax on consumers** requires consumers to pay for each unit of electricity they purchase; the tax reflects the greenhouse gas emissions from producing the electricity.

(iii) A **standard** sets a maximum limit on each plant's emissions rate so that each plant must emit less than what the standard indicates.

(iv) A **cap-and-trade** market lets power plants buy and sell pollution permits to cover their total pollution emissions each year. The government reduces pollution by determining the total number of permits allocated to firms (the "cap"). Each permit gives the firm the right to emit one ton of pollution. So if one power plant wants to increase its pollution emissions, it must find another power plant willing to sell permits and the other plant must decrease its emissions.

After reading these descriptions, participants answered comprehension questions. We showed participants descriptions of policy instruments and asked them to match the description to the correct instrument. If participants answered a question incorrectly, they receive a second opportunity to answer it. In each question, participants could click a link to review descriptions of the policy instruments. If participants failed to match all policy instruments with their correct definitions twice, they were screened out of the survey.

2.2.2 Environmental policy questions

For each environmental policy instrument, we described a scenario where governments use the policy to reduce greenhouse gas emissions by 20 percent by the year 2026.[8] We randomized the order of the policy instruments across participants.

After the survey explains each policy scenario, we ask participants to answer questions characterizing their beliefs about how each policy would impact monthly household electricity bills and inequality. We focused on these two outcomes since pilot surveys indicate, and the main survey confirms, that consumers primarily care about electricity bills (Appendix Figure 4), and because inequality has provided an important recent political force against market-based policy instruments (Shapiro, 2022). To estimate the perceived effects of each policy instrument on prices, we told participants that the mean household has a monthly electricity bill of $112, and asked how participants expect each policy instrument to affect monthly electricity bills, in dollars. To estimate each policy's effects on inequality, we used

[8] We generally use "policy instrument" to describe the choice between standards, consumer taxes, producer taxes, or cap and trade, and "policy scenarios" to describe a specific description like a policy that decreases greenhouse gases by 20 percent in 2026.

a five-point scale and asked whether the effect of the instrument on inequality would be a substantial decrease, modest decrease, no effect, modest increase, or substantial increase.

We then use three questions to assess support for each policy instrument. First, we asked whether participants would support the policy instrument, oppose it, or if they were not sure. Second, to measure the intensive margin of policy support, we asked participants what percent emissions reduction they would prefer for each policy instrument. Rather than having each policy reduce emissions by 20%, participants could choose any number between 0% and 35% in 5% increments, with additional options of preferring to increase emissions or to decrease emissions by 40% or more. The survey reminded participants that a larger reduction in emissions implies a stricter policy.[9] Third, after participants answered questions on all four policy scenarios, we asked participants to rank the four policies. Regardless of whether a participant supports or opposes climate change policy overall, the rankings allow ordinal comparisons of stated preferences across policy instruments. Additionally, after ranking the policies, we asked participants to describe, in an open-ended question, the reasoning behind their ranking and in the following survey page to mark all the considerations that led to their ranking.

2.2.3 Experimental conditions

We randomly assign participants to one of three groups: allocative efficiency (25%), pass-through (25%), or control (50%). Participants in the allocative efficiency and pass-through treatments saw the videos explaining allocative efficiency and pass-through principles, respectively, at the beginning of the survey, right after passing the quiz on the description of policy instruments. Participants in the control group saw either the allocative efficiency or pass-through video at the end of the survey. We had the control group view the videos as well so that we could control as best as possible for any attrition induced by the videos themselves.

The pass-through video explained the concepts of incidence and pass-through in non-technical language, by comparing a tax on consumers and a tax on producers. The video explains how a commodity tax on businesses can be passed through to consumer prices, and how the tax-inclusive price of an example product (gasoline) is the same whether the tax is collected from consumers or businesses.[10]

The allocative efficiency video explained the concept of cost effectiveness in non-technical

[9] For example, for taxes on producers we used the following wording: "Now suppose you can choose the tax rate that power plants pay for the greenhouse gas emissions associated with their electricity use. A higher tax rate will lead to fewer emissions. All changes in emission rates will occur by the year 2026 and are calculated relative to current emission levels. What tax rate would you choose?"

[10] The video can be found in the following link `https://www.dropbox.com/scl/fi/uynse65wgr48ng28qf5pt/Pass-through-Debiasing-v4.mp4?rlkey=va45of7ktc1xobh7rx39f54zd&dl=0`.

language. The video compares a tax on emissions with a standard. The video defines cost-effectiveness as the lowest-cost way to achieve an outcome. The survey then explains that a tax has greater cost effectiveness than a standard because taxes allow power plants with lower costs of reducing emissions to decrease emissions the most, while a standard forces power plants with both high and low costs to decrease emissions.[11]

After watching each video, we asked participants to answer two questions assessing understanding of the video's concepts. For the allocative efficiency group, we first asked respondents to indicate the definition of allocative efficiency and then we asked them to indicate the reason why economists think pollution standards and pollution taxes have different cost effectiveness. For the pass-through group, we first asked them under which environmental tax system (tax on consumers vis-a-vis tax on producers) would consumers end up paying more for gas and then we asked them under which environmental tax system would companies' profits be higher.

Table 2 show that the treatment was balanced in our AmeriSpeak sample and Appendix Table A1 shows that the treatment was balanced in the prolific samples.

2.2.4 Demographics and other opinions

AmeriSpeak collects demographic data on its panel, including educational attainment, age, gender, income, and ethnicity. The end of our Prolific survey includes similar demographic questions.

We also elicited respondents' opinions about climate change and government policy. Specifically, we asked participants whether they believe the government intervenes too much in the economy, whether the government should do more to protect the environment, whether climate change is primarily due to human activity or natural Earth patterns, how important it is to address climate change, and which of a list of gases trap heat in the Earth's atmosphere.

Finally, we asked participants questions designed to assess financial literacy, from Lusardi and Mitchell (2011). These assess participants' understanding of personal finance, with questions covering understanding of interest rates, inflation, investment principles, and basic financial concepts like risk diversification and debt management.

[11] The video can be found in the following link `https://www.dropbox.com/scl/fi/xfxl9nsxq133an97jbv44/Allocative-Efficiency-v4.mp4?rlkey=qurr171eotl40tc2c989w1bda&dl=0`.

2.3 Additional surveys

2.3.1 Expert survey

To compare respondents' views to those of experts, we conducted the expert surveys. These surveys were shortened versions of our main survey, with the same questions concerning respondents' beliefs on the effects of each of our four policy scenarios. We collected beliefs on the effects on electricity bills, effects on inequality, and whether the respondent would support each policy. We also asked them questions about their expertise (educational attainment, publishing an environmental economics paper).

2.3.2 Auxiliary Survey

To test for experimenter demand effects, we conducted an experiment where we manipulated the degree to which participants felt that the researchers were observing them. We randomized participants into a control group, a *scrutiny* treatment, and an *anonymity* treatment. We crossed these conditions with the three conditions—control, pass-through video, allocative efficiency video—in our main survey experiment.

The scrutiny treatment showed participants the following message after the consent form and before the rest of the survey:

> We would like to inform you that **the researchers will precisely and carefully scrutinize your answers**, so we strongly urge you to answer carefully.

The anonymity treatment instead showed the following message:

> We would like to inform you that **the answers you give to the survey will be completely anonymous**. No one, not even the researchers, will be able to match the answers you give to your name.

Both statements are true for all respondents. We used the experimental variation to increase or decrease participants' perceptions that the researchers were observing their individual answers, similar to the messages in Bursztyn et al. (2020). At the end of the survey (about 17 minutes after participants saw the original message), we asked participants to what extent they believed the researchers will observe their answers and carefully scrutinize them, with answers chosen on a 1 to 5 scale.[12]

[12]Participants could choose an integer between 1 and 5, where 1 means "My answers are completely anonymous. No one, not even the researchers, will be able to match my answers to my name" and 5 means "The researchers will precisely and carefully scrutinize my answers." Note the trade-off between generating variation in experimenter demand and deceiving participants. We chose not to deceive participants and therefore options 1 and 5 do not completely contradict each other, but can still proxy how much participants felt the researchers were observing them.

To analyze additional mechanisms which could explain the effect of the videos, in this survey we also asked participants how much they trust experts. This survey experiment was otherwise identical to our main experiment.

2.4 Quality controls

We took several steps to ensure high quality of responses. First, the beginning of the survey validates that participants can see video and hear audio while taking the survey.[13] Second, to ensure that participants do not skip important information, we require participants to spend at least 35 seconds on the page defining the policy instruments, and to wait until the videos finish before proceeding. Third, we exclude participants who in both of two attempts incorrectly answer comprehension questions on the policy instruments questions. Fourth, we exclude participants whose survey duration was less than a third of the median survey duration, and we exclude participants who answered less than half of the environmental policy questions.[14]

Most participants felt that the survey was clear and impartial. Although the survey addresses complex policies, 85% of participants thought that the survey was somewhat or very easy to understand, 75% of participants perceived the videos as somewhat or very trustworthy, and only 20% thought that the researchers had a left-wing or right-wing bias.[15]

3 Support for Environmental Policy Instruments

This section presents survey results. We describe beliefs and preferences, compare AmeriSpeak to environmental economists, and analyze heterogeneity in observed and unobserved characteristics. Unless otherwise noted, descriptive results in this section summarize the AmeriSpeak control group.[16]

[13] Specifically, we presented respondents with a short test video and asked participants whether they were able to to see the video and hear the audio. Those who did not respond that both audio and video worked were screened out.

[14] The member agreement of AmeriSpeak requires panelists to have the option to skip questions. Therefore, all questions are not forced-response in the AmeriSpeak version. To suppress item non-response, we use soft prompts (a reminder of missing answers before moving to the next page) for crucial questions such as the support, preferred emissions reduction, and impact on electricity bills of each policy

[15] We randomized whether we described the survey as affiliated with UC Berkeley or the NBER, but found no effect on these or the main survey outcomes.

[16] We present unweighted results, for simplicity and transparency and since Table 1 shows weights do not substantially change sample composition. Appendix Figures A2,A4, A8, and A9 show that we obtain similar estimates of preferences over policy instruments and the effects of interventions when weighting AmeriSpeak.

3.1 Policy Preferences & Beliefs

3.1.1 Policy Support

Figure 2 presents various measures of support for the four policy instruments—consumer taxes, producer taxes, cap & trade, and standards. Panel (a) reports what share of participants would support each policy instrument—as opposed to stating "not sure" or "oppose"—under the assumption that each of the four policy instruments would decrease emissions by 20 percent. Consumer taxes receive the least support, and standards and producer taxes receive the most support, with standards receiving more support than any of the market-based instruments. However, all policy instruments are supported by fewer than forty percent of participants.

The significantly lower support for consumer taxes (14% respondents) compared to producer taxes (27%) suggests that respondents do not believe that these taxes have identical incidence. This is in contrast to conventional economic wisdom (e.g., Jenkin, 1871; Weyl and Fabinger, 2013), although it is in principle possible in the presence of additional frictions, such as when consumer taxes are not fully salient (e.g., Chetty et al., 2009; Taubinsky and Rees-Jones, 2018).

Panel (b) presents a variation on panel (a), where for each policy we report the difference between the fraction of participants supporting the policy minus the fraction opposing the policy. A similar number of individuals support versus oppose standards. Cap and trade, producer taxes, and especially consumer taxes, in contrast, receive negative net support. Overall, the general pattern in panel (b) closely mirrors the pattern in panel (a).

Panel (c) instead summarizes people's rankings of the four policy instruments. Recall that, in a separate question, participants had to rank the four policy instruments in order of which they most preferred to be implemented (if one had to be), again under the assumption that they would reduce emissions by 20 percent. This question allows us to determine people's preferences across instrument even they support or oppose all the individual policy scenarios. For this figure, we first normalize the ranks to be between 0 and 1, with 1 assigned to the most preferred policy instrument, 0 to the least preferred, and values of $1/3$ and $2/3$ assigned to the two policies ranked in the middle. We then take the average of the ranks for each policy instrument. The pattern in panel (c) is similar to that of panels (a) and (b), with an even more pronounced preference for standards. About 51% of participants rank standards first and 80% rank them first or second. In contrast, only 6% of participants rank consumer taxes first.

Panel (d) shows that participants prefer stricter policy—i.e., greater emissions reductions—under standards than under market-based instruments. Under a standard, respondents prefer a 15 percent reduction in emissions. Respondents prefer slightly weaker strin-

gency under cap-and-trade or under a producer tax. Respondents prefer far weaker stringency under consumer taxes—only a 1 to 2 percent emissions reduction, on average. The large gap in emissions reduction preferences for consumer versus producer taxes again reinforces the conclusion that people appear to not think these two types of policy instruments have the same economic incidence.

Figure 3 presents CDFs of the preferred emission reductions for each instrument. Under a consumer tax, nearly half of participants prefer 0% change in emissions (i.e., no tax). Under the other policy instruments, less than a third of respondents prefer a 0% change in emissions. Preferred emissions reductions under consumer taxes are first-order stochastically dominated by preferred emissions reductions under each of the other instruments. Additionally, consistent with the policy rankings discussed earlier, respondents prefer larger emission reductions for standards than for producer taxes.

These preferences over emission reductions illustrate political trade-offs between stringent and efficient climate policy. Implementing an environmental tax on consumers would be extremely unpopular. For example, suppose a policy can only pass with majority support, and further suppose that voters support a policy if it reduces emissions weakly less than their preferred level. Policymakers could then only implement a consumer tax reducing emissions by 5%, or a standard reducing emissions by 10-15%. Because current electricity prices do not internalize most of the harms from carbon emissions, an *efficient* environmental policy would substantially reduce emissions (Greenstone 2024). If the benefits of additional pollution reduction exceed the inefficiency of using a cost-ineffective instrument, policymakers facing these political economy constraints could maximize welfare by using standards rather than market-based policy. These political economy forces may explain why some environmental organizations support standards over market-based instruments—although standards achieve less environmental benefit per dollar of abatement, individuals prefer more stringent abatement under standards than under market-based instruments. Figure 3 also shows that cap-and-trade and production taxes provide cost-effective alternatives where respondents support stricter emission reductions than under consumer taxes, though still less than under standards.

The results presented in Figure 2 echo findings from other surveys. Across countries and contexts, when participants are asked about various policies, they are more likely to support policies relying on standards compared to tax-based policies.[17] In contrast to previous

[17]For example, based on an AP-NORC/EPIC survey, a large majority of Americans support a bill that increases the share of clean energy, but most oppose a $20 carbon tax (AP and NORC 2021); in an international survey, Dechezleprêtre et al. (forthcoming), find higher support for bans on polluting cars and mandatory and subsidized insulation of buildings, compared to a tax on flying and a tax on fossil fuels; in France, Douenne and Fabre (2020a), find greater support for insulation standards and vehicle pollutions standards compared to carbon taxes, a higher tax on diesel, a meat tax, and urban tolls; in a survey of registered American voters, Leiserowitz et al. (2025) find slightly greater support for regulating carbon dioxide

surveys, our survey fixes the sector and magnitude of emissions reduction and asks participants to rank the instruments. Thus, our survey diminishes the possibility that support for standards over taxes reflects these confounding policy attributes.

3.1.2 Understanding preferences over policy instruments

To better understand what drives participants' policy preferences, we asked them to identify general issues that influenced their ranking of the policy instruments. Figure 4 shows that impacts on electricity bills are the most important consideration, listed by 69.8 percent of participants. Fairness and effects on inequality are the second- and third-most important variables, listed by 54.9 and 39.6 percent of participants. Only 10.5% of respondents list effects on government revenue.[18]

Figure 5 summarizes participants' beliefs about how the different policies—which were all described as reducing emissions by 20 percent—would influence electricity bills and inequality. Panel (a) shows that participants believe that consumer taxes will have by far the largest impact on electricity bills ($p < 0.001$). [19] These beliefs about policies' impacts on consumer prices can help explain preferences across policy instruments. If participants believe that statutory incidence affects economic incidence (i.e., that who pays the bill affects the tax-inclusive price), then participants may believe that consumer taxes cost more than producer taxes and thus prefer producer taxes.

Interestingly, Figure 5 also shows that participants believe that standards will increase electricity bills less than even producer taxes ($p = .005$). This result suggests that participants may not take into account standard economic arguments for the relative efficiency of market-based instruments.

Panel (b) of Figure 5 shows that beliefs about how each policy affects inequality resemble beliefs about how each policy affects electricity bills. 70 percent of participants believe that consumer taxes increase inequality, while 57 percent believe that standards increase inequality. Because lower-income households devote a larger share of expenditure to energy than richer households do (Grainger and Kolstad 2010; Rausch et al. 2011; Goulder et al. 2019), one explanation for the similarity of responses is that respondents perceive policies

compared to requiring fossil fuel companies to pay a carbon tax.

[18] Only 32% of participants mention the policy instruments' enforceability. To further assess the importance of enforceability an auxiliary survey asked participants to rank policies but assuming perfect enforceability:

> Now suppose you knew each of the policies would be implemented properly and enforced with no loopholes, how would you rank the policies?

Adding this text hardly changed participants' rankings. Therefore, we do not focus further on enforceability.

[19] It is theoretically possible that consumer taxes increase electricity bills more than standards if individuals have in mind the *tax-inclusive* price and if the additional costs due to an inefficient allocation of emission reduction are sufficiently low. The next section shows that environmental experts believe increase consumer bills more than consumer taxes do.

that have a larger relative impact on lower- versus higher-income household expenditures to be inequality-increasing.

Finally, Figure 5 shows that participants also believe that cap-and-trade policies have smaller effects than taxes on electricity bills and inequality. These beliefs contrast with the standard economic logic that when marginal costs and benefits are certain, taxes and cap-and-trade markets produce the same market outcomes (Weitzman 1974). These results may help explain why in US environmental policy, cap-and-trade markets are far more prevalent than pollution taxes: people believe that cap-and-trade markets are less harmful. This complements the previously-posited explanation that free distribution of cap-and-trade allowances provides a hidden subsidy to polluting industries, which makes them more politically acceptable to the polluting parties (Stavins 2007).

3.2 Heterogeneity in support for policy instruments

3.2.1 Expert preferences and beliefs

Our results so far suggest that individuals may prefer standards over market-based instruments due to limited understanding of incidence and allocative efficiency. Our expert survey provides a benchmark for these beliefs.

Figure A10 presents experts' beliefs about the impact of each policy on electricity bills. While our representative sample of Americans believes that standards increase costs less than consumer taxes and producer taxes, experts believe standards increase costs more than producer taxes and are similar to consumer taxes. This suggests that experts are more likely to understand and consider allocative efficiency principles.

Figure A11 focuses on consumer and producer taxes and compares the perceive difference between these two taxes on electricity bills. Panel (a) shows that in the AmeriSpeak control group, 43% of respondents believe the difference in the effects of consumer and producer taxes on electricity bills is below $5 (i.e., they thought that consumer and producer taxes have similar effects on bills). Panel (b) shows that the corresponding number among experts is 64%.[20]

[20]Note that while experts were more likely to think consumer and producer taxes have similar effects, a minority of experts thinks that consumer taxes increase electricity bills more than producer taxes. Several dozen experts emailed us in response to the survey invitation, so we replied with a description of this aggregate finding and solicited hypotheses to explain it. The most common response focused on electricity market regulation—vertically-integrated utilities face state regulators who must approve electricity rates. Regulators might limit firms' ability to pass producer taxes through to consumer prices, which could make consumer taxes increase prices more than producer taxes.

3.2.2 Variation by observables

Appendix Figure A5 shows heterogeneity in support for each policy instrument across demographic groups. Some groups have relatively high support for environmental policy, regardless of the instrument. Other groups have relatively low support for all instruments. For example, the bottom section of the graph shows that conservatives and liberals have non-overlapping support across instruments–only 15 percent of conservatives support the most popular instrument (standards), while nearly 20 percent of liberals support the last popular instrument (consumer taxes). Higher-income, college-educated individuals, and non-Black/non-Hispanic individuals also have relatively high support for all these instruments.

Despite this variation in mean support for environmental policy overall, every demographic group has similar relative ranking across policy instruments. In every demographic group, standards (orange triangles) have the strongest support, consumer taxes (blue circles) have the lowest support, and producer taxes and cap and trade have intermediate support. These similar rankings across instruments suggest that quantitative patterns about preferences across policy instruments may generalize, although preferences for policy overall vary more and may not generalize as easily.

3.2.3 Selection on unobservables

Although AmeriSpeak is a high-quality, probability-based sample, unobservable selection into the survey may still skew our conclusions about policy support, even when responses are weighted to fully match the demographic distribution in the US population. To study selection on unobservables in survey platforms and whether higher-quality probability-based samples yield different conclusions than commonly used convenience samples, we compare our AmeriSpeak and Prolific samples. An additional advantage of this comparison is that it sheds light on selection into our auxilliary survey, which uses Prolific.

To assess selection, we first compare the results in the AmeriSpeak and Prolific samples. Unlike AmeriSpeak, Prolific is an opt-in sample, meaning participation is self-selected and respondents may be different than AmeriSpeak even within the same demographic groups. Therefore, we also compare the two samples conditional on demographics and other observable characteristics.

The blue circles in Figure 6 show differences in survey outcomes between the AmeriSpeak and Prolific control groups; separate results for each survey appear in Figure 2 and Appendix Figure A1. Panel (a) shows support for each policy, panel (b) shows the net support, panel (c) the mean rank of each policy, and panel (d) shows the mean emissions reduction that respondents prefer for each policy. Within each panel, we separate results by instrument (consumer tax, producer tax, cap and trade, standard). Within the instrument for a given

panel, the first point (blue circle) shows the unadjusted value in Prolific minus AmeriSpeak. The second point (red square) shows the Prolific-AmeriSpeak difference after adjusting for demographic controls (age, gender, rage, education, marital status, employment status, income). The third point (green diamond) shows the difference after adjusting for demographics, party affiliation and ideology. The fourth point (orange triangle) shows the difference after also adjusting for environmental opinions and financial literacy.

Figure 6 shows that adjusting for demographics (along with political variables, general attitudes and financial literacy) significantly reduces the differences in preferences between the AmeriSpeak and Prolific samples, while the evidence is mixed around whether the observables can fully account for the differences. Panel (a) finds that Prolific respondents support all four environmental policy instruments by 5 to 15 percentage points more than AmeriSpeak respondents do. Because the two surveys were run at nearly the same time, this difference is due to sample selection. The squares, diamonds, and triangles show that linearly adjusting for demographics and other respondent characteristics closes around half of the gap between Prolific and AmeriSpeak. Ideology and party affiliation have the most explanatory power; the other controls add little. Panel (b) presents results for net support that are similar to those in panel (a). Panel (c) shows that respondents in AmeriSpeak and Prolific have similar ranking of the policy instruments, both with and without controls. Finally, panel (d) shows shows that the Prolific sample has a higher desired emission reduction goal. In this case, controlling for demographics completely closes the gap between surveys, and again adding the other controls matters little.

The fact that the Prolific sample generally has higher support for environmental regulation is perhaps not surprising, as this sample skews younger, higher educated, and more liberal. It is therefore reassuring that controlling for these demographics closes much, though not all, of the gap between the Prolific and the Amerispeak samples. The remaining, but significantly-diminished gap in panels (a) and (b) suggests that there may be other, more difficult-to-measure factors that are positively associated both with willingness to participate in surveys and with support for environmental policies. Panels (c) and (d), however, suggest that conditional on demographics, the rankings of policy instruments and desired emissions reductions do not seem to vary with willingness to participate in surveys. Extrapolating to implications for our AmeriSpeak sample—where individuals contacted through the probability-based sampling scheme still had to consent to join Amerispeak—these results would suggest that even our AmeriSpeak sample may slightly overstate the extent of US citizens' support for environmental policies, though arguably not their rankings or the desired emissions reductions.

4 How understanding of and support for policy responds to information

This section discusses how experimental variation in exposure to our informational videos affects support for different environmental policy instruments.

4.1 Effects on policy support

Figure 7 shows the effects of the allocative efficiency and pass-through video treatments on survey responses. Each panel separates results across the four policy instruments. Within each policy instrument, the blue circle shows the control group, the black square shows the pass-through treatment group, and the green diamond shows the allocative efficiency treatment group. Text in each panel shows the average treatment effect and p-value of either treatment group compared to the control group. We begin by summarizing results from the pass-through video, and then discuss results for the allocative efficiency video.

Figure 7(a) shows that the pass-through video increased support for consumer taxes and decreased support for producer taxes ($p = 0.04$ and $p = 0.01$, respectively). The control group supports producer taxes 13 percentage points more than consumer taxes. The pass-through video closes this gap to 2 percentage points, meaning that it closes 84 percent of the initial gap. These results show that a better understanding of pass-through made consumer taxes more attractive and producer taxes less attractive.

Panel (a) of Figure 7 also shows that the pass-through video reduced support for standards and had a statistically null effect on support for cap-and-trade. The statistically significant reduction in support for standards could be consistent with respondents absorbing deeper principles from the pass-through video. Respondents may have come to better appreciate that more generally, policies that increase production costs may lead to higher prices. We interpret this pattern as one modest piece of evidence that respondents did not merely parrot the video in their survey responses, but instead may have absorbed broader economics lessons.

Panels (b) through (d) of Figure 7 find qualitatively similar results. The pass-through video increased enthusiasm for producer taxes—including the desired emissions reduction with those taxes—and decreased enthusiasm for consumer taxes. The effects on both cap-and-trade and standards are statistically indistinguishable from zero in both panels (c) and (d). The Prolific sample shows qualitative similar results (Appendix Figure A6).

We find more nuanced effects of the allocative efficiency video on policy support. The red diamonds in Panels (a) and (b) of Figure 7 show that the allocative efficiency video did not significantly impact support for policies. When pooling all market-based instruments, the

video decreased support by 1 percent more for standards than for market-based instruments, but the effect is not statistically significant. Panel (c), however, shows that the allocative efficiency video did affect respondents' rankings of the different policy instruments. The video decreased the relative attractiveness of standards and increased the relative attractiveness of producer taxes. These effects are in line with the main message that standards are less cost effective than market-based instruments.

What is arguably puzzling is that the allocative efficiency video increased the desired emissions reduction for *all* policies, including standards. One explanation of this is that the allocative efficiency video—unlike the pass-through video—focused its discussion specifically on reducing emissions. Consequently, the video may have made emissions reduction more salient, or may have simply generated an experimenter demand effect for a preference to reduce emissions. Section 4.3 below, however, shows that the videos were unlikely to have generated demand effects.

Appendix Figure A6 shows that in the Prolific sample, the allocative efficiency video increased support for all three market-based instruments, and decreased support for standards. These effects are also statistically significant when pooling the Prolific and AmeriSpeak samples. The video could have had a different effect among the Prolific sample because of the demographics of this sample, or because participants in the Prolific sample are more experienced survey respondents who are better able to pay attention to and process information presented to them in surveys. Figure A17 shows that controlling for demographics and other individual characteristics closes some (but not all) of the difference between the effects of the allocative efficiency treatment in AmeriSpeak and Prolific.

4.2 Perceived policy impacts

We now turn to how the informational videos influenced the perceived impacts of environmental policies.

Panel (a) of Figure 8 shows that the pass-through video significantly decreased the perceived impact of consumer taxes on electricity bills, by \$5 per month, or 20% relative to baseline. This effect is so large that the video completely closes the gap between the perceived impact of consumer and producer taxes on electricity bills. The pass-through video also slightly decreased the perceived impact of all policy instruments on electricity bills, though these effects are statistically insignificant.

Appendix Figure A11 shows thatwhile 43% of participants in the control group thought the difference in the effects of consumer and producer taxes on electricity bills is below \$5/month this share increased by nearly half, to 64%, for participants who saw the pass-through video. Remarkably, this is nearly the same share as the expert group. The three-minute pass-through video, therefore, led AmeriSpeak respondents to hold similar beliefs on

this issue to those of environmental economists. If we assume that everyone in the treatment arm actually watched the video, then the video had a persuasion rate (DellaVigna and Gentzkow 2010) of approximately 36%. In other words, for respondents who did not initially think that consumer and producer taxes have similar effects on bills, the video changed the minds of one in three. This evidence suggests that, at least to some degree, participants understood the principles that the pass-through video explains. Appendix Figure A12 presents the same data as a distribution (CDF).

The results for the allocative efficiency video in panel (a) are more mixed. With the exception of a marginally significant decrease in the perceived impacts of cap-and-trade, this video had no statistically discernible impact on the perceived impacts of the policies.

Panel (b) presents results about how the informational videos influenced the perceived impact on inequality. Interestingly, the pass-through video decreased participants' concerns about the impact on inequality for *all* policies. This is arguably surprising, as the pass-through video only discussed consumer and producer taxes. One possible explanation is that while the videos emphasized how the incidence does not vary across policies, some participants may have simply left with as sense of "non-varying incidence," and consequently also felt that a given policy will have similar incidence across consumers. The allocative efficiency video, by contrast, had no effect on perceived inequality.

Our reading of this evidence is that the videos influenced participants' beliefs and preferences through channels other than just better economic understanding. Part of the videos' effects seem to stem for making certain kinds concepts or ideas—such as emissions reduction or equal incidence—more salient in participants' minds.

4.3 Mechanisms and robustness

There are three potential mechanisms through which the videos affected beliefs and preferences. First, the videos could increase *economic literacy*, i.e., the participants learn the principles that the video explains. Second, effects could arise through *expert persuasion*. Participants may not understand the details, but still believe the videos' main message. For example, the videos may make respondents believe that standards increase abatement costs relative to market-based instruments, even if participants do not understand the mechanisms for how allocative efficiency decreases costs. Third, *experimenter demand* may explain our results. Participants may not believe or understand the videos, but may understand what message the videos seek to convey and then repeat that message to please the researchers.

These three mechanisms have different implications, so distinguishing between them is important. If treatment effects primarily reflect experimenter demand effects, then the results have limited external relevance. Classes providing more than a three-minute video can improve economic literacy, while advertisements and media coverage may be able to convince

people through expert persuasion. For example, expert persuasion may help explain why people believe that carbon dioxide emissions contribute to climate change (i.e., because of the strong scientific consensus supporting this pathway), even if many people who believe this do not understand the mechanisms (e.g., greenhouse gases trap heat in the atmosphere).

Video comprehension As discussed in the previous section, some of the results suggest that participants at least partially understood the pass through video, as the video closed most of the gap between the perceived impact of producer and consumer taxes on electricity bills.

To analyze comprehension of the allocative efficiency video, we also included a question, at the end of the survey, about environmental policies that would reduce pollution from two factories. In this question, Factory 1 emits high levels of pollution and has high marginal abatement costs, while factory 2 emits low levels of pollution and has low marginal abatement costs. We then asked two questions. First, which factory would reduce their pollution more in response to a tax, and second, which factory would respond more to a standard that places a maximum limit on emissions. Participants could answer factory 1, factory 2, or "same" for each question. Economic theory, and the lessons conveyed in our allocative efficiency video, suggest that factory 1 should respond more to a standard (because of it's higher baseline levels of pollution), while factory 2 should respond more to a tax.

Appendix Figure A13 shows that the allocative efficiency treatment increased the share of individuals indicating that Factory 2 would disproportionately reduce pollution in response to the tax, compared to the control group. The video increased this share from 64% to 71%, corresponding to a persuasion rate of 21%. This provides evidence that at least some respondents understood the principles of the allocative efficiency video.

Experimenter demand In the auxiliary survey, we altered the participants' perceived anonymity to test whether experimenter demand effects can explain our results. Appendix Figure A14 shows that scrutiny and anonymity treatments effectively manipulated perceived scrutiny. Compared to participants in the anonymity treatment, participants in the scrutiny treatment were far more likely to answer that they felt like their answers would be observed. The difference between the treatments is 1.8 points on the 5-point scale (s.e.=.08). Participants in the control group, who received no message about anonymity or scrutiny, responded similarly to the anonymity treatment, which implies that participants in the main sample believed their responses to be anonymous.

Figure 9 shows that the scrutiny and anonymity treatments had little effect on survey responses. Panel (a) shows the effect of the pass-through video on the difference in support between consumer and producer taxes. The first two bars show that the treatment effects did

not change between the first wave of the Prolific sample and the non-message group in the second wave of the Prolific sample. The third and fourth points in panel (a) show that the scrutiny and anonymity conditions did not impact the treatment effect of the pass-through video. The pass-through treatment in all these settings significantly closed the gap between support for producer and consumer taxes ($p < 0.01$ in all groups).

Panel (b) of Figure 9 analyzes the effect of the allocative efficiency treatment on support for market-based instruments versus standards. We combine consumer taxes, producer taxes, and cap and trade into the pooled category of market-based instruments for the sake of parsimony. Again, the treatment effects are also significant and do not vary between the four groups. If anything, the added scrutiny diminished the intended treatment effect of the allocative efficiency video. Thus, we find no evidence of experimenter demand driving the treatment effects of our informational videos.

Expert persuasion Finally, we also leveraged the second-round survey to study the importance of expert persuasion. The end of the survey asked participants how much they trust experts. Appendix Figure A15 separates the videos' treatment effects by whether participants trust experts completely (red squares) or not (blue circles). We find that the pass-through video treatment effect does not vary by trust in experts, while the effects of the allocative efficiency video are larger among participants who trust more in experts, suggesting that expert persuasion could be driving some of the effects of the allocative efficiency video.

5 Conclusions

Economists often lament that environmental policy uses cost-ineffective standards rather than market-based instruments like cap-and-trade markets or pollution taxes. The stakes are high, as public and private actors are spending trillions of dollars to address climate change and invest in renewable energy.

We study the extent to which beliefs and preferences which diverge from textbook standards can explain these patterns. We use a nationally representative survey and an experiment with short informational videos on tax incidence and allocative efficiency. Survey responses indicate that people believe standards lead to lower energy bills than environmental markets do, in contrast to our survey of environmental economists. The short informational videos move respondent beliefs closer to textbook guidance around corrective policies. We investigate several channels for mechanisms and find some evidence that persuasion accounts for the videos' effects.

Our analysis leaves several questions open for future work. To what extent do the beliefs

and preferences we analyze influence policy in non-environmental domains? How does the policymaking and regulatory process combine these beliefs with influence from interest groups to produce the policies we have? Finally, what forces have led governments in particular settings to adopt market-based environmental policies?

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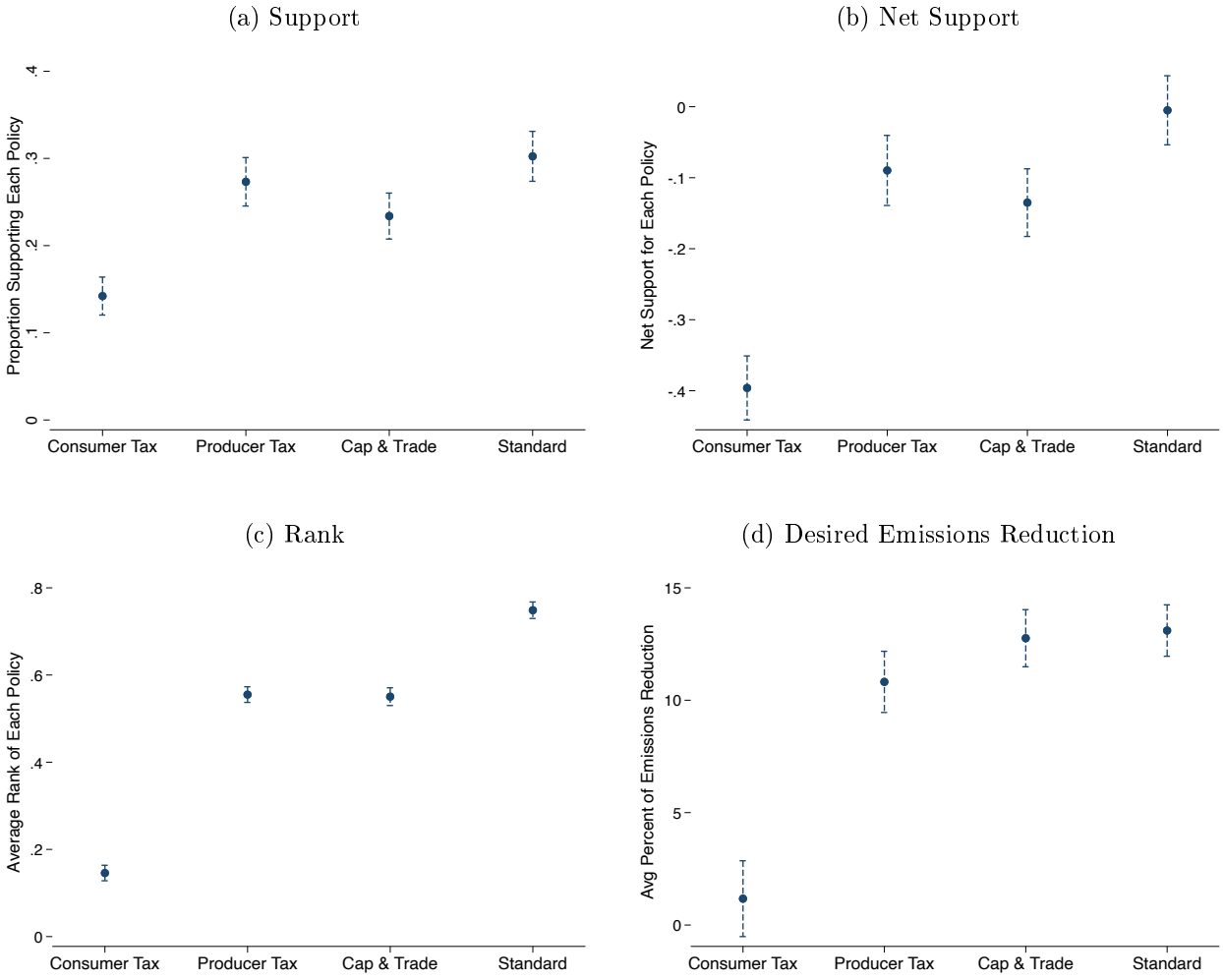
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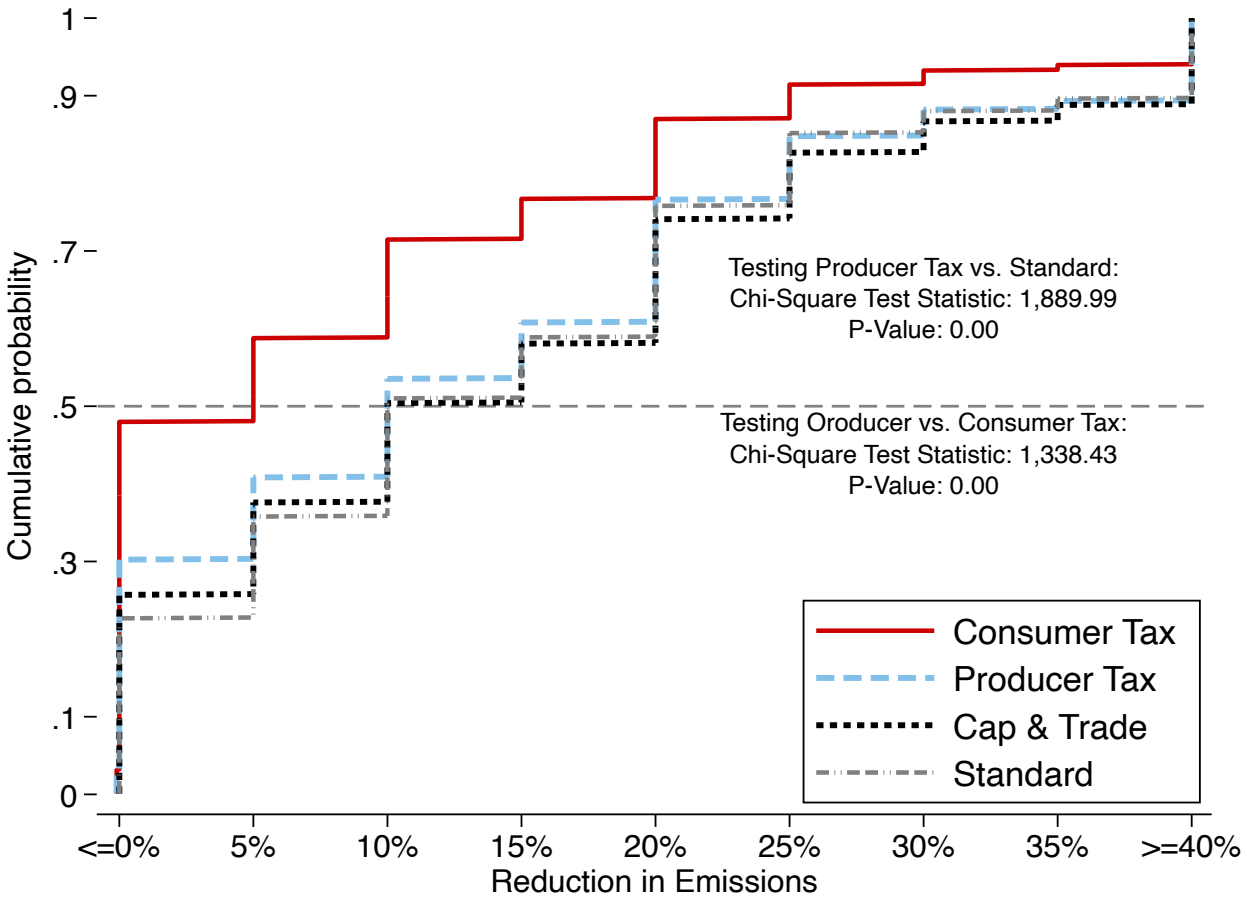
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Figure 2: Policy Preferences: Control Group



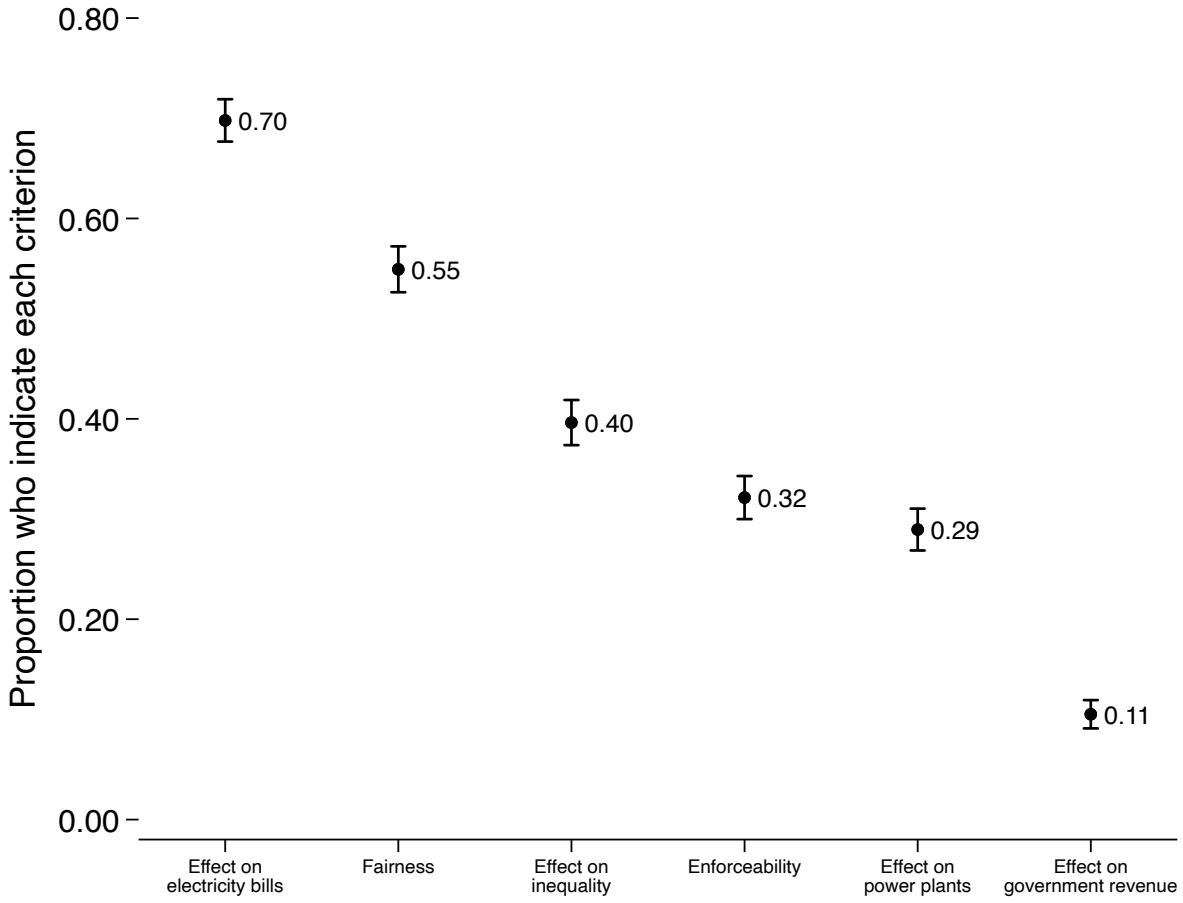
Notes: Figure uses the AmeriSpeak control group. In Panel (a), the outcome variable is an indicator for supporting each policy. In Panel (b), the outcome variable is an indicator for supporting each policy minus an indicator for not supporting this policy (1=yes, 0=not sure, -1=no). In Panel (c), the outcome variable is rank, which originally ranges from 1 to 4 for each policy and is normalized to 0-1 range (0 for ranking last and 1 for ranking first). In Panel (d), the outcome variable is the desired percent reduction in emissions the respondent chooses for each policy.

Figure 3: CDF of Emissions Reduction



Notes: Figure uses the AmeriSpeak control group and shows the CDF of participants' preferred emissions reduction. The text shows the p-values from the chi-square test of independence between pairs of policies. About 1-5% of the respondents indicated preferring an increase in emissions across policies; for simplicity, the figure is presented after winsorizing them at the 0% level.

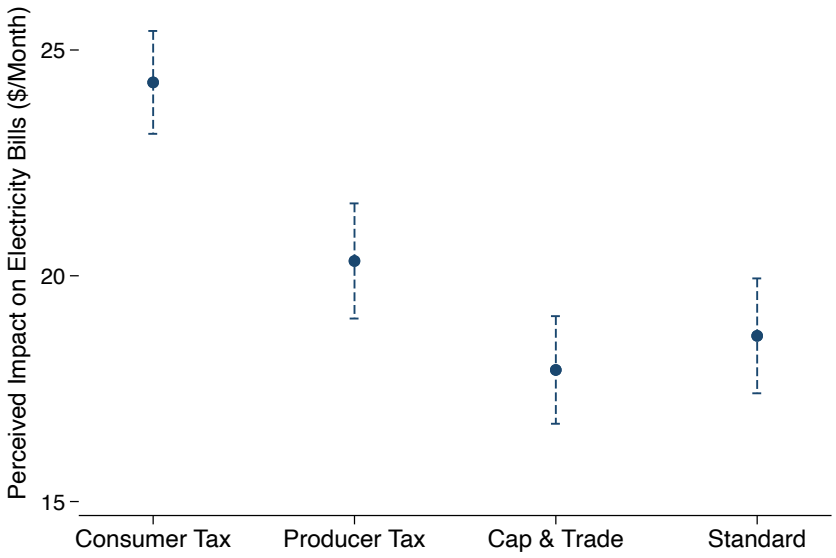
Figure 4: Criteria Influencing Respondents' Policy Support



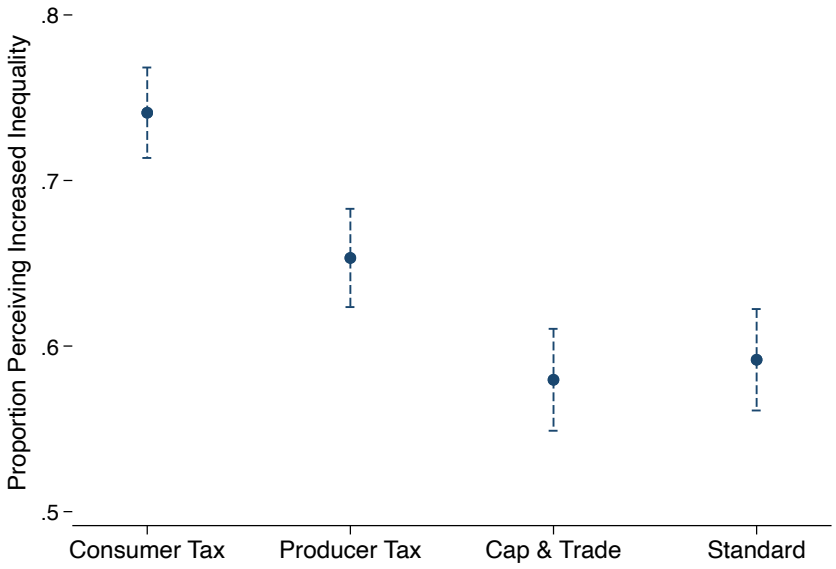
Notes: Figure uses AmeriSpeak responses to a multiple-choice question "Please mark all the considerations that influenced your ranking", allowing multiple answers. Two other criteria—"effect on the environment" and "political feasibility of implementing the policies"—are also included as options in this question but not displayed in this graph. The proportion of respondents who mentioned each criterion is displayed with a 95% confidence interval.

Figure 5: Perceived Effects of Policies on Electricity Bills and Inequality: Control Group

(a) Impact on Electricity Bills ($/Month)

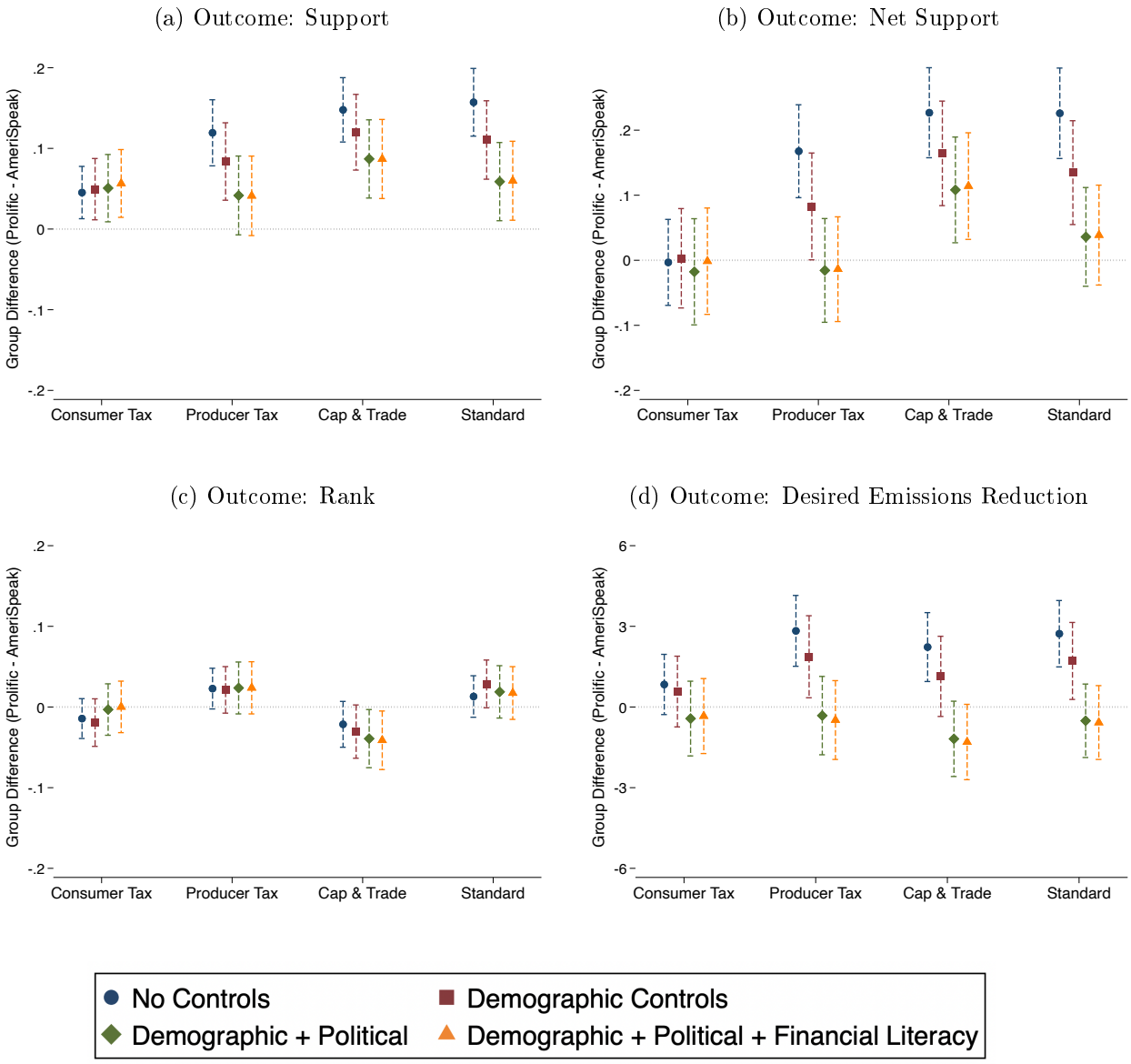


(b) Impact on Increasing Inequality



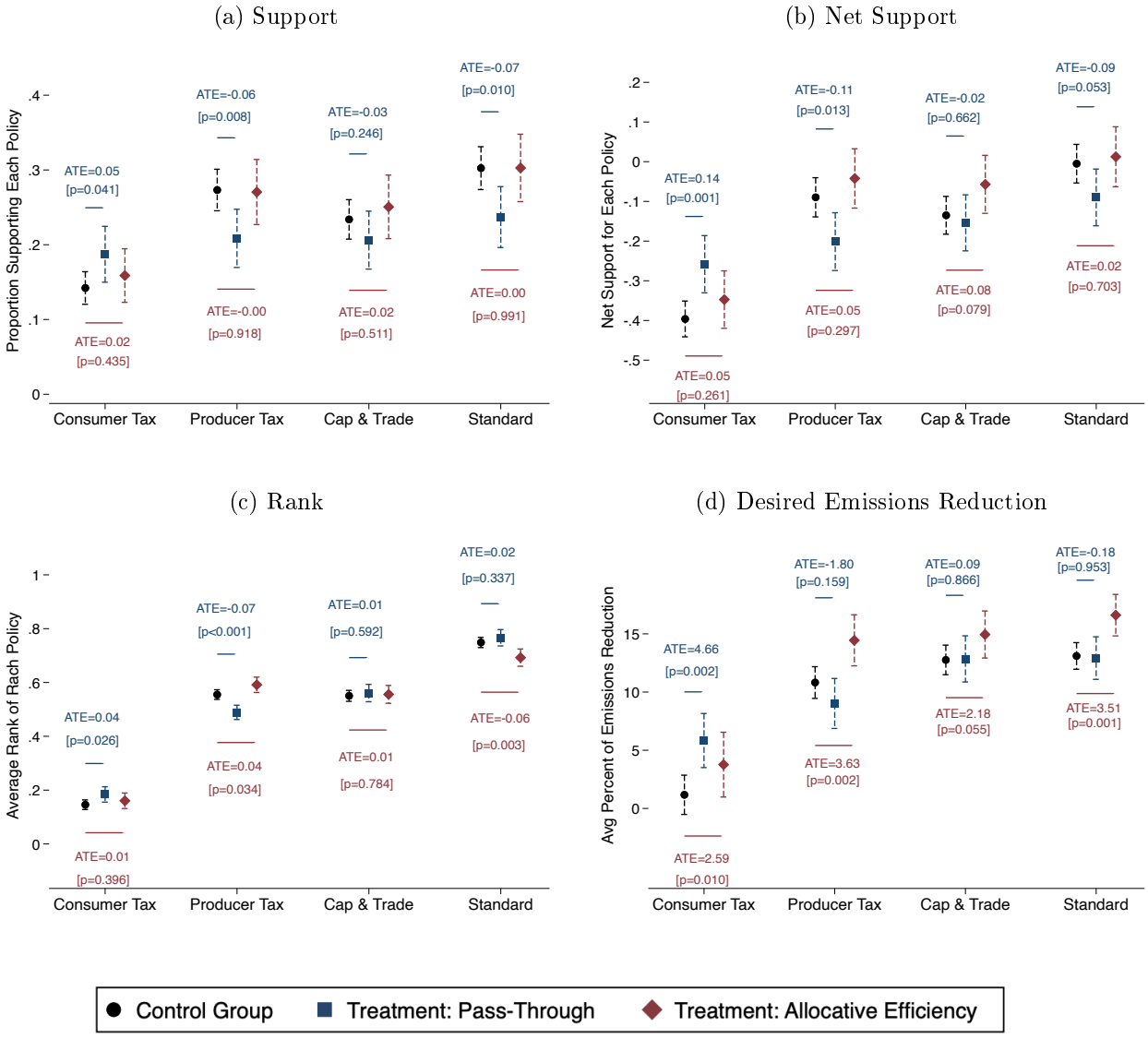
Notes: Figures use the AmeriSpeak control group. In panel (a), the outcome variable is the perceived impact on electricity bills for each policy (in dollars). In panel (b), the outcome variable is an indicator for believing that a policy increases inequality.

Figure 6: Policy Preferences in Prolific Versus AmeriSpeak



Notes: Figures use AmeriSpeak and Prolific control groups pooled. In Panel (a), the outcome variable is an indicator for supporting each policy. In Panel (b), the outcome variable is an indicator for supporting each policy minus an indicator for not supporting this policy (1=support, 0=not sure, -1=don't support). In Panel (c), the outcome variable is rank, which originally ranges from 1 to 4 for each policy and is normalized to 0-1 range (0 for ranking last and 1 for ranking first). In Panel (d), the outcome variable is the desired percent reduction in emissions the respondent chooses for each policy. Since the original question includes options such as no reduction or an increase in emissions and 40% or more, tobit regressions are applied with lower-censoring limit = 0 and upper-censoring limit = 40. Demographic controls include gender, age, race, education level, marital status, employment status, household income, political party affiliation, and ideology. Additional controls include the opinion about the role of government intervention on environmental protection and financial literacy. We also tested no difference in the baseline of all policies (all four coefficients = 0). For all outcomes other than rank, the p-values in the no control condition is less than 0.01 (rejecting no difference). For rank, the p-value is 0.14. After adding demographic controls, the p-value is less than 0.01 for support and net support, 0.06 for rank, and 0.11 for desired emissions reduction. With demographic and political controls, the p-value is 0.003 for support, 0.036 for net support, 0.131 for rank, and 0.492 for desired emissions reduction. With full controls, the p-value is 0.002 for support, 0.037 for net support, 0.124 for rank, and 0.428 for desired emissions reduction.

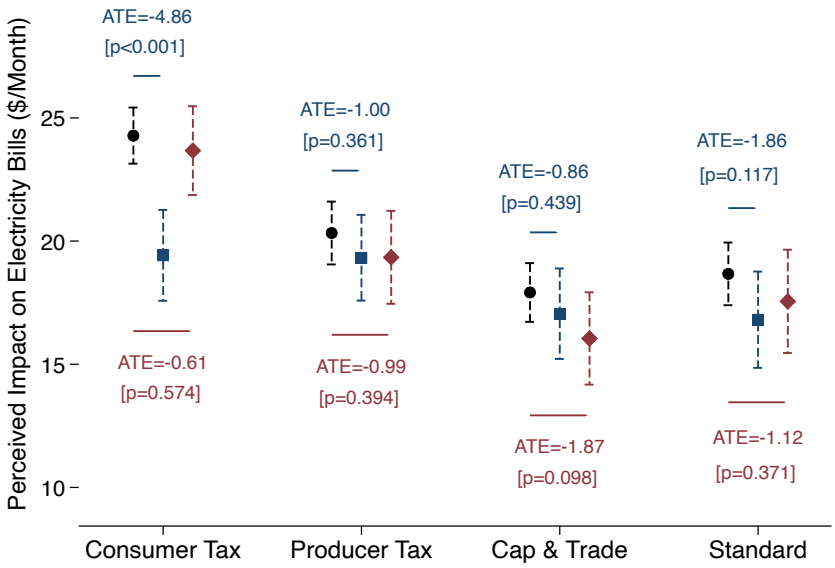
Figure 7: Effects of Treatments on Policy Preferences



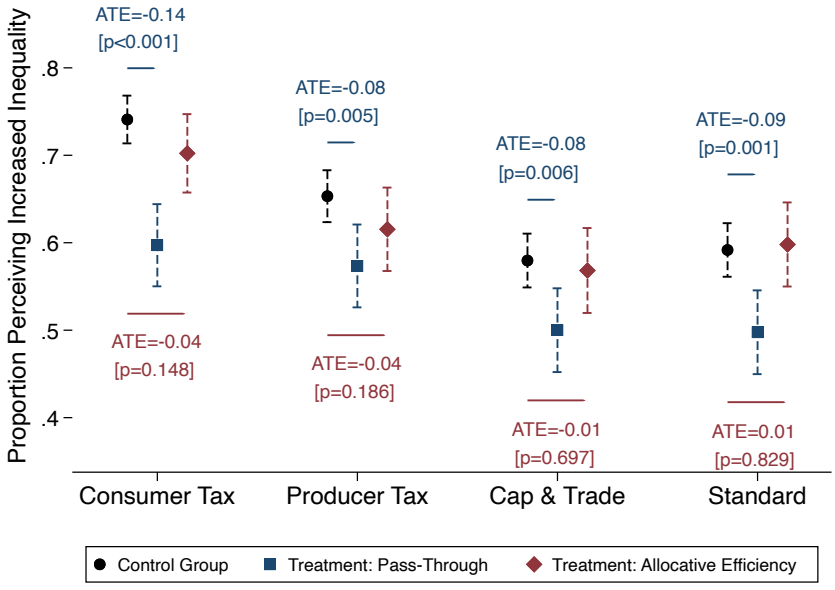
Notes: Each panel shows the effect of the indicated treatment on respondent preferences for each policy. In panel (a), the outcome variable is an indicator for supporting each policy. In Panel (b), the outcome variable is an indicator for supporting each policy minus an indicator for not supporting this policy (1=yes, 0=not sure, -1=no). In panel (c), the outcome variable is rank, which originally ranges from 1 to 4 for each policy and is normalized to 0-1 range (0 for ranking last and 1 for ranking first). In Panel (d), the outcome variable is the percent reduction in emissions the respondent chooses for each policy. The text in each figure shows the average treatment effects (ATEs) and their p-values.

Figure 8: Perceived Effects of Policies on Electricity Bills and Inequality: Effects of Treatments

(a) Policy Impact on Electricity Bills ($/Month)



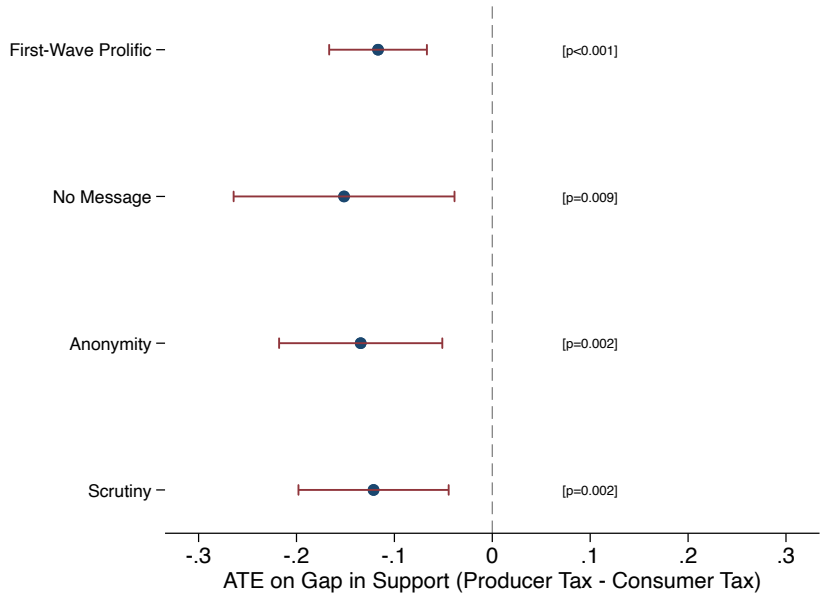
(b) Policy Impact on Inequality



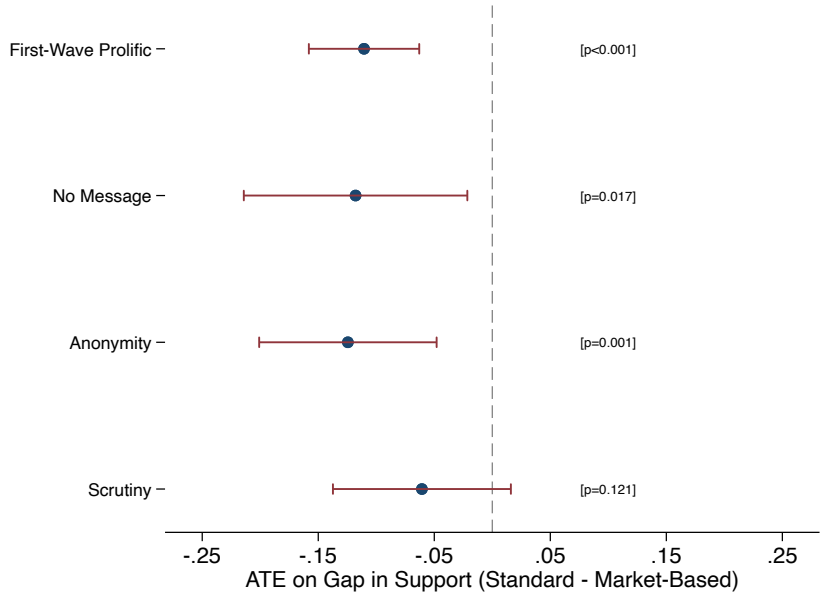
Notes: Each panel shows the effect of the indicated treatment on respondents' beliefs about how the policies affect electricity bills and inequality. For panel (a), the outcome variable is the perceived impact on electricity bills for each policy (in dollars). For panel (b), the outcome variable is an indicator for believing whether a policy increases inequality. The text shows the average treatment effects (ATEs) and their p-values.

Figure 9: Policy Support, Overlaying Anonymity Versus Scrutiny Treatment With pass-through Versus Allocative Efficiency Treatment

(a) Pass-Through Treatment



(b) Allocative Efficiency Treatment



Notes: Each panel shows the effect of the indicated treatment on the support gap between the policies of interest. Panel A shows the effect of watching pass-through video on the support gap between taxing consumers and producers. Panel B shows the effect of watching the allocative efficiency video on the support gap between standard and other market-based policies aggregated. In each panel, the first column shows the treatment effect in the first-wave Prolific sample, and the other columns show the treatment effect of the auxiliary survey on Prolific by the no-message, anonymity, or scrutiny conditions. The p value of each column is also displayed. ATE is average treatment effect.

Table 1: Demographics and Beliefs of Survey Respondents and US Population

	AmeriSpeak	Prolific	Prolific (2nd Round)	AmeriSpeak (Weighted)	CPS	Gallup
	(1)	(2)	(3)	(4)	(5)	(6)
Male	51%	57%	41%	49%	49%	50%
Over age 60	29%	12%	8%	29%	30%	-
College grad	41%	55%	57%	37%	34%	35%
Married	52%	33%	37%	50%	48%	46%
Employed	64%	76%	76%	60%	60%	-
Household income $<$ \$35,000	22%	26%	23%	25%	24%	-
Household income $<$ \$60,000	42%	50%	44%	44%	41%	-
Household income $<$ \$100,000	68%	77%	72%	68%	63%	-
Self-identified liberal	27%	44%	41%	25%	-	25%
Government should do more in protecting environment	69%	77%	78%	68%	-	56%
Human activity causing climate change	61%	77%	76%	59%	-	62%
Median age	45	38	38	47	47	-

Notes: Column (1)-(3) show the demographics of our primary AmeriSpeak sample, the Prolific sample used for the same survey, and the Prolific sample of our auxiliary survey. Column (4) shows the demographics of AmeriSpeak after reweighting (using the weights provided by AmeriSpeak) to resemble the population obtained from Current Population Survey (Feb / March Supplement 2023). The reweighting uses the following variables: age, gender, census division, race/ethnicity, education, housing tenure, household phone status, age×gender, age×race/ethnicity. The last two columns show the demographics of the US population for comparison. The statistics on gender, age, education, marital status, employment status, and household income use the Current Population Survey (Feb / March Supplement 2023). The statistics related to political party affiliation, and environmental opinions use the 2023 Gallup poll. Ideology is based on the 2021 poll since data for 2023 are unavailable.

Table 2: Balance Table for the AmeriSpeak Sample

	Control Mean	Pass-Through Mean	Allocative Efficiency Mean	Control - Pass-Through T-test	Control - Allocative Efficiency T-test
Male	0.513	0.481	0.538	0.032	-0.025
Age 18-29	0.169	0.168	0.218	0.001	-0.049**
Age 30-44	0.323	0.322	0.303	0.000	0.020
Age 45-59	0.217	0.227	0.201	-0.011	0.016
White	0.671	0.687	0.700	-0.016	-0.028
Black	0.097	0.100	0.082	-0.003	0.015
College graduate	0.400	0.412	0.437	-0.012	-0.037
Married	0.534	0.512	0.494	0.022	0.040
Working	0.640	0.671	0.615	-0.030	0.025
Income less than 30,000	0.172	0.185	0.191	-0.012	-0.019
Income 30,000-60,000	0.256	0.237	0.221	0.019	0.035
Income 60,000-100,000	0.260	0.254	0.270	0.007	-0.010
Liberal	0.268	0.254	0.261	0.015	0.008
Conservative	0.212	0.254	0.246	-0.042*	-0.034
Democrat	0.512	0.472	0.484	0.040	0.028
Republican	0.311	0.360	0.357	-0.049*	-0.046
Earth warmer due to human activities	0.598	0.559	0.598	0.039	-0.000
Gov. should do more to protect the environment	0.685	0.635	0.705	0.050*	-0.019
P-value for F-test on all variables				0.850	0.269

Notes: Table uses the AmeriSpeak sample that are included in the final sample . Columns (1)-(3) show the distribution of demographic characteristics across the control, pass-through treatment, and allocative efficiency treatment group. Column (4) presents the testing of the difference between the control and pass-through treatment group. Column (5) presents the testing of the difference between the control and allocative efficiency treatment group. In Columns (4)-(5), we use * for p-value < 0.1, ** for p-value < 0.05, and *** for p-value < 0.01. *Liberal* categorizes respondents who self-identify as very liberal or somewhat liberal (1 or 2 on a 5-point scale); *Conservative* categorizes respondents who self-identify as very conservative or somewhat conservative (4 or 5 on a 5-point scale). The bottom row shows the p-values of the F-test on all variables being equal between two groups.

Online Appendix

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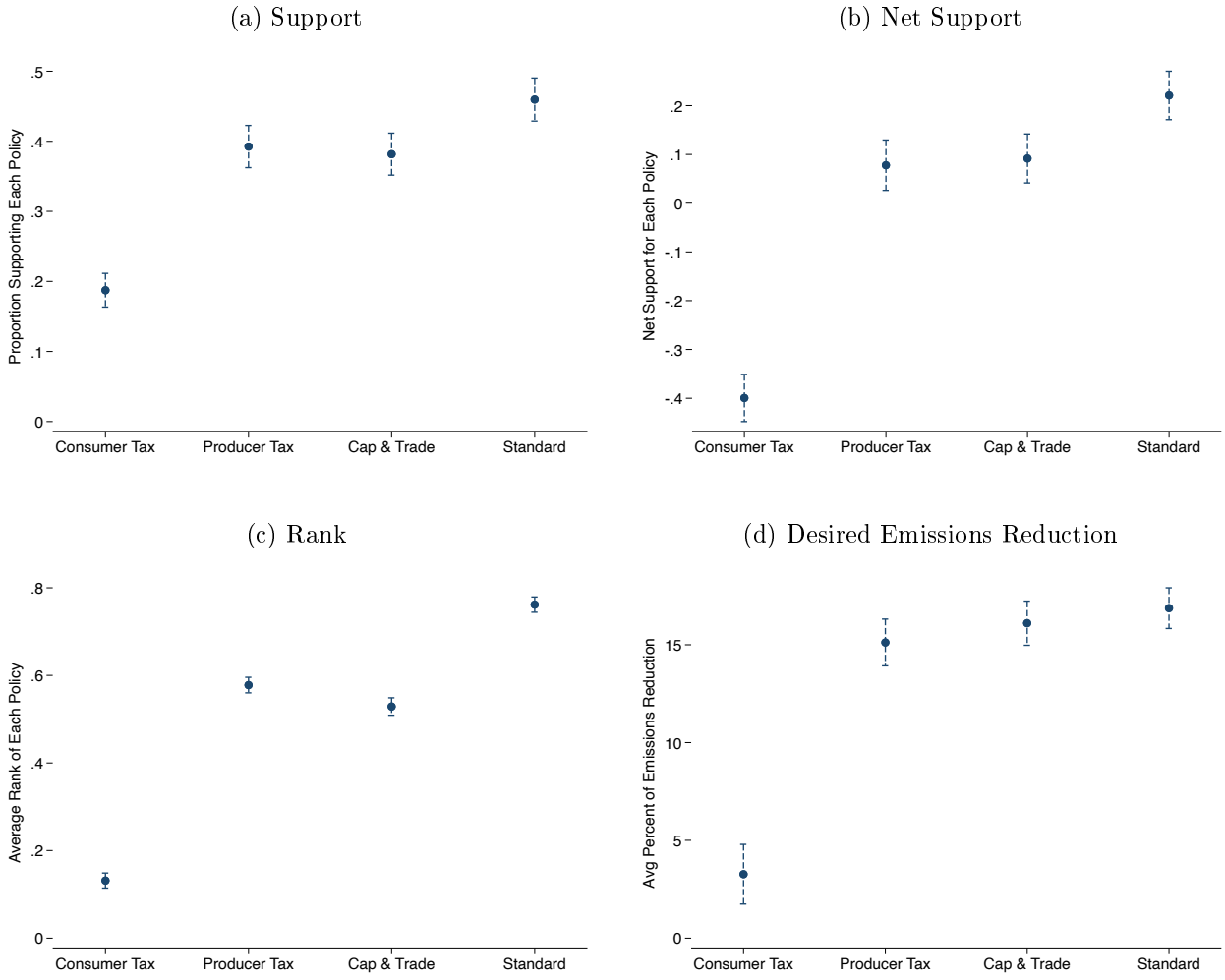
A Supplementary Figures and Tables

Table A1: Balance Table for the Prolific Sample

	Control Mean	Pass-Through Mean	Allocative Efficiency Mean	Control - Pass-Through T-test	Control - Allocative Efficiency T-test
Male	0.567	0.578	0.574	-0.011	-0.007
Age 18-29	0.224	0.231	0.239	-0.007	-0.015
Age 30-44	0.417	0.426	0.403	-0.009	0.014
Age 45-59	0.245	0.215	0.230	0.029	0.015
White	0.740	0.760	0.786	-0.020	-0.046*
Black	0.100	0.100	0.090	-0.000	0.010
College graduate	0.541	0.592	0.550	-0.050*	-0.008
Married	0.339	0.327	0.324	0.012	0.014
Working	0.751	0.760	0.770	-0.008	-0.019
Income less than 30,000	0.230	0.202	0.212	0.028	0.018
Income 30,000-60,000	0.263	0.290	0.324	-0.027	-0.061**
Income 60,000-100,000	0.256	0.288	0.267	-0.031	-0.011
Liberal	0.570	0.569	0.592	0.001	-0.022
Conservative	0.215	0.220	0.209	-0.005	0.006
Democrat	0.491	0.508	0.534	-0.017	-0.043
Republican	0.174	0.168	0.149	0.006	0.025
Earth warmer due to human activities	0.771	0.780	0.766	-0.009	0.005
Gov. should do more to protect the environment	0.770	0.744	0.786	0.026	-0.016
P-value for F-test on all variables				0.703	0.270

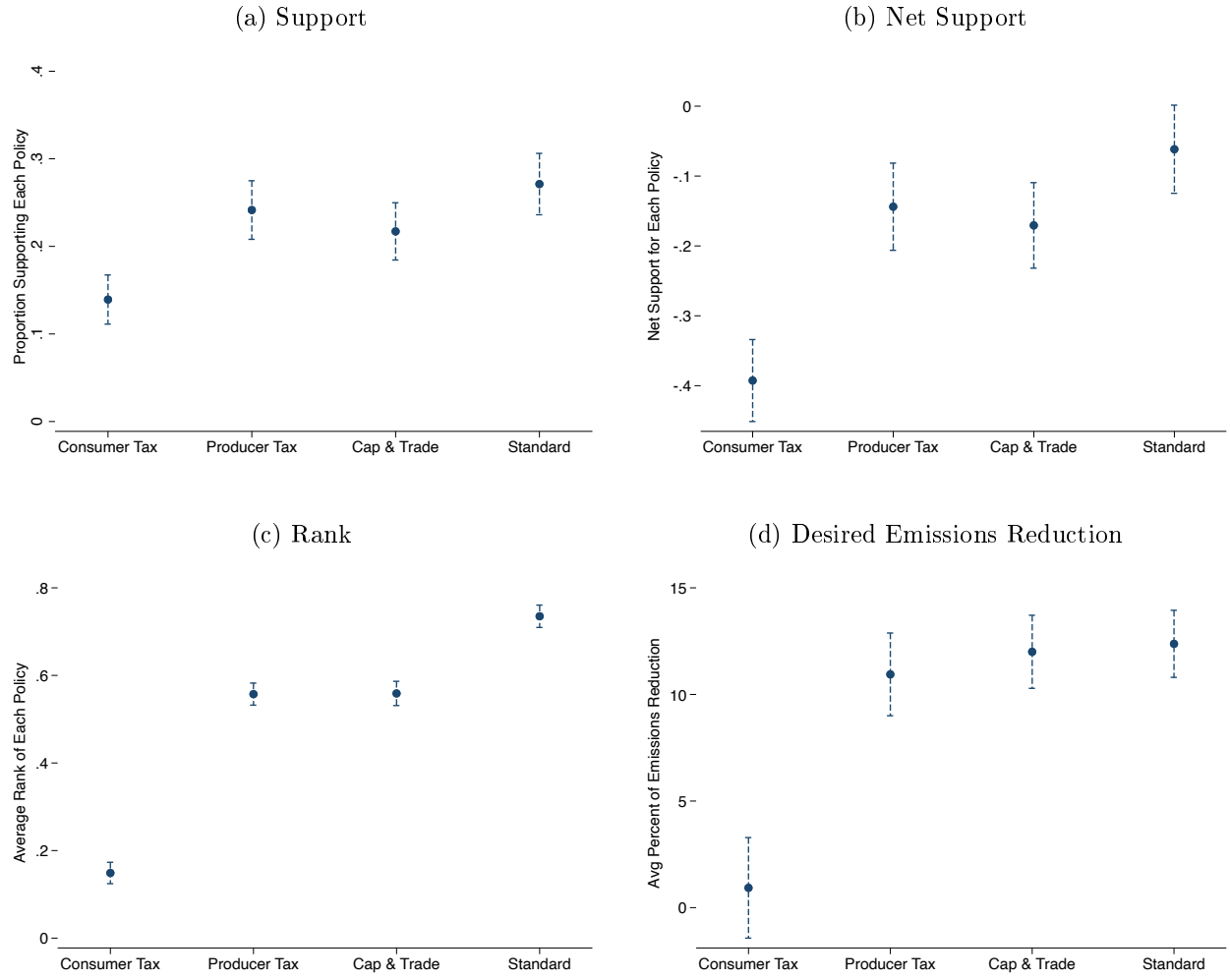
Notes: Table uses the Prolific sample that passes the screening conditions and compose our final sample. Columns (1)-(3) show the distribution of demographic characteristics across the control, pass-through treatment, and allocative efficiency treatment group. Column (4) presents the testing of the difference between the control and pass-through treatment group. Column (5) presents the testing of the difference between the control and allocative efficiency treatment group. In Columns (4)-(5), we use * for p-value < 0.1, ** for p-value < 0.05, and *** for p-value < 0.01. *Liberal* categorizes respondents who self-identify as extremely liberal, liberal, or slightly liberal (1-3 on a 7-point scale); *Conservative* categorizes respondents who self-identify as extremely conservative, conservative, or slightly conservative (5-7 on a 7-point scale). The bottom row shows the p-values of the F-test on all variables being equal between two groups.

Figure A1: Policy Preferences: Prolific Control Group



Notes: Figure uses the Prolific control group. In Panel (a), the outcome variable is an indicator for supporting each policy. In Panel (b), the outcome variable is an indicator for supporting each policy minus an indicator for not supporting this policy (1=yes, 0=not sure, -1=no). In Panel (c), the outcome variable is rank, which originally ranges from 1 to 4 for each policy and is normalized to 0-1 range (0 for ranking last and 1 for ranking first). In Panel (d), the outcome variable is the desired percent reduction in emissions the respondent chooses for each policy.

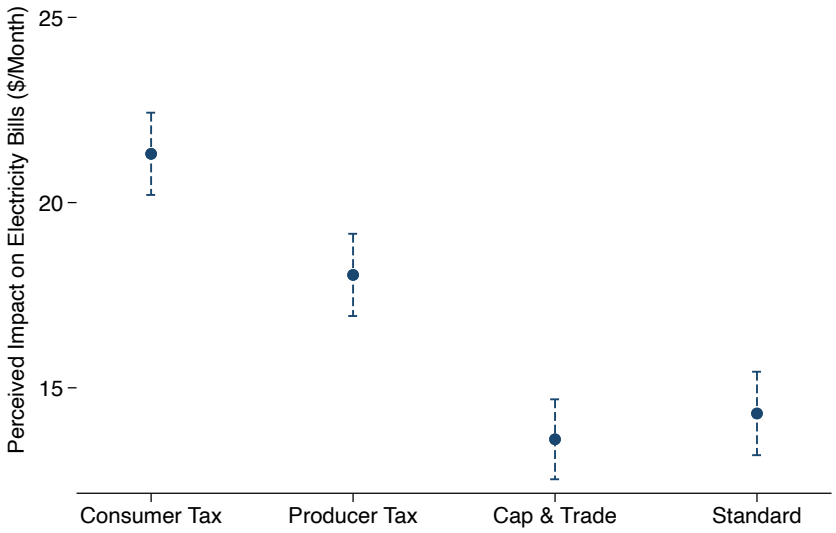
Figure A2: Policy Preferences: Control Group, Weighted



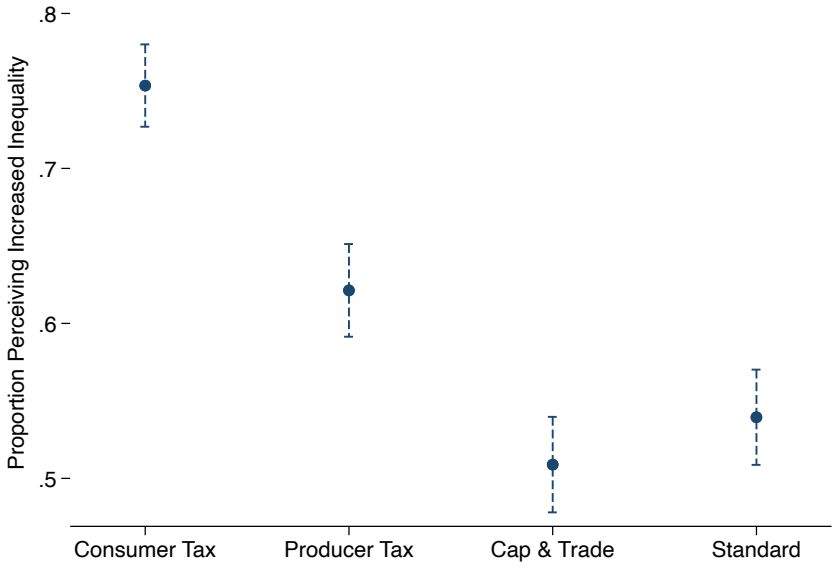
Notes: Figure uses the AmeriSpeak control group and apply the weights provided by NORC. In Panel (a), the outcome variable is an indicator for supporting each policy. In Panel (b), the outcome variable is an indicator for supporting each policy minus an indicator for not supporting this policy (1=yes, 0=not sure, -1=no). In Panel (c), the outcome variable is rank, which originally ranges from 1 to 4 for each policy and is normalized to 0-1 range (0 for ranking last and 1 for ranking first). In Panel (d), the outcome variable is the desired percent reduction in emissions the respondent chooses for each policy.

Figure A3: Perceived Effects of Policies on Electricity Bills and Inequality: Prolific Control Group

(a) Impact on Electricity Bills ($/Month)



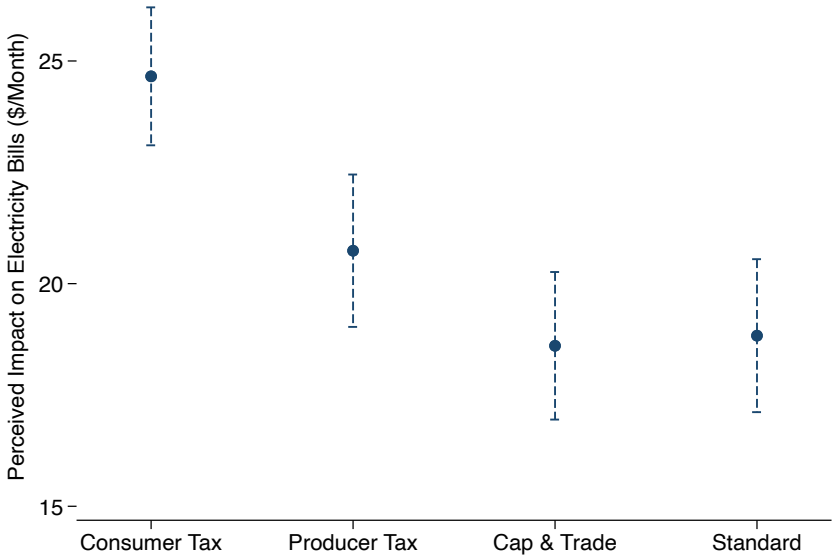
(b) Impact on Increasing Inequality



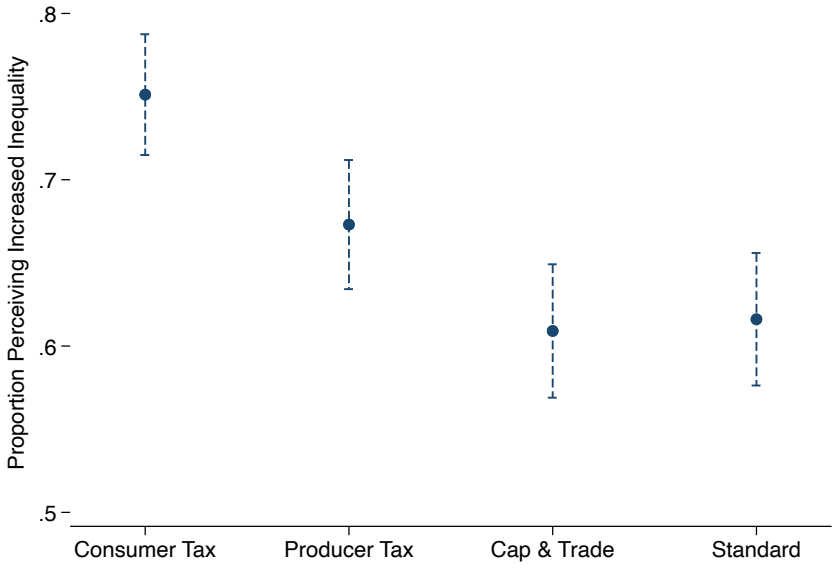
Notes: Figures use the Prolific control group. In Panel (a), the outcome variable is the perceived impact on electricity bills for each policy (in dollars). In Panel (b), the outcome variable is an indicator for believing that a policy increases inequality.

Figure A4: Perceived Effects of Policies on Electricity Bills and Inequality: Control Group, Weighted

(a) Impact on Electricity Bills ($/Month)

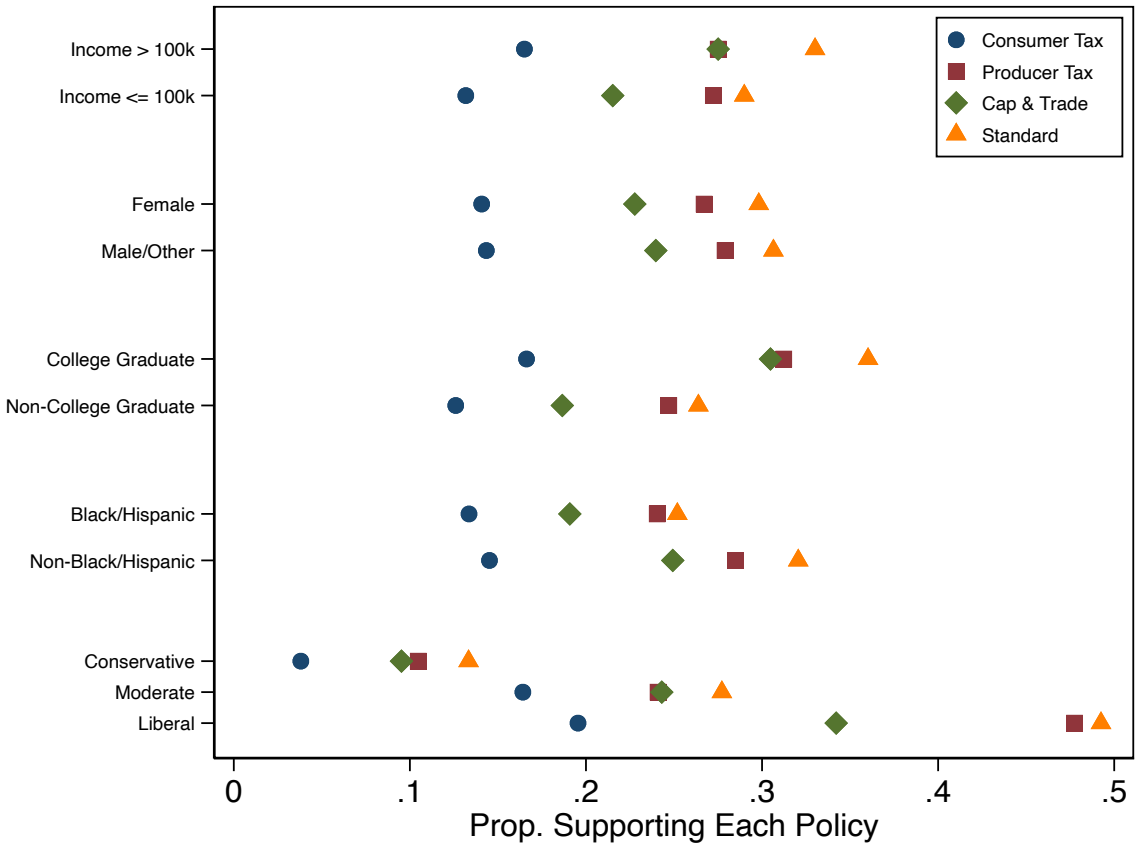


(b) Impact on Increasing Inequality



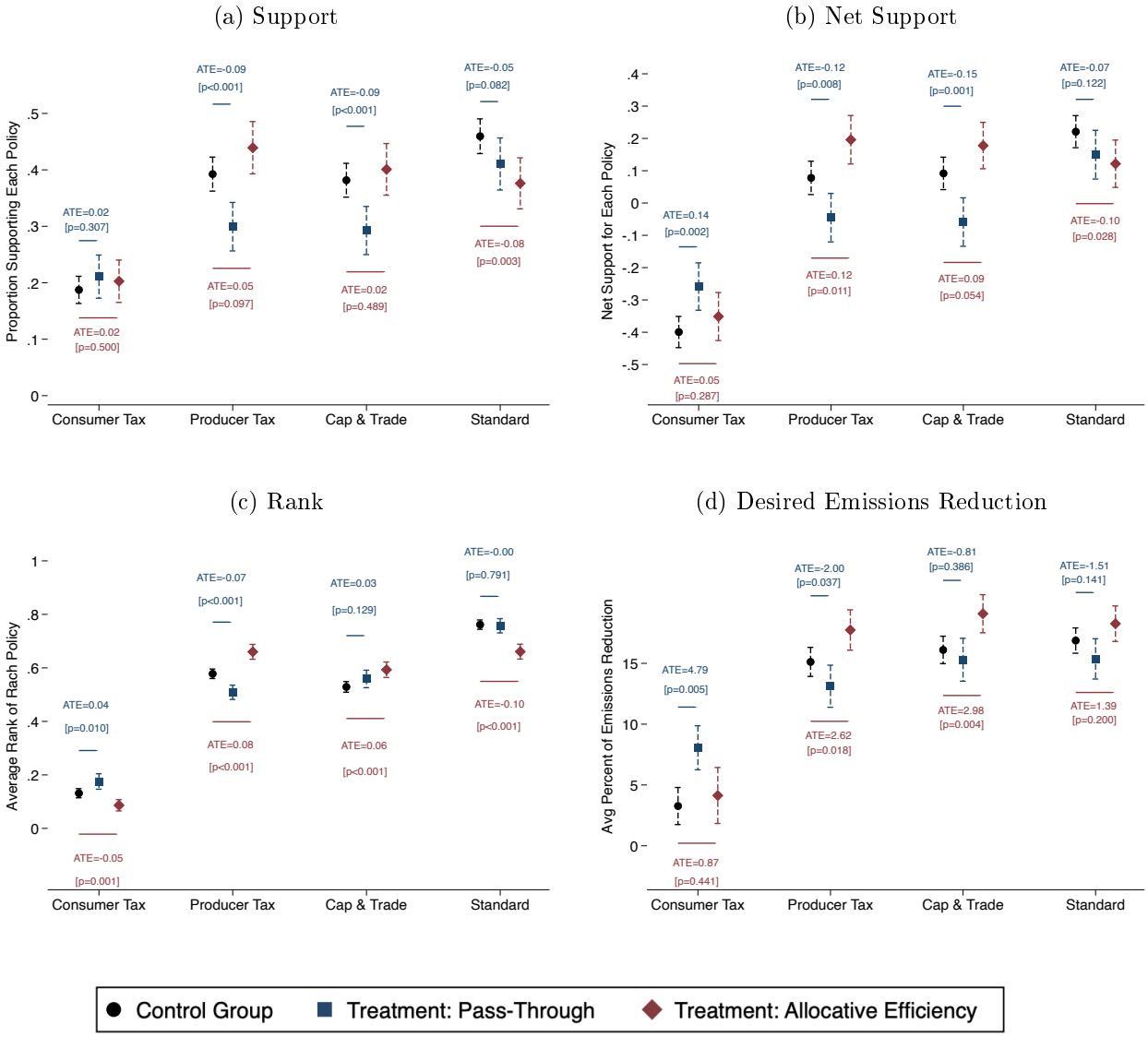
Notes: Figures use the AmeriSpeak control group and apply the weights provided by NORC. In panel (a), the outcome variable is the perceived impact on electricity bills for each policy (in dollars). In panel (b), the outcome variable is an indicator for believing that a policy increases inequality.

Figure A5: Policy Support: Heterogeneity by Demographics



Notes: The figure uses the AmeriSpeak control group. The outcome variable is an indicator for supporting each policy.

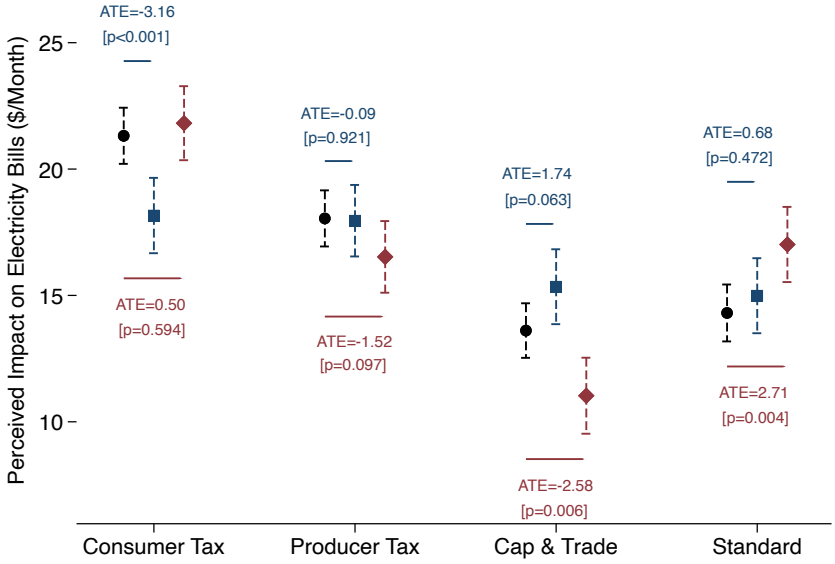
Figure A6: Effects of Treatments on Policy Preferences in Prolific



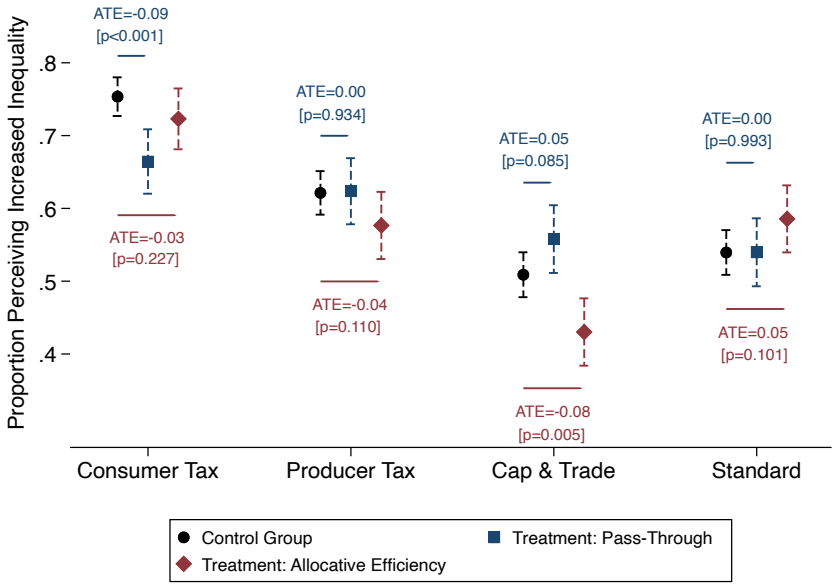
Notes: Each panel shows the effect of the indicated treatment on respondent preferences for each policy. In Panel (a), the outcome variable is an indicator for supporting each policy. In Panel (b), the outcome variable is an indicator for supporting each policy minus an indicator for not supporting this policy (1=support, 0=not sure, -1=don't support). In Panel (c), the outcome variable is rank, which originally ranges from 1 to 4 for each policy and is normalized to 0-1 range (0 for ranking last and 1 for ranking first). In Panel (d), the outcome variable is the desired percent reduction in emissions the respondent chooses for each policy. The text in each figure shows the average treatment effects (ATEs) and their p-values.

Figure A7: Effects of Treatments on Beliefs About Electricity Bills and Inequality in Prolific

(a) Impact on Electricity Bills ($/Month)

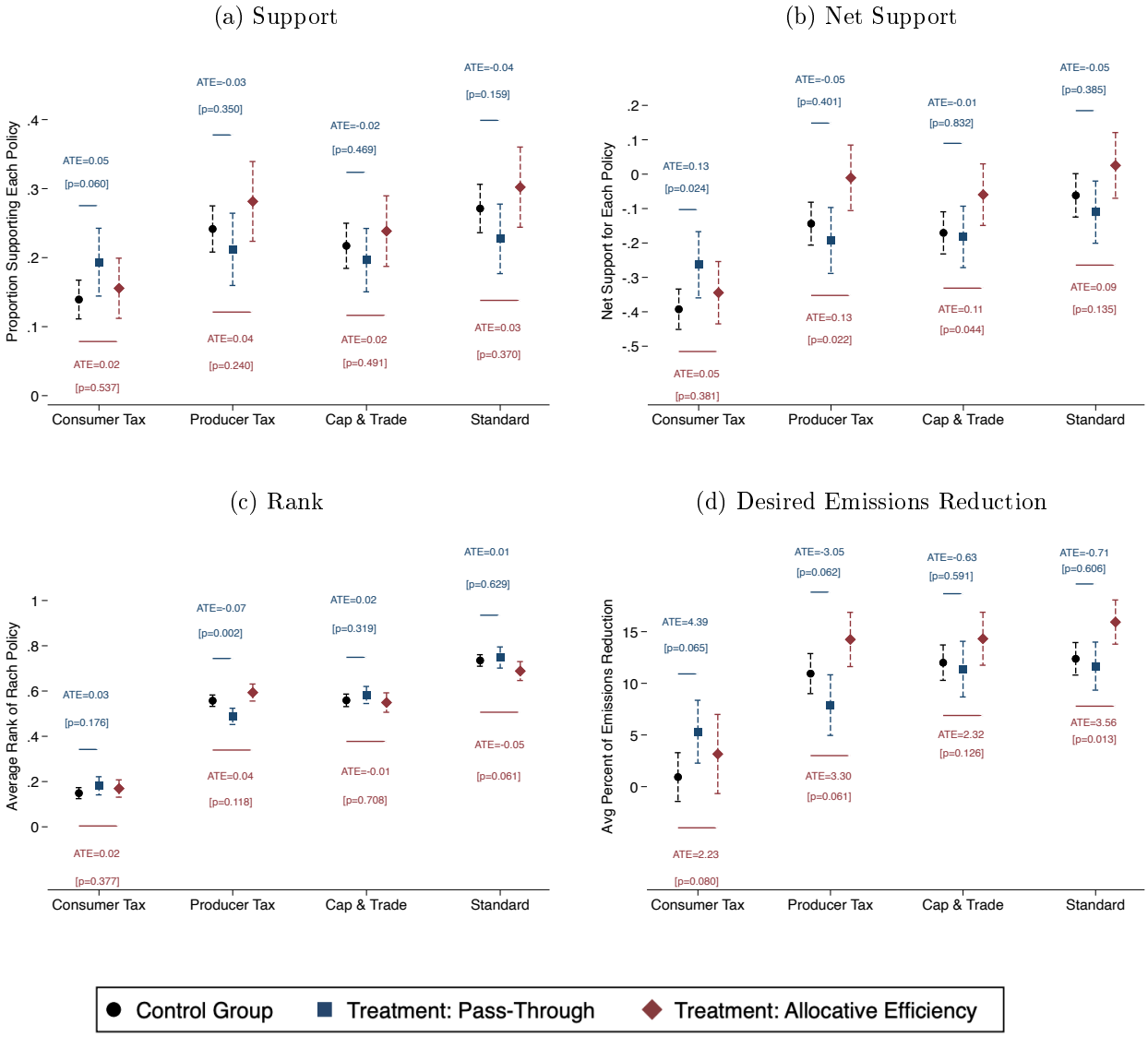


(b) Impact on Inequality



Notes: Each panel shows the effect of the indicated treatment on respondents' beliefs about how the policies affect electricity bills and inequality. For panel (a), the outcome variable is the perceived impact on electricity bills for each policy (in dollars). For panel (b), the outcome variable is an indicator for believing whether a policy increases inequality. The text shows the average treatment effects (ATEs) and their p-values.

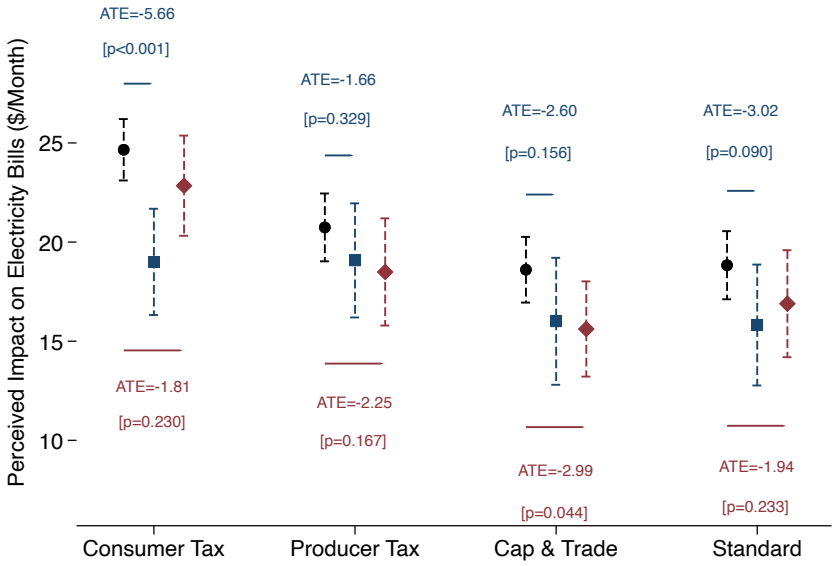
Figure A8: Effects of Treatments on Policy Preferences: Weighted



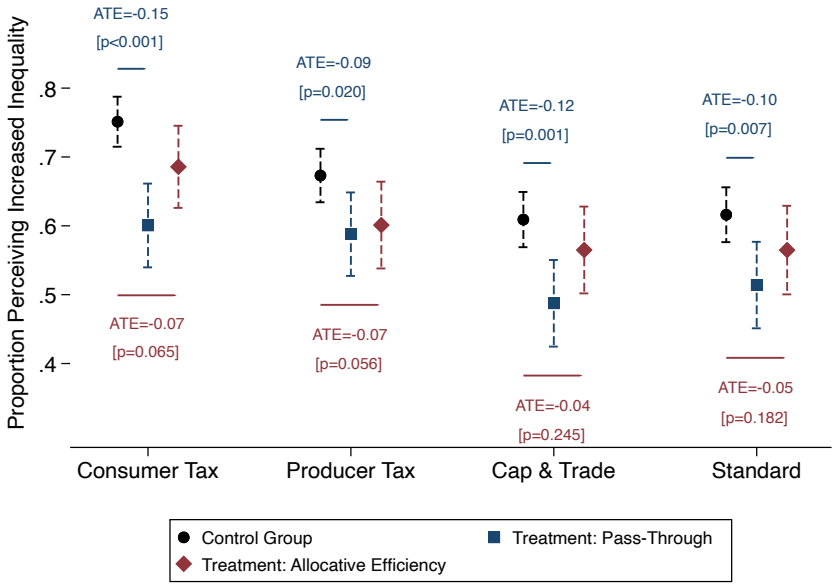
Notes: Each panel shows the effect of the indicated treatment on respondent preferences for each policy. In Panel (a), the outcome variable is an indicator for supporting each policy. In Panel (b), the outcome variable is an indicator for supporting each policy minus an indicator for not supporting this policy (1=support, 0=not sure, -1=don't support). In Panel (c), the outcome variable is rank, which originally ranges from 1 to 4 for each policy and is normalized to 0-1 range (0 for ranking last and 1 for ranking first). In Panel (d), the outcome variable is the desired percent reduction in emissions the respondent chooses for each policy. The text in each figure shows the average treatment effects (ATEs) and their p-values.

Figure A9: Effects of Treatments on Beliefs About Electricity Bills and Inequality: Weighted

(a) Impact on Electricity Bills ($/Month)

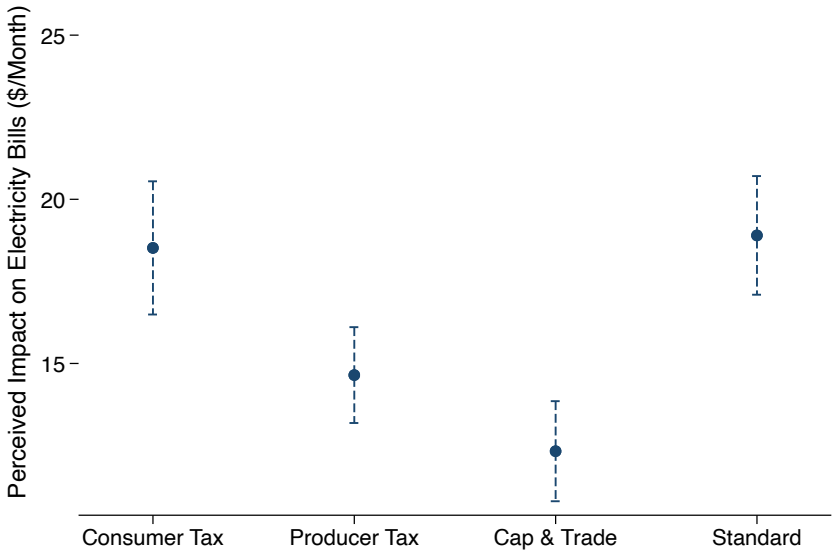


(b) Impact on Inequality



Notes: Each panel shows the effect of the indicated treatment on respondents' beliefs about how the policies affect electricity bills and inequality. For panel (a), the outcome variable is the perceived impact on electricity bills for each policy (in dollars). For panel (b), the outcome variable is an indicator for believing whether a policy increases inequality. The text shows the average treatment effects (ATEs) and their p-values.

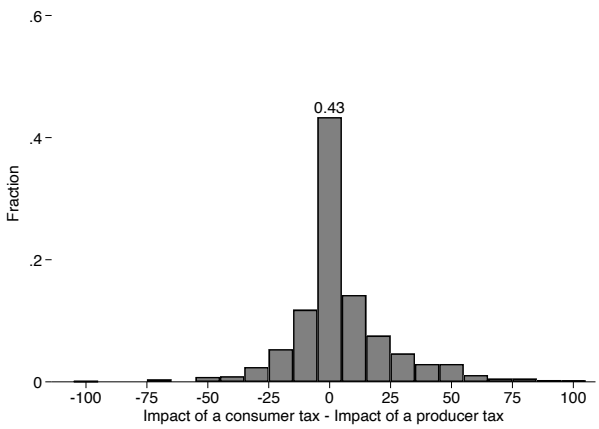
Figure A10: Experts' Perception About Impact on Electricity Bills ($/Month)



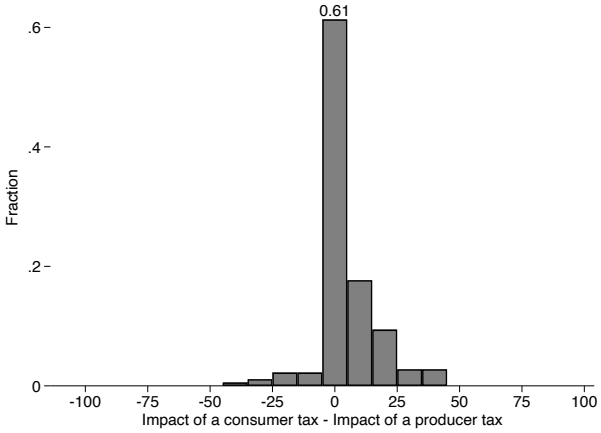
Notes: Figures use expert responses that we include in final analysis. The outcome variable is the perceived impact on electricity bills for each policy (in dollars).

Figure A11: Perceived Impacts of Consumer Versus Producer Taxes on Electricity Bills

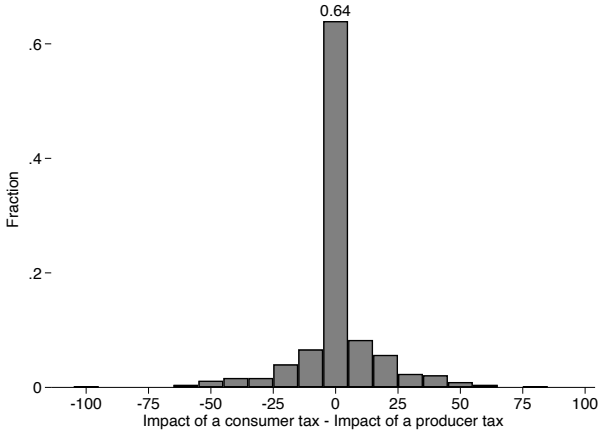
(a) Control Group



(b) Experts

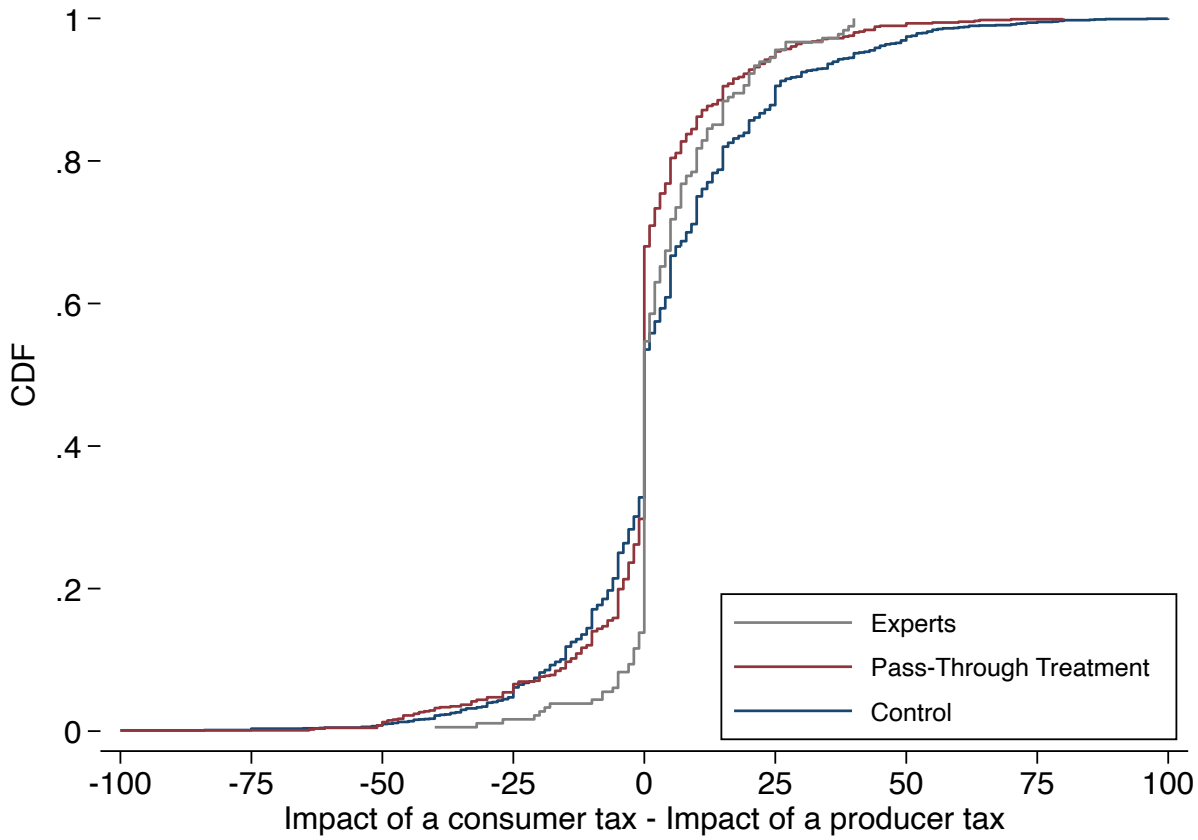


(c) Pass-through Treatment Group



Notes: Figures show the within-person difference in perceiving the impact of a consumer tax and a producer tax across different groups / samples. Each bin has width of $5. Experts include environmental economists who answered the first or second expert survey described in text. Because the second expert survey has two different displays, Panel (c) pools the sample from the first survey and the sample from the second survey that shares the same display as the first one (about half of all experts in the second survey). The total number of expert responses we analyze is 181.

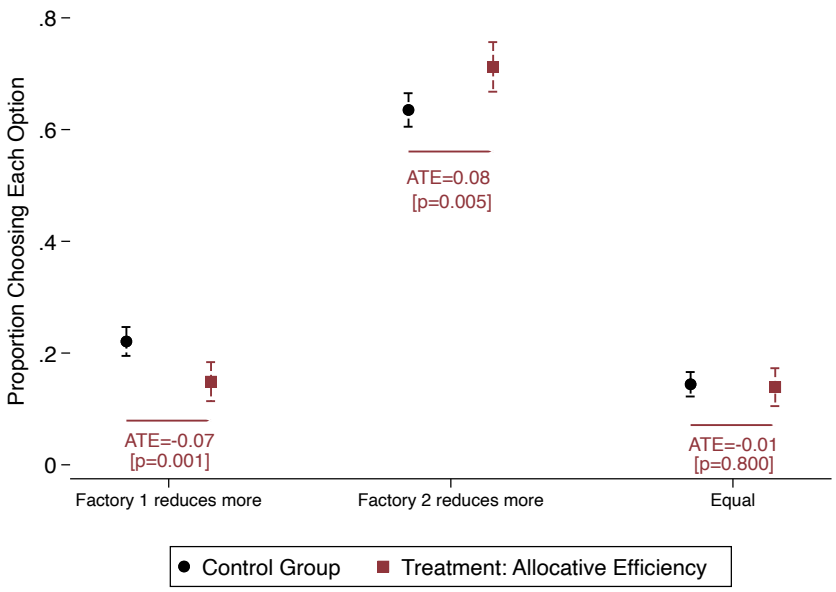
Figure A12: Perceived Impact of Consumer Versus Producer Taxes on Electricity Bills, CDF



Notes: Figure shows the within-person difference in perceiving the impact of a consumer tax and a producer tax across different groups / samples (the CDF version of Table A11). Experts include environmental economists who answered the first or second expert survey described in text. Because the second expert survey has two different displays, Panel (c) pools the sample from the first survey and the sample from the second survey that shares the same display as the first one (about half of all experts in the second survey). The total number of expert responses we analyze is 181.

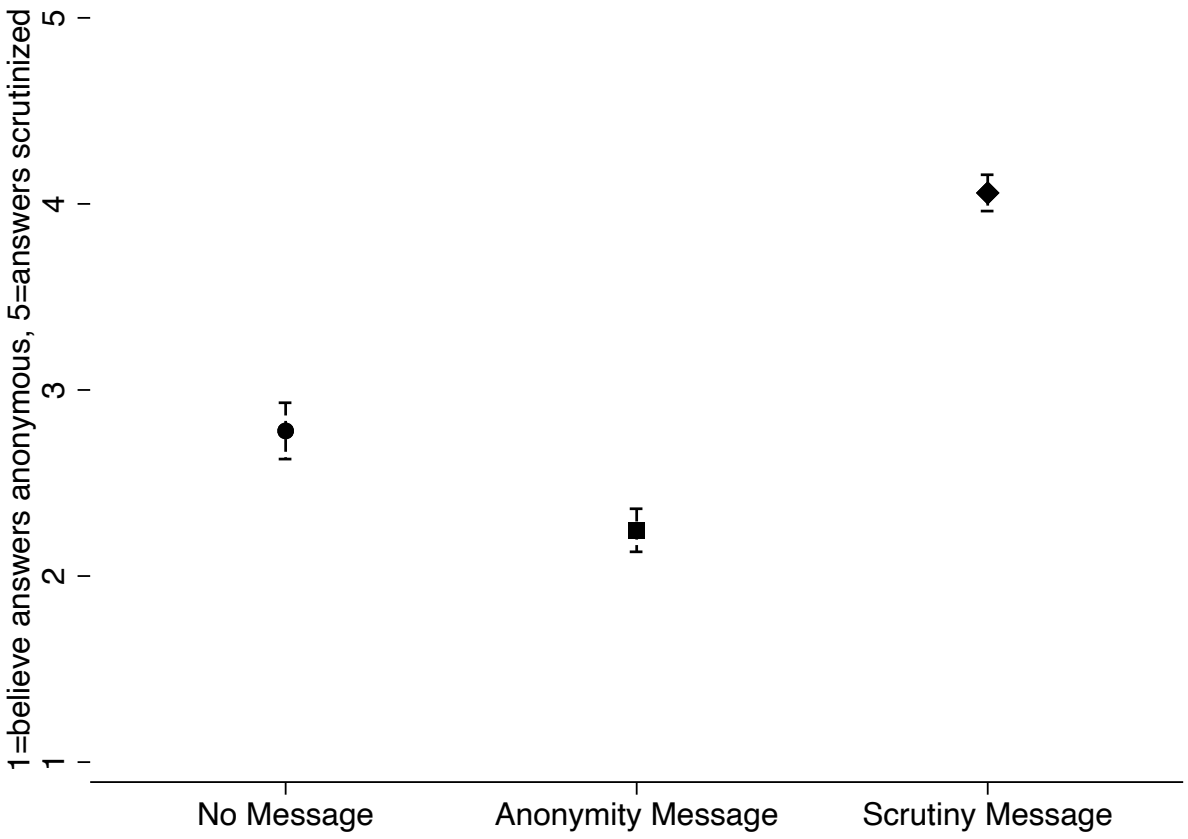
Figure A13: Effect of Treatments on Comprehension Question About Allocative Efficiency

(a) Tax on Producers



Notes: Figure uses responses from AmeriSpeak control and allocative efficiency treatment group to show the treatment effect of the video on understanding the concept of allocative efficiency. Participants were asked to consider two factories: Factory 1 is high pollution and high mariginal cost of abatement; Factory 2 is low pollution and low cost of abatement. They choose which company reduce pollution more (or equally) if the government sets a tax that requires power plants to pay for each unit of greenhouse gas emissions they emit (assuming the tax will result in a total reduction of 50 tons of emissions).

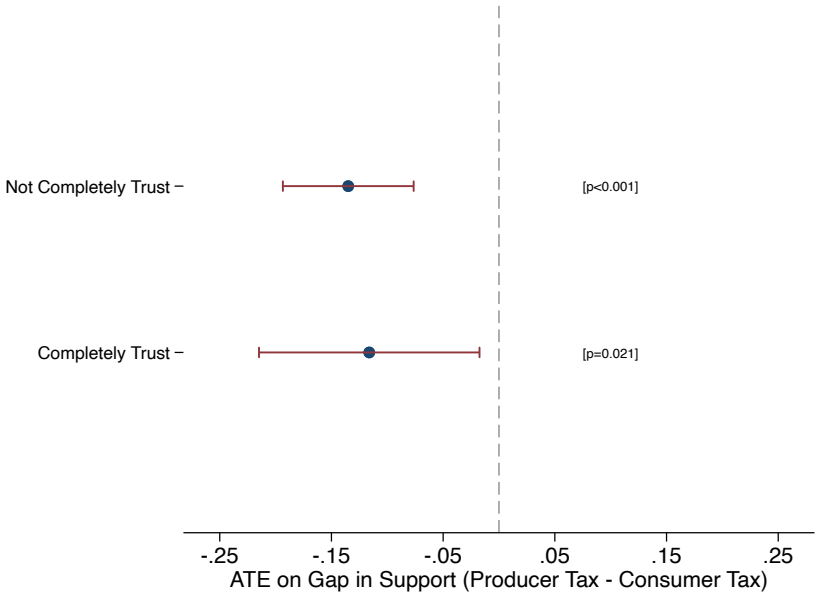
Figure A14: Effects of Anonymity and Scrutiny Treatments on Perceived Scrutiny



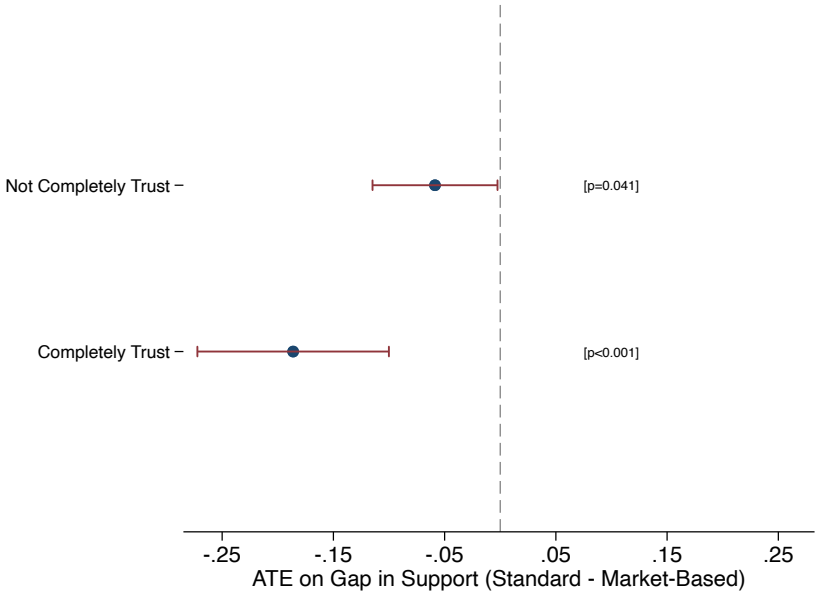
Notes: The figure shows the average belief of how much the researchers scrutinize responses (1 = believe answers are completely anonymous and 5 = believe answers are carefully scrutinized) across the three groups. The text in the figure shows the average treatment effects (ATEs) and their p-values.

Figure A15: Effect on Support for Policies, by Trust in Expert

(a) Effects of Pass-Through Treatment

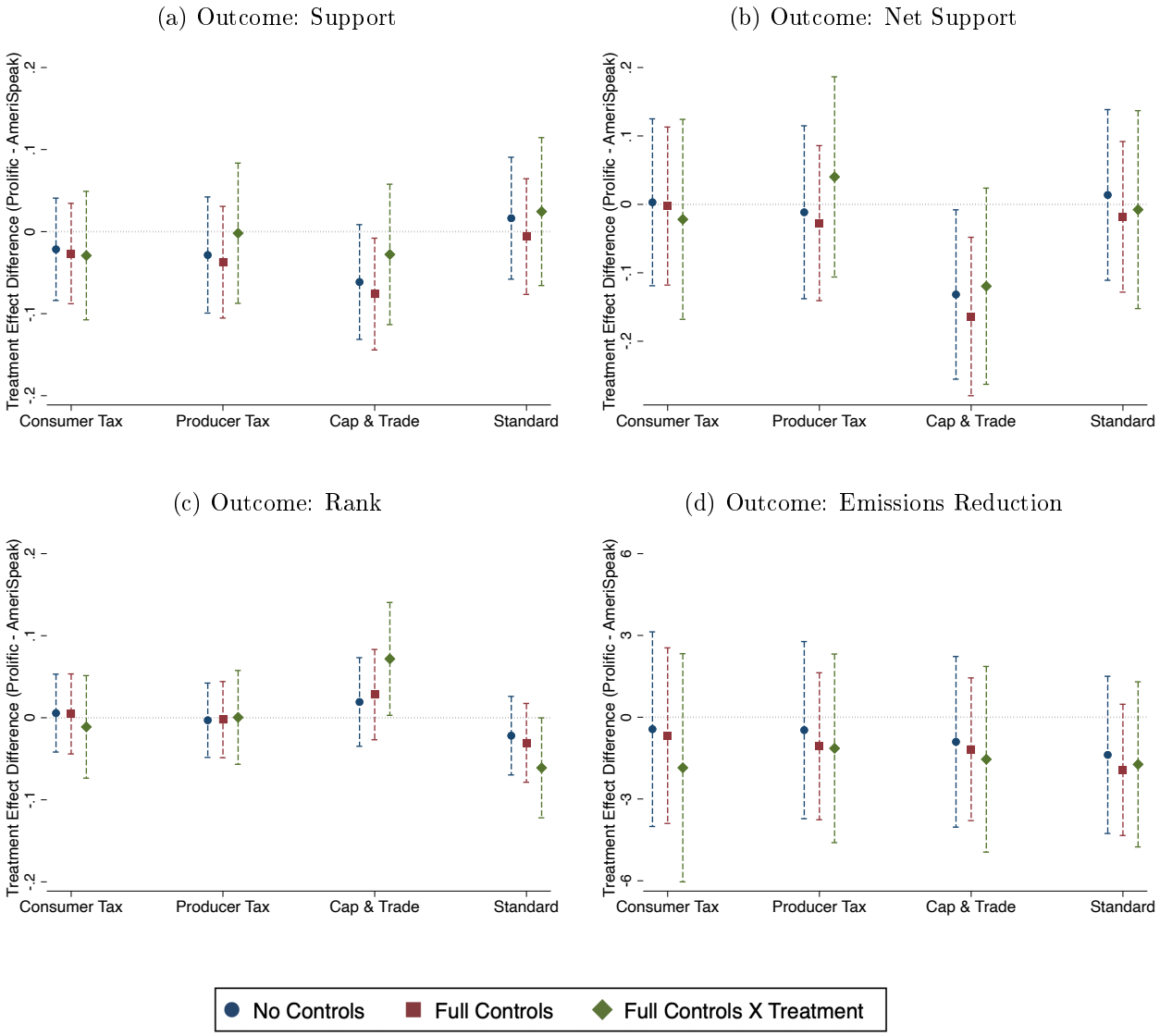


(b) Effects of Allocative Efficiency Treatment



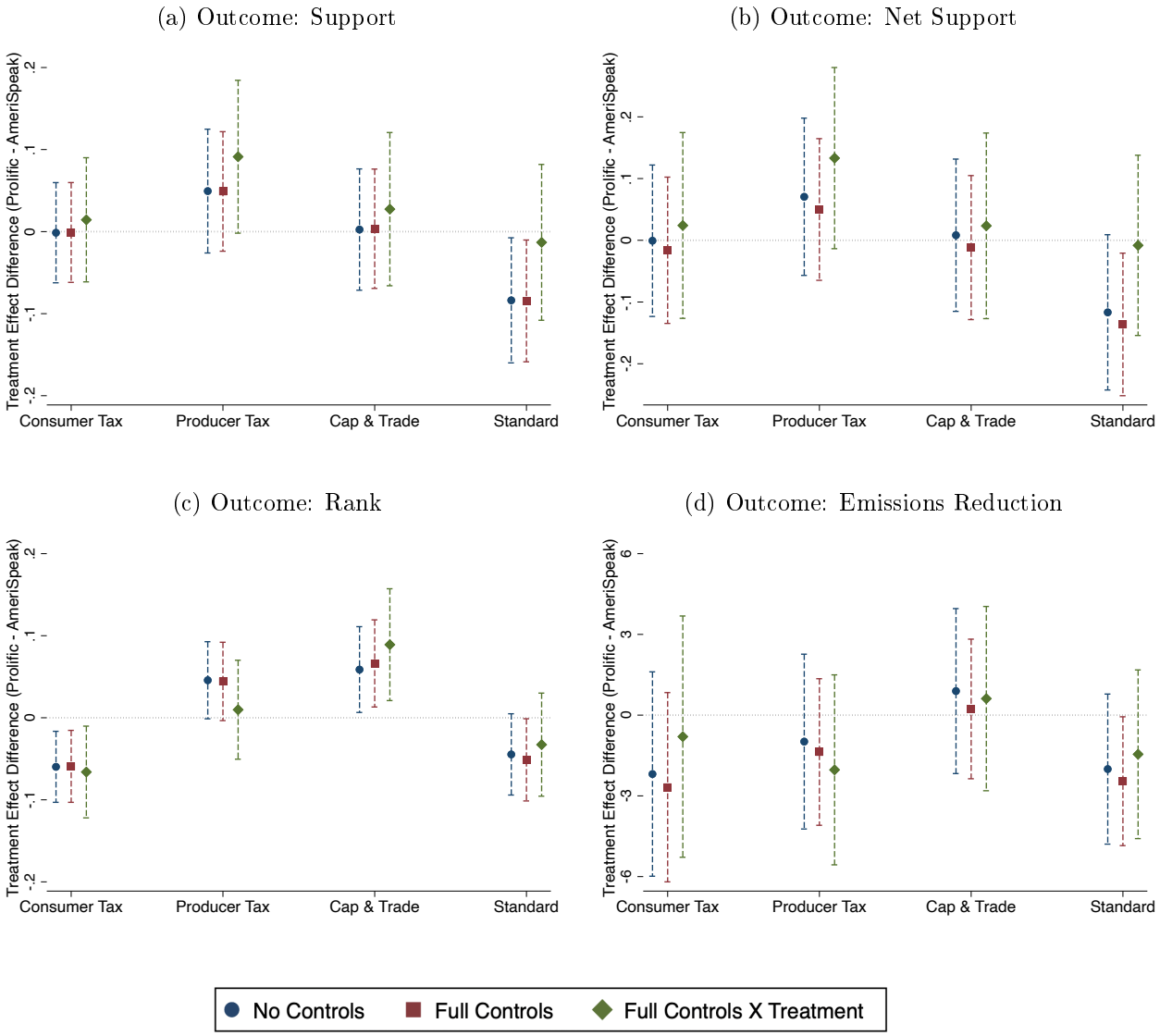
Notes: Each panel shows the effect of the indicated treatment on respondent support of the policies. The p values in the annotation are for the difference between two policies in the effect of each message treatment on the ATE of each video.

Figure A16: Difference in Pass-Through Treatment Effects (and Test Whether Controls Close the Gap)



Notes: The figures above show the difference in treatment effect between the two samples (Prolific - AmeriSpeak). In (a), the outcome variable is an indicator for supporting each policy. In (b), the outcome variable is rank, which originally ranges from 1 to 4 for each policy and is normalized to 0-1 range (0 for ranking last and 1 for ranking first). In (c), the outcome variable is the percent reduction in emissions the respondent chooses for each policy. Since the original question includes options such as no reduction or an increase in emissions and 40% or more, tobit regressions are applied with lower-censoring limit = 0 and upper-censoring limit = 40. In (d), the outcome variable is the perceived impact on electricity bills for each policy (in dollars). In (e), the outcome variable is an indicator for believing whether a policy increases inequality. The two treatments are watching a video on pass-through and watching a video on allocative efficiency. Demographic controls include gender, age, race, education level, marital status, employment status, household income, political party affiliation, and ideology. Additional controls include the opinion about the role of government intervention on environmental protection and financial literacy. Below each panel, the results of testing the joint hypothesis of no difference in the treatment effect of all policies (all four coefficeints = 0) with or without control are displayed. Testing the joint hypothesis of no difference in treatment effect across all policies and outcomes (all twenty coefficients = 0) gives a p-value of 0.3111 without controls, a p-value of 0.2396 with full controls, and a p-value of 0.3939 when treatment effects are interacted with controls.

Figure A17: Difference in Allocative-Efficiency Treatment Effects (and Test Whether Controls Close the Gap)



Notes: The figures above show the difference in treatment effect between the two samples (Prolific - AmeriSpeak). In (a), the outcome variable is an indicator for supporting each policy. In (b), the outcome variable is rank, which originally ranges from 1 to 4 for each policy and is normalized to 0-1 range (0 for ranking last and 1 for ranking first). In (c), the outcome variable is the percent reduction in emissions the respondent chooses for each policy. Since the original question includes options such as no reduction or an increase in emissions and 40% or more, tobit regressions are applied with lower-censoring limit = 0 and upper-censoring limit = 40. In (d), the outcome variable is the perceived impact on electricity bills for each policy (in dollars). In (e), the outcome variable is an indicator for believing whether a policy increases inequality. The two treatments are watching a video on pass-through and watching a video on allocative efficiency. Demographic controls include gender, age, race, education level, marital status, employment status, household income, political party affiliation, and political ideology. Additional controls include the opinion about the role of government intervention on environmental protection and financial literacy. Below each panel, the results of testing the joint hypothesis of no difference in the treatment effect of all policies (all four coefficeints = 0) with or without control are displayed. Testing the joint hypothesis of no difference in the treatment effect across all policies and outcomes (all twenty coefficients = 0) gives a p-value of 0.0016 without controls, a p-value of 0.0014 with full controls, and a p-value of 0.1082 when treatment effects are interacted with controls.

B Text for Expert Survey Invitation

Our expert survey used the following email invitation or minor variations:

> Hi {firstname},
>
> I hope all is well. To support a paper I'm writing on the political economy of environmental policy, it would be a big help if you could take the following 5-minute survey:
>
> {qualtrics link}
>
> I'm emailing because you are an EEEE (expert in environmental/energy econ); please don't forward this invite. Your responses will be anonymous, including from us the researchers, unless you choose to provide your name at the end.
>
> Thanks much and very happy to discuss the research at some point.

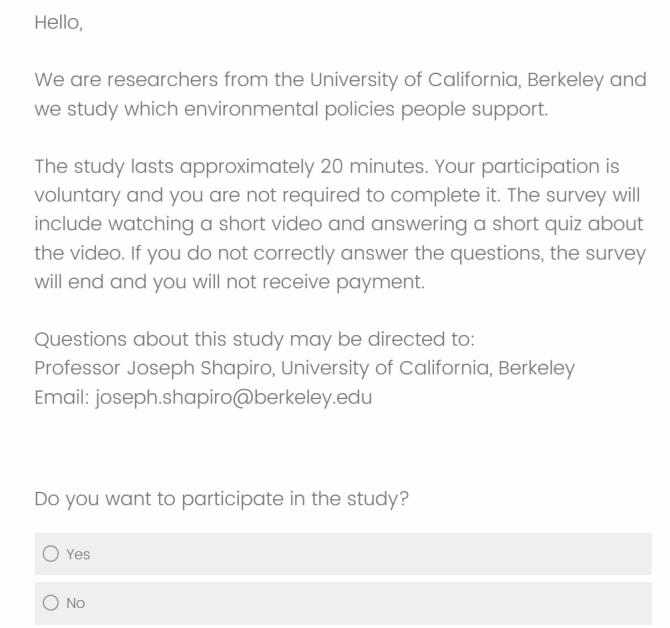
C Survey Instrument

In this section, we present screenshots of our survey experiments. The section organization roughly follows the order in which screens were presented to participants. Section C.1 shows the introductory screens of our survey. Section C.2 shows how the policies were explained to the participants. Section C.3 shows the quiz respondents had to take after reading the policy descriptions. Section C.4 shows screenshots shown to treated participants. Section C.5 shows the hypothetical policy scenarios and questions eliciting beliefs and support for policies. Sections C.6 and C.7 show additional allocative efficiency and opinion questions. Section C.8 shows the financial literacy questions.

C.1 Introduction

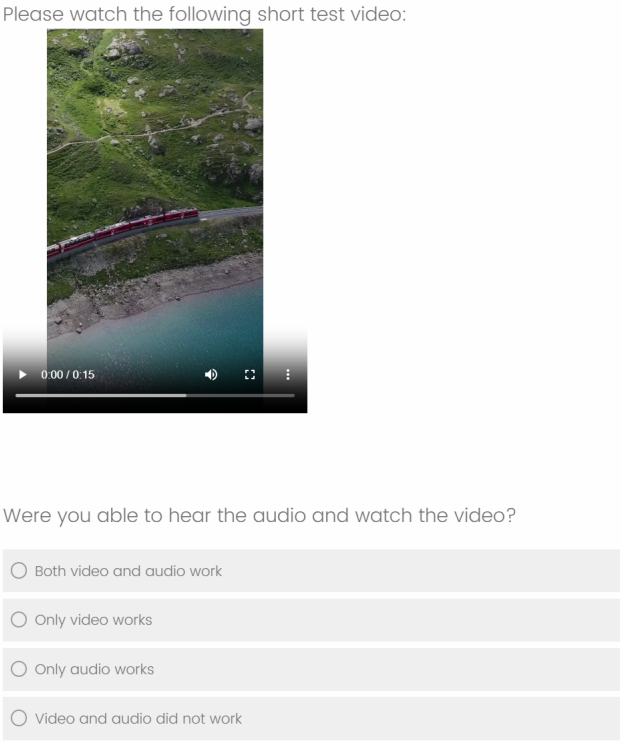
Participants were shown an introductory screen that gave them the expected duration of the study and informed them that participation was voluntary. Participants were informed that the survey required them to watch a video and that they should take it another time if they were unable to watch a video at the moment. They were also provided with contact information of one of the researchers.

Figure A18: Introduction screen and consent form



Participants were presented with a test video, and were screened out if they reported being unable to see the video or hear the audio.

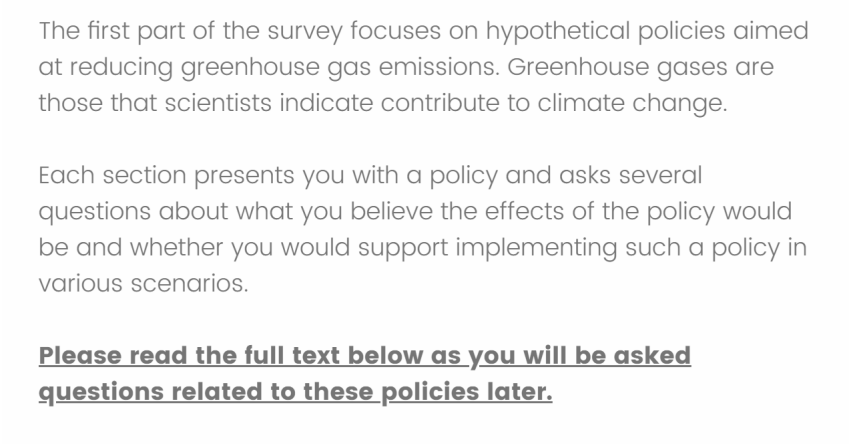
Figure A19: Test video



C.2 Policy descriptions

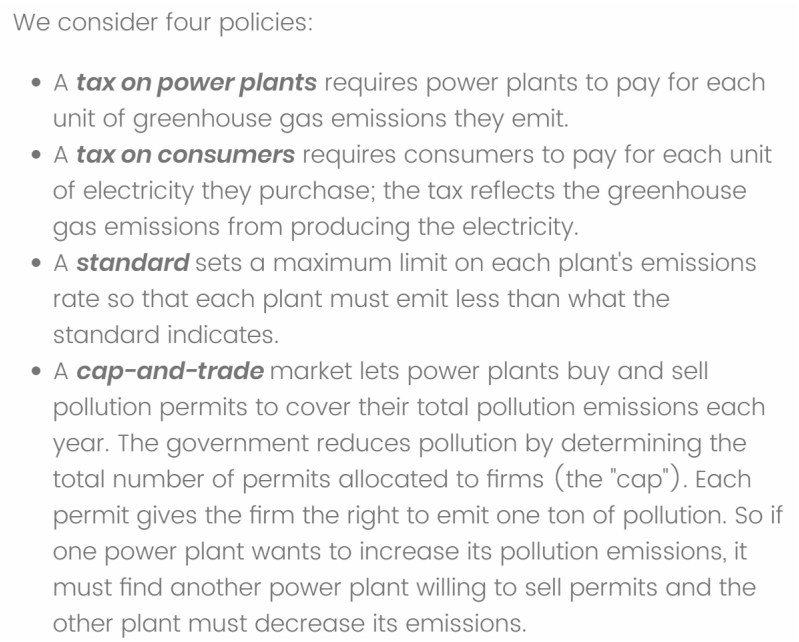
Participants were told that the survey would ask about their beliefs on the effects of a series hypothetical polices aimed at reducing greenhouse gas emissions. Participants were asked to carefully read the policy descriptions and informed that they would be asked questions regarding those policies later.

Figure A20: Policy descriptions 1



Participants were then shown descriptions for each of the policies covered in the study.

Figure A21: Policy descriptions 2



C.3 Policy quiz

Participants were then asked several questions to assess the degree to which they understood the policy descritpions. Participants were allowed to read the policy definitions again by clicking a hyperlink.

Figure A22: Policy descriptions quiz 1

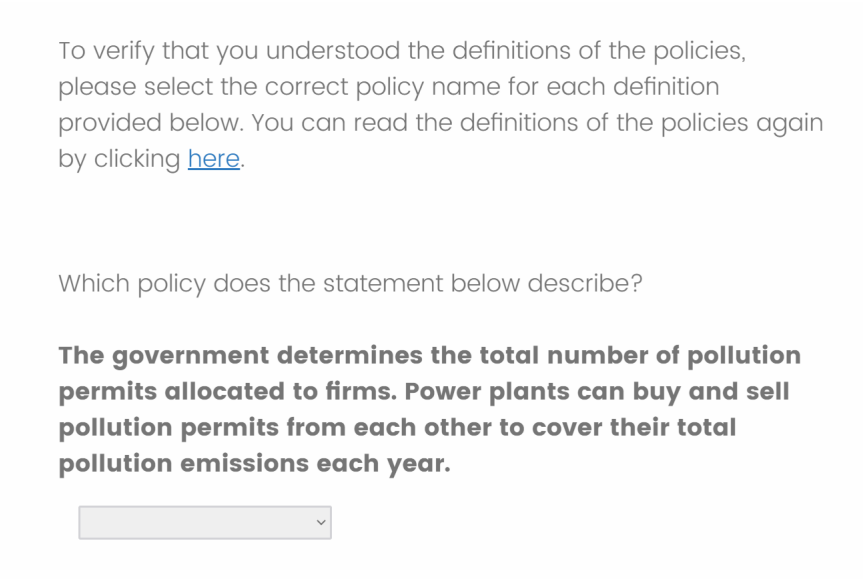
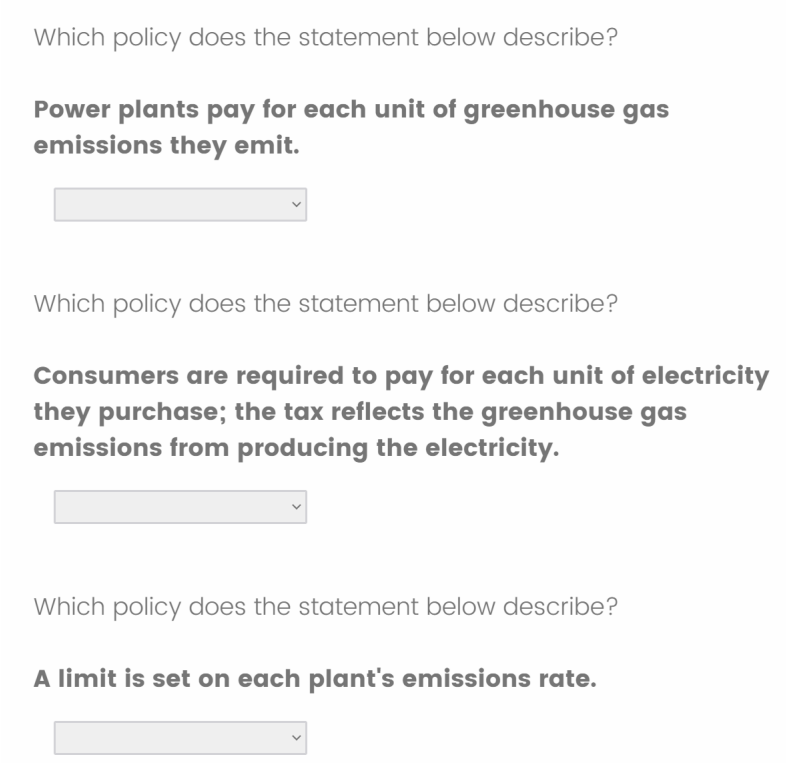


Figure A23: Policy descriptions quiz 2



Participants who failed to answer the quiz questions correctly were given another opportunity to correct their answers. Those who failed twice were screened out of the experiment.

C.4 Treatment videos

Participants in the treatment groups were shown the video corresponding to their treatment after answering the policies quiz. Participants were informed that they would have to answer some questions regarding the content of the video and that answering correctly was required to complete the study. They were also informed about the duration of the video and that the button to continue the survey would show up after that time.

Figure A24: Pass-through video

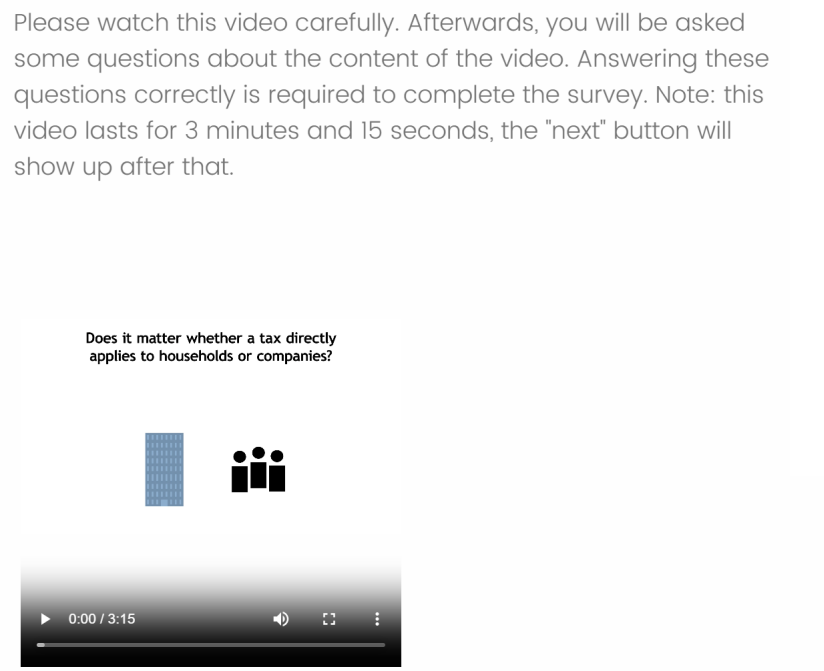
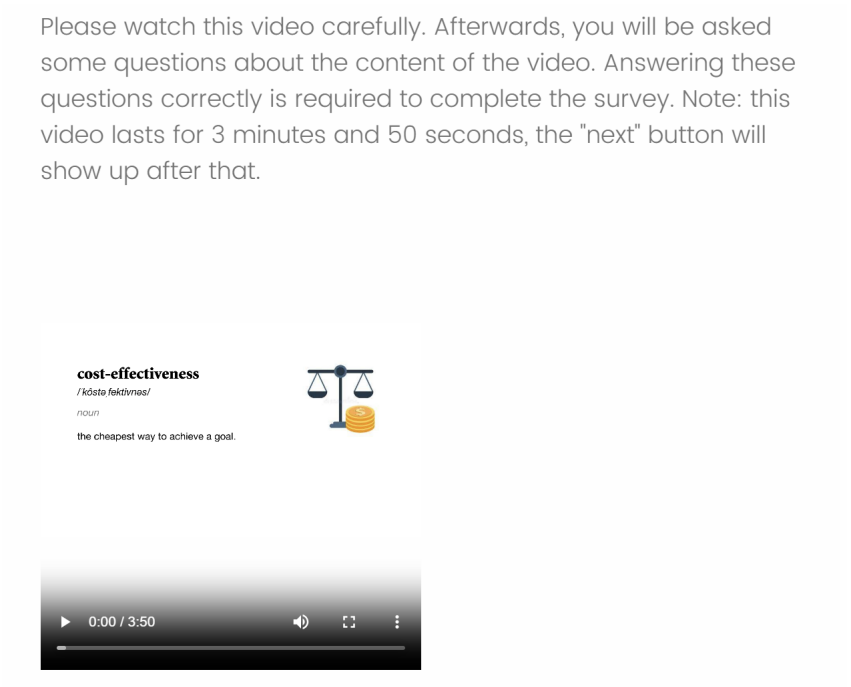


Figure A25: Allocative efficiency video



Participants then had to answer two questions regarding the content of their corresponding videos.

Figure A26: Allocative efficiency quiz

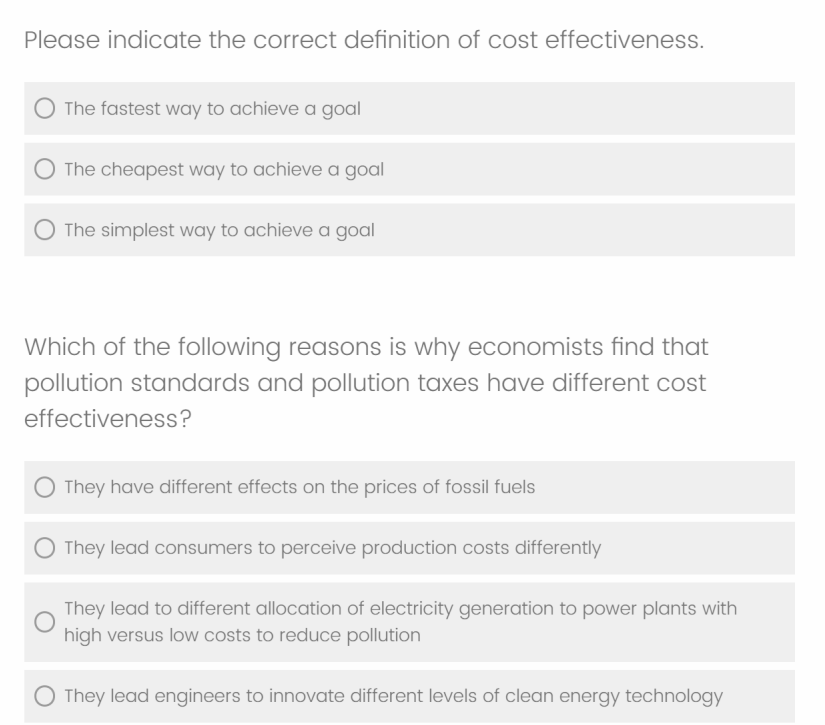
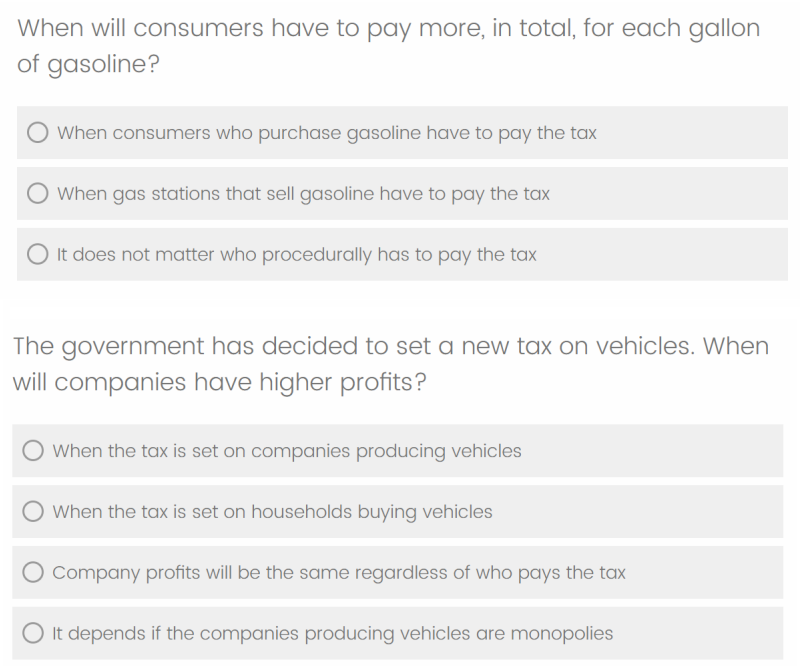
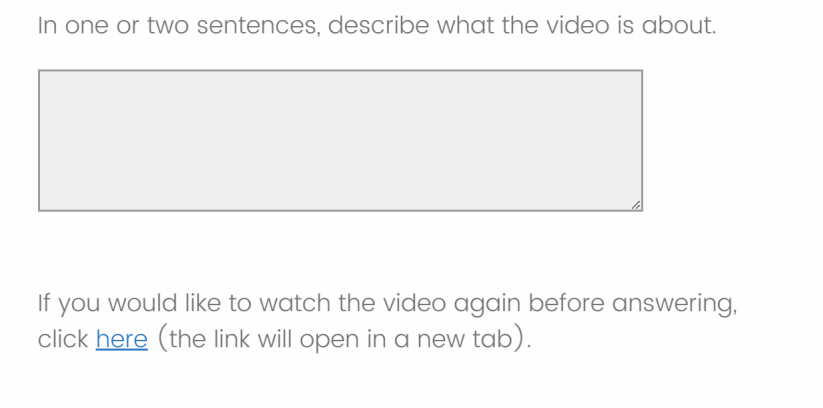


Figure A27: Pass-through quiz



After both video-specific quizzes, participants had to answer an open-ended question asking them to briefly describe what the video was about.

Figure A28: Quiz text entry question



C.5 Policy scenarios questions

Participants were shown a scenario for each of the policies being implemented to reduce emissions by 20 percent by the year 2026. The order in which policy scenarios were presented was randomized.

Figure A29: Policy scenarios - Tax on power plants

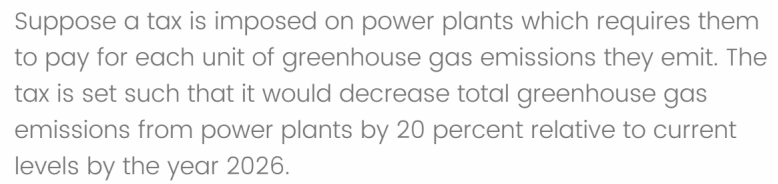


Figure A30: Policy scenarios - Tax on consumers

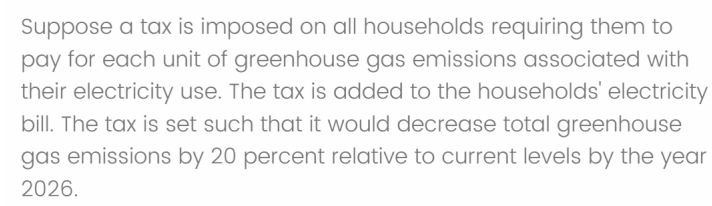


Figure A31: Policy scenarios - Standard

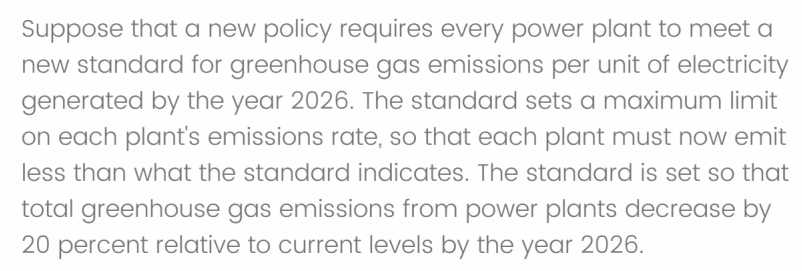
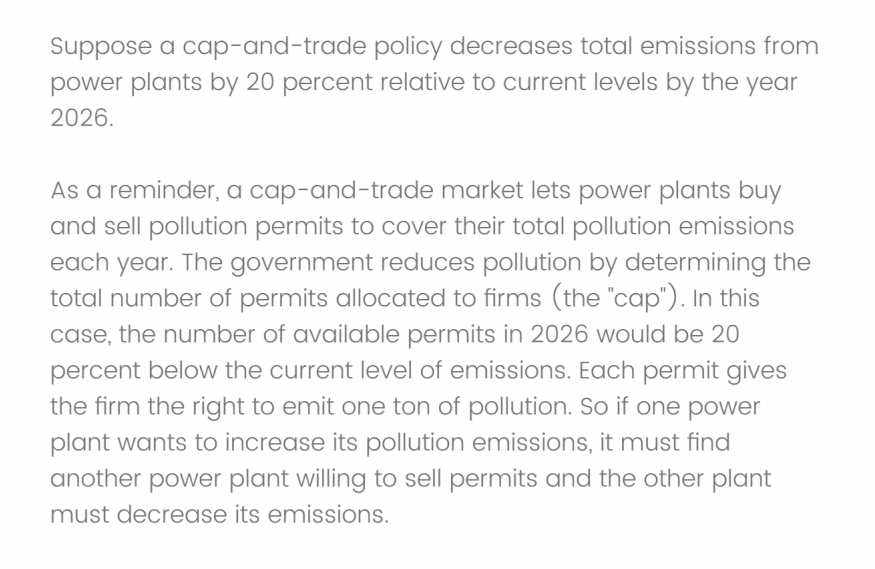
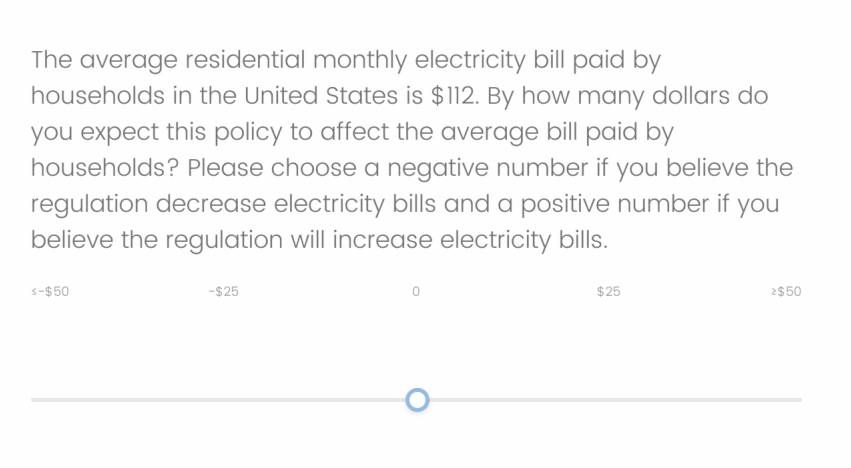


Figure A32: Policy scenarios - Cap and trade



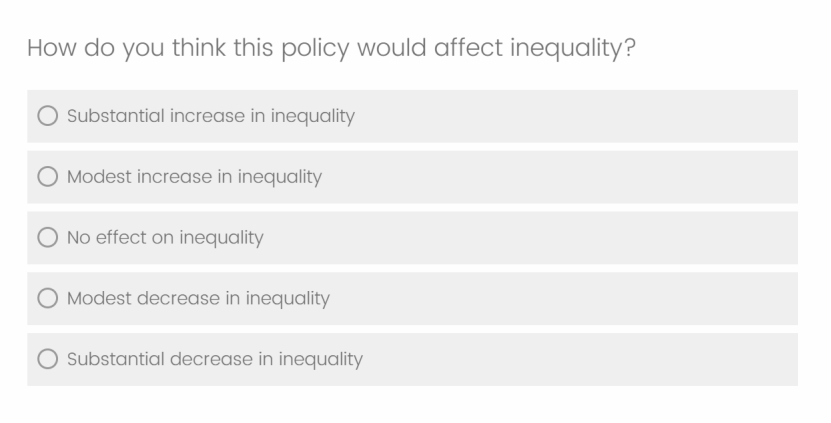
After each of the policy scenarios, participants were asked to report their belief about how such a policy would affect the cost of electricity bills using a slider.

Figure A33: Effect on electricity bills



Then, participants were asked about their beliefs about how such a policy would affect inequality.

Figure A34: Effect on inequality



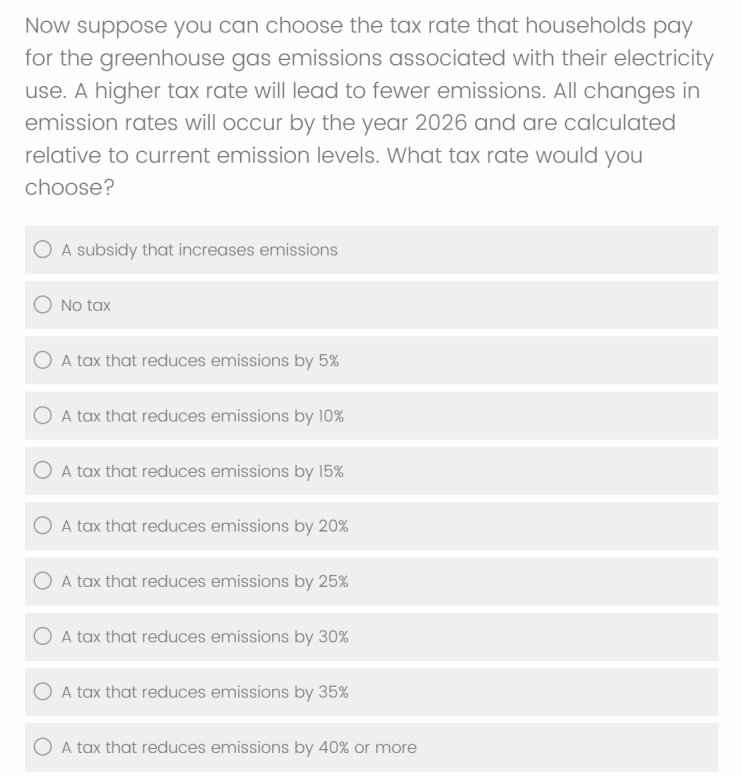
Then, participants were asked whether they would support such a policy.

Figure A35: Policy support



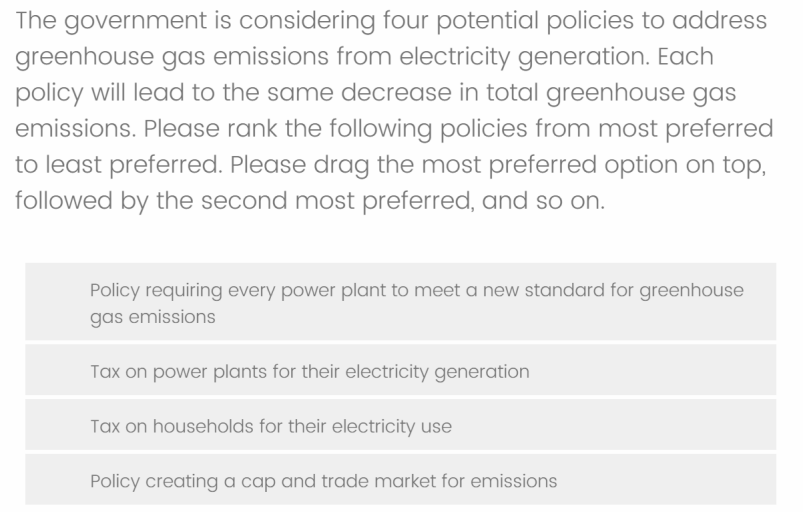
Finally, participants were asked what level of emissions reductions they would choose if they could implement each of the policies (this example is for a tax on consumers).

Figure A36: Emissions choice



Participants were then asked to rank each of the four policies from most preferred to least preferred.

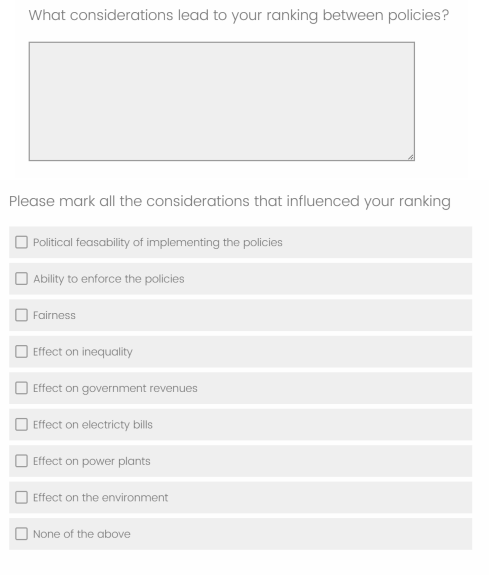
Figure A37: Ranking policies



Participants were then asked what considerations led to their ranking. They first answered an open-ended question and then in the next page could choose all the relevant

considerations among several options.

Figure A38: Ranking considerations



C.6 Additional allocative efficiency question

Participants were then presented with a hypothetical scenario to assess their understanding of the concept of allocative efficiency. We presented them with a situation with two power plants, one with high levels of pollution and high marginal cost of abatement and the other with low levels of pollution and low marginal cost of abatement. We then presented them with two scenarios, one in which the government introduces a standard and in the other a tax on power plants. We asked respondents which plant they think would reduce more emissions in each scenario.

Figure A39: Hypothetical scenario - standard

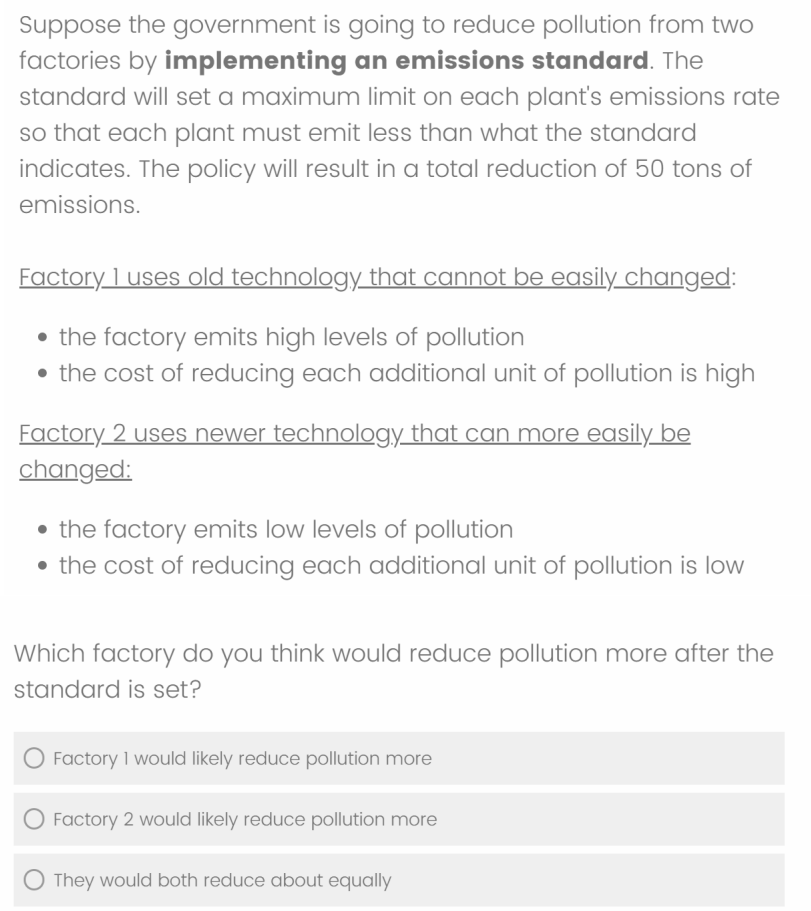
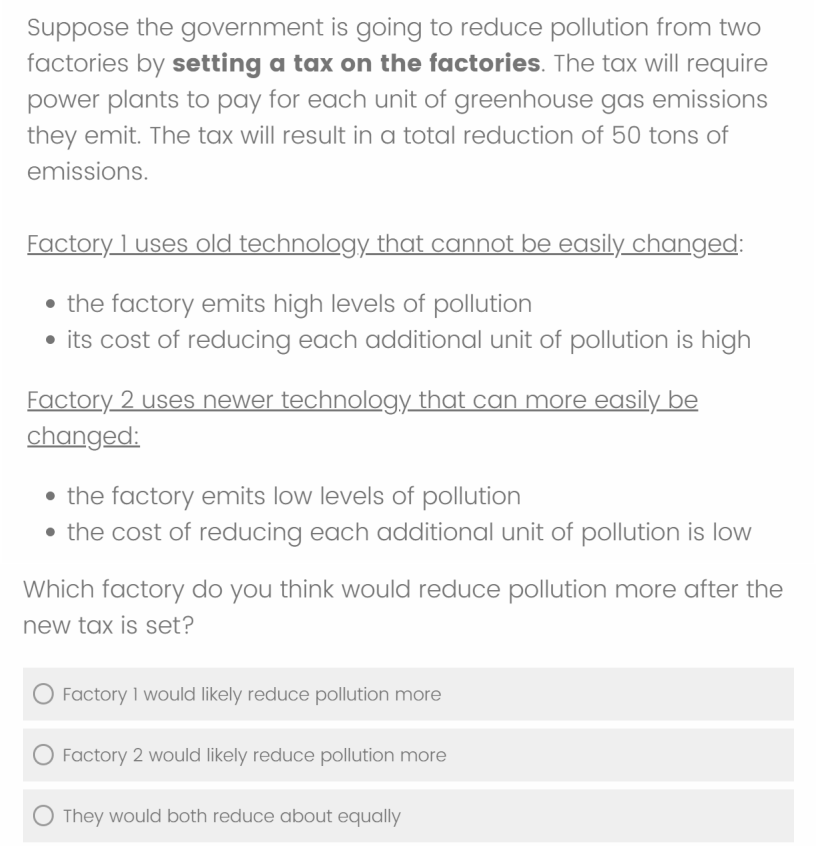


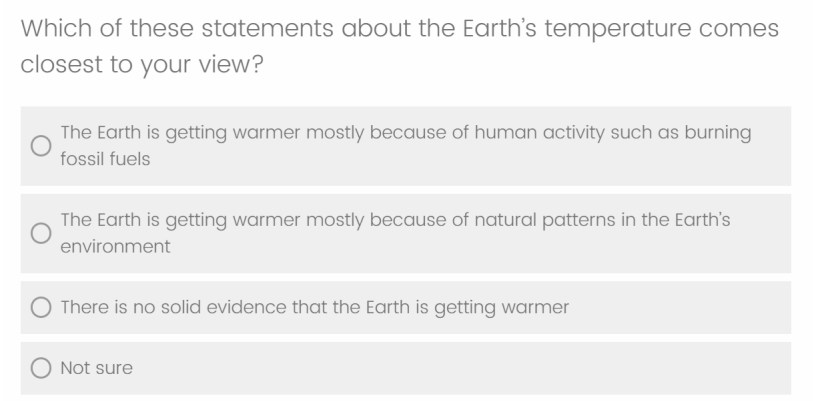
Figure A40: Hypothetical scenario - tax



C.7 Opinion questions

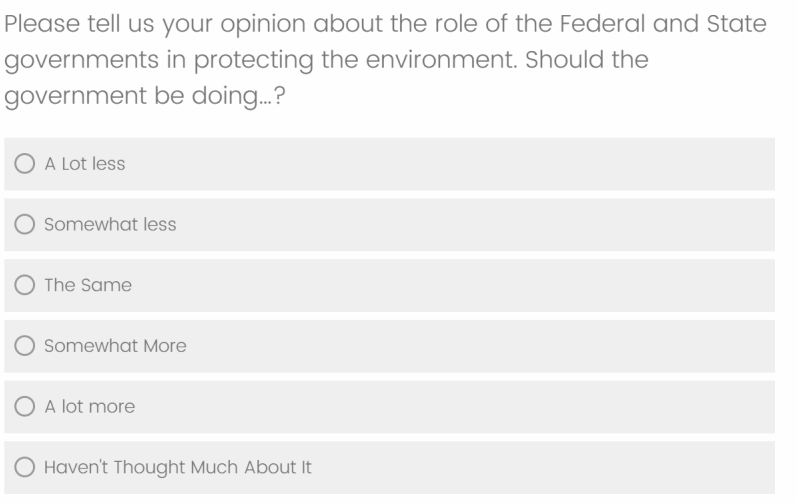
Participants then were asked several opinion questions regarding climate change and government policy. We first asked respondents whether they thought Earth's warming is caused mostly by human activity or natural patterns.

Figure A41: Opinion on climate change



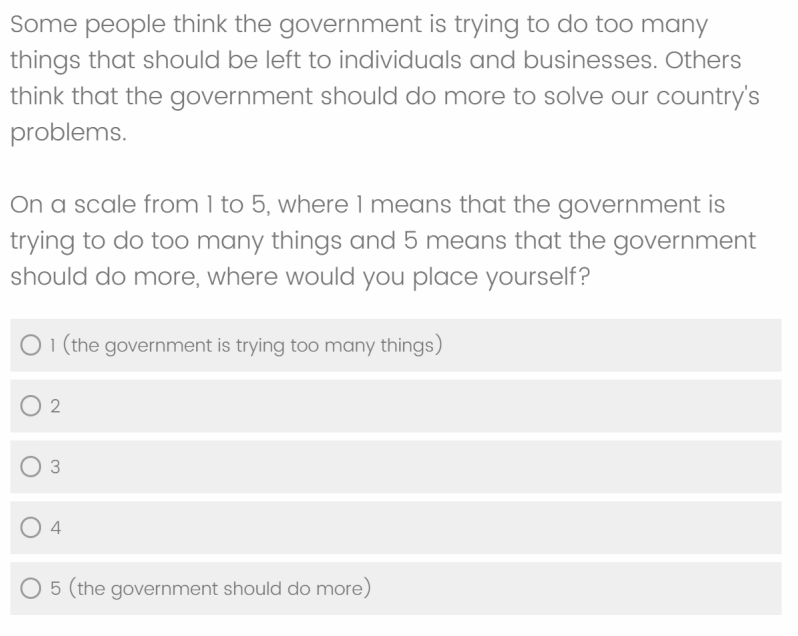
We then asked them whether they thought that the Federal and State governments should do more or less for protecting the environment.

Figure A42: Opinion on environmental government policy



We then asked them whether they thought that the government should do more or less to solve society's problems.

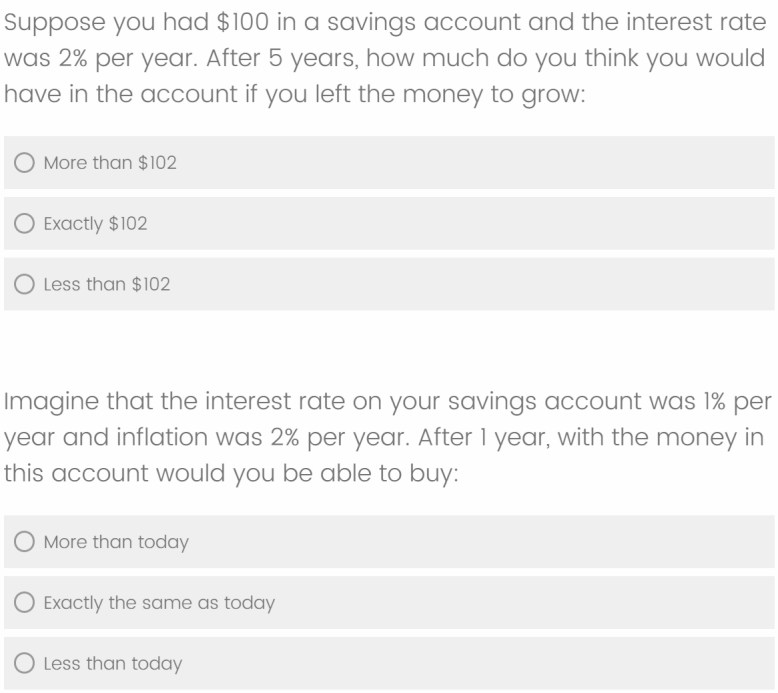
Figure A43: Opinion on government policy



C.8 Financial literacy questions

We then asked respondents a series of questions to assess their degree of financial literacy. We first asked them simple questions to assess their understanding of interest and inflation.

Figure A44: Financial literacy - interest



We then asked them a question to assess their understanding of investment risk and diversification:

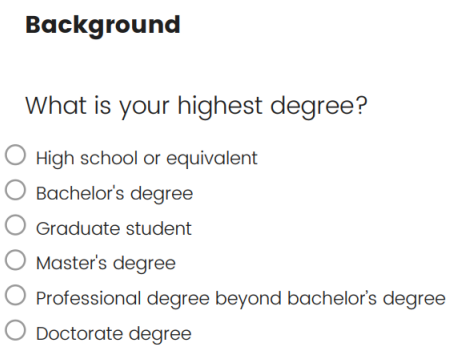
Figure A45: Financial literacy - risk



C.9 Expert survey additional questions

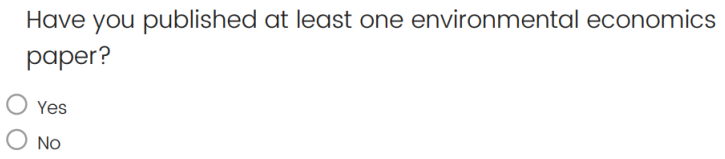
The expert survey included some additional questions. Participants were asked their degree of educational attainment:

Figure A46: Expert background



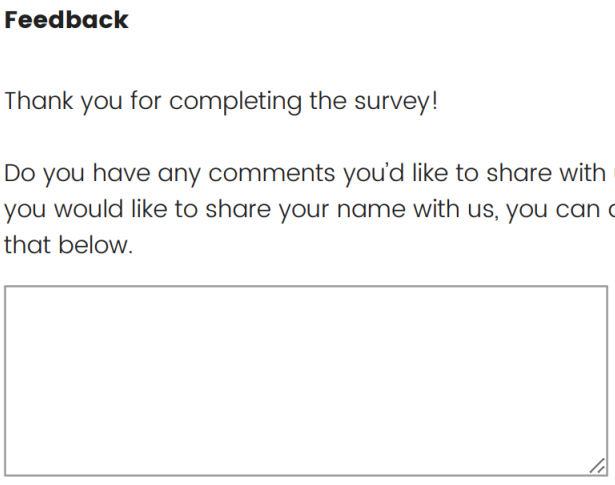
And whether they had published a paper in environmental economics:

Figure A47: Environmental economics publication



Then we requested feedback in an open-ended question:

Figure A48: Expert feedback



For a subset of experts in the second wave, we presented all policy scenarios side-by-side for each of the belief questions. The order of the policies was randomized, hence the values of the fields appearing as ${e://Field/policy_label#}.

Figure A49: Expert alternative effect on bills

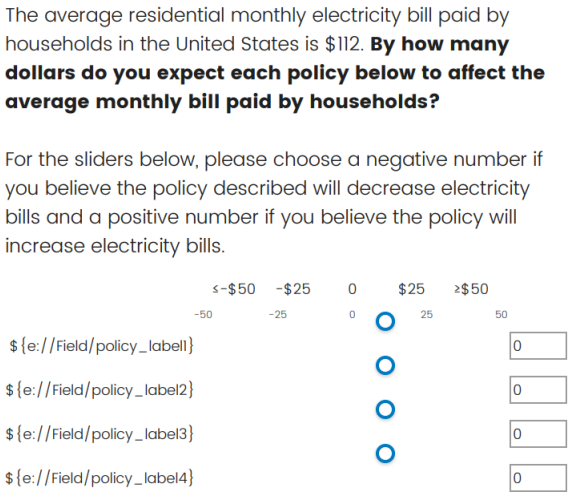


Figure A50: Expert alternative effect on inequality

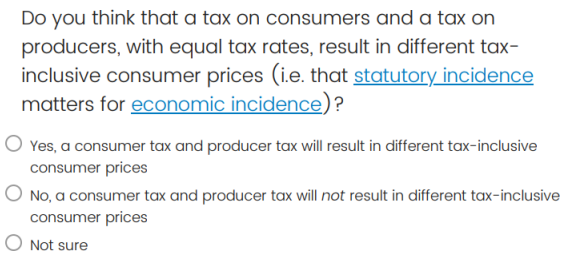


Figure A51: Expert alternative support for policies



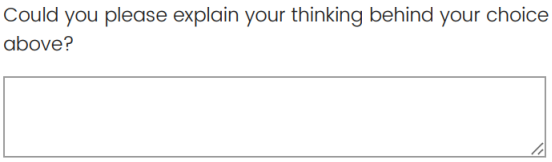
We then asked them if they expected a tax on consumers and a tax on producers to yield different tax-inclusive prices:

Figure A52: Expert additional incidence question



And gave them an open-ended question on their reasoning behind their answer:

Figure A53: Expert open ended incidence question



Finally, we asked them if they had earned a PhD:

Figure A54: Expert PhD degree question

