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Understanding Support for Inefficient Environmental Policy Instruments

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Abstract

Many governments use environmental standards rather than more cost-effective market-based instruments like pollution taxes or cap-and-trade markets. Using a nationally representative survey experiment, we study whether and why limited understanding of economic principles helps explain this practice. Holding environmental impacts constant, respondents prefer standards over market-based instruments, and prefer producer taxes and cap-and-trade over consumer taxes. These preferences reflect consumers' beliefs about how these policies will affect electricity bills. Respondents also prefer the weakest environmental targets for consumer taxes and the strongest targets for standards, which suggests that policymakers face a tradeoff between policy stringency and cost effectiveness. A separate survey of environmental economists shows that they have strikingly different beliefs about the effects of environmental policies than the respondents in our representative survey. For example, typical respondents—in contrast to environmental economists—believe that environmental standards increase consumer energy bills less than market-based instruments do. Educational videos on pass-through and cost-effectiveness of policies affect policy support and close some of the gap between nationally representative respondents and experts, which suggests that economic literacy is a factor in voters' preferences.

JEL Codes: C83, D9, D83, H23, Q48, Q50, Q58

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1 Introduction

The development of market-based policies for environmental goods, including taxes and cap-and-trade, represents one of economists' most important contributions to environmental policy. Standards, also called command-and-control regulation, represent an alternative policy instrument that mandates levels of emission rates, total emissions, required technologies, or ambient environmental quality.

Textbooks emphasize that market-based instruments can minimize the cost of achieving a given level of pollution reduction, and so be cost effective, because they equate marginal abatement costs across pollution sources. Canonical sources emphasize that standards are not cost effective because they do not in general equate marginal abatement costs. 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 reduce costs relative to alternatives, while only 2 percent disagreed.[1]

In practice, however, environmental laws often rely on 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, central parts of China's War on Pollution (Greenstone et al. 2021), India's air and water pollution policies (Greenstone and Hanna 2014; Duflo et al. 2018; Jack and Ryan 2026), vehicle air pollution policy in most middle and high-income countries (Davis 2008; Jacobsen et al. 2023), and deforestation policy in Brazil, Indonesia, and other tropical regions (Burgess et al. 2012; Balboni et al. 2023). Governments are spending trillions of dollars to advance the energy transition and address climate change (International Energy Agency 2024), as the cost of not addressing climate change is also estimated to be enormous (Burke et al. 2023). With such large stakes, why do many regulations use standards, rather than market-based instruments that can maximize the environmental benefit per dollar of spending?

We use survey experiments to assess whether the widespread use of inefficient standards reflects the preferences of the electorate, whether such preferences are due to misunderstanding economic principles, and whether simple interventions can affect these beliefs and preferences. We first 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

[1]The poll asked respondents to evaluate 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.

informational videos about allocative efficiency and the economic incidence of taxes impact respondents' support for and beliefs about various environmental policies. We also study alternative mechanisms through which the video could have affected beliefs and preferences, including the possibility of experimenter demand.

Our main analysis uses AmeriSpeak, a nationally-representative probability-based survey. To investigate how selection into surveys on observables and unobservables relates to support for and beliefs about environmental policy, we simultaneously ran an identical survey on a Prolific convenience sample.

The first set of results summarizes stated beliefs and preferences from the AmeriSpeak control group. We begin by documenting that Americans support standards more than they support market-based policy instruments, both when discussing each instrument separately and when explicitly ranking the instruments. Americans are particularly averse to consumer taxes, relative to taxes on power plants and cap-and-trade. While similar patterns have been documented in other surveys (Leiserowitz 2006; Rabe and Borick 2012; Dechezleprêtre et al. 2025), our surveys involve a controlled elicitation that holds the effect of each policy instrument on pollution constant. We thus establish that individuals' preference for standards, and aversion to consumer taxes, stem from the instrument used, not from its perceived impact on pollution.

We then study how this support varies with policy stringency. We measure preferences 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). Consistent with their ranking of instruments, participants also prefer weaker regulation under market-based instruments and stricter regulation under standards. The preferences for weaker regulation when market-based instruments—and in particular consumer taxes—are used generates a tradeoff between policy stringency and cost-effectiveness. This tradeoff may explain why some environmental organizations prefer standards: using standards increases public support for stricter regulation. This tradeoff also matters 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 might improve welfare in a second-best world, as they could move government policy closer to optimal levels of stringency, but in a cost-ineffective way.

We then elicit beliefs about policy instruments and energy prices. Surprisingly, we find that Americans believe environmental standards lead to *lower* consumer energy bills than market-based policies do, and in particular consumer taxes, holding environmental outcomes

[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 on carbon emissions from all countries is around an order of magnitude lower (World Bank 2024).

fixed across instruments. Environmental economists 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 believe that standards will have less adverse effects on inequality than market-based instruments.

The beliefs that standards lead to lower consumer energy bills could stem from participants misunderstanding economic principles. Specifically, participants may not realize that costs are passed through from firms to consumers or they may not realize that standards do not equate marginal costs across firms. To examine these possibilities, we study whether simple informational interventions that explain these economic principles can affect respondents' beliefs and preferences. We randomly assign participants to a video explaining economic incidence, a video explaining allocative efficiency, or a control group. (The control group watches a video at the survey's end, to keep total survey time, and thus attrition, constant). The incidence video makes support for consumer versus producer taxes more similar, and also moves participants' beliefs about policy impacts closer to those of environmental economists. The allocative efficiency video increases support for market-based instruments relative to standards, though the evidence for this is weaker.

Three mechanisms could account for the effects of our videos on beliefs and preferences. The first is lack of economic literacy, which may involve either systematically biased beliefs or an inability to reason through the equilibrium implications of policies (Dreyfuss 2025). The second is expert persuasion, where people might simply be persuaded by expert advice without fully understanding it. The third is experimenter demand. These mechanisms have different implications. If experimenter demand primarily explains results, then the results have limited external relevance; but if the other channels drive the effects, then policymakers can implement policies to increase support for cost-effective instruments. An auxiliary survey on Prolific shows that experimenter demand is unlikely to be important. We inform a random subset of respondents at the outset that researchers will closely scrutinize their responses, and find that this statement substantially increases perceived scrutiny (measured at the end of the survey) but does not alter the videos' effects on beliefs and preferences. Instead, our results suggest that the videos function at least partly through increasing economic literacy, potentially including understanding of and attention to equilibrium effects, though some may also operate through expert persuasion.

We build on several literatures. We contribute to growing research using environmental surveys and lab experiments by analyzing which policy instruments people prefer and why, holding fixed the level of policy intervention (i.e., the environmental impact of a given policy). Andre et al. (2024) study global support for climate action and Dechezleprêtre et al.

(2025) study support for specific policies such as subsidies to low-carbon technology adoption and infrastructure policies, bans on polluting vehicles, carbon taxes, and agriculture-related policies. These papers focus on overall support for fighting climate change, while we focus on the choice among policy instruments conditional on a given environmental impact. A broader literature uses survey, lab experiments, and related methods to study preferences around climate change and associated policies (Cherry et al. 2012; Millner and Ollivier 2016; Douenne and Fabre 2022; Funke et al. 2025). These papers find that policy support depends on policy impact, language, framing, and the perceived benefits and distributional effects of policies (Kallbekken et al. 2011; Drews and Van den Bergh 2016; Baranzini and Carattini 2017; Maestre-Andrés et al. 2019), that people are generally averse to carbon taxes (Carattini et al. 2018), that people prefer emissions trading over carbon taxation (Funke et al. 2025), and that revenue recycling increases support (Beiser-McGrath and Bernauer 2019; Mohammadzadeh Valencia et al. 2024), especially when made salient (Klenert et al. 2018). We contribute to this literature by quantifying support for standards over taxes and exploring the mechanisms explaining this difference. Moreover, we test how interventions discussing economic literacy (pass-through and allocative efficiency) affect support for climate policies.[3]

We also contribute to a literature that studies how political constraints can lead to inefficient policy design. 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 under-appreciate 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. Dreyfuss (2025) shows that equilibrium neglect can make efficient reforms politically infeasible. Jenkins (2014) provides a theoretical framework for climate policies when the first-best policy is infeasible. We contribute to this literature by documenting that voters prefer inefficient environmental policies and that ostensibly less-efficient policies may be the more politically-tractable means of addressing climate change.

In addition, we make a methodological contribution to the literature using large-scale surveys to study people's perceptions of and preferences over public policy. By simultaneously running identical surveys on Prolific (convenience sample) and AmeriSpeak (representative, probability-based sample), we are able to show how responses vary by observed and unobserved dimensions of selection into convenience samples. Prior work comparing convenience and representative samples has typically used very simple survey questions (Tang et al. 2022; Mercer and Lau 2023; Jordan et al. 2025) and often found similar effects when running the same experiments on convenience and representative samples (Mullinix et al. 2015; Coppock

[3]A classic economics literature compares the properties of different environmental policy instruments. For example, Weitzman (1974) essentially compares price instruments like pollution taxes with quantity instruments like cap-and-trade under certainty versus uncertainty, and Stavins (2010) compares standards to market-based instruments.

et al. 2018). In the environmental policy domain, we find substantial differences in beliefs, preferences, and information treatment effects between the convenience and representative samples—that cannot be fully explained by differences in demographics. This suggests that to accurately understand citizens' (environmental) policy preferences, it may not be enough to generate samples that match the population on demographics, and thus that probability-based sampling schemes may be an important tool.

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 and discusses mechanisms. Section 5 concludes.

2 Experimental Design

This subsection describes our main survey experiment and two additional surveys we conducted.

2.1 Sample

Our main results use a sample from AmeriSpeak, a high quality panel. AmeriSpeak fielded this survey from March 28 to May 22, 2023. The National Opinion Research Center (NORC) designs AmeriSpeak to represent the US population. The probability-based AmeriSpeak panel primarily recruits participants by randomly selecting households from the NORC National Frame. To reduce selection bias, AmeriSpeak recruits the participants using mailings, telephone contact, and in-person visits offering enhanced incentives. Additionally, participants may complete the 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 (AmeriSpeak 2025). AmeriSpeak is used in selected economics papers (e.g., Haaland and Roth 2017; Ferey et al. 2024; Mui and Schoefer 2024; Allcott et al. 2025) and the NORC National Frame it samples is used in landmark studies, such as the General Social Survey.

We simultaneously ran an essentially identical survey on Prolific between April 3 and April 24, 2023.[4] Prolific is an online platform that connects researchers with participants for online research studies. Participants complete tasks in exchange for monetary incentives. Most Prolific participants spend 1-8 weekly hours on the platform, suggesting they complete many more studies than AmeriSpeak participants (Eyal et al. 2021). 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

[4]In addition to information collected in our survey, for all AmeriSpeak participants, we received a list of standard demographic variables and financial profile variables. To obtain the same variables for Prolific respondents, we appended at the end of the Prolific survey the same questions asked in AmeriSpeak.

cost and flexibility. However, these convenience samples come with the possible tradeoff of lower representativeness, which we use the simultaneous AmeriSpeak and Prolific surveys to analyze.[5]

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. AmeriSpeak cost approximately $20 per respondent and Prolific cost about $3.50 per respondent.

Table 1 provides demographic summaries of our samples and 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 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 15 percentage points or more. We report comparisons between platforms both with and without controls. Any differences that remain after controlling for demographics imply "unobservable" differences due to the two different methods of recruitment: a probability-based versus an opt-in sampling scheme.

Expert Survey

We also obtained responses of expert environmental economists. On June 2, 2024, we emailed 195 environmental economists, selected primarily from environmental/energy economics groups in the National Bureau of Economic Research (NBER) and the Centre for Economic and Policy Research (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.

This survey obtained a good response rate and successfully reached genuine experts. We obtained 292 complete responses, 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 responses from 42 NBER affiliates and 7 CEPR affiliates. In the second survey, 90% of respondents held academic appointments (in contrast to government or industry jobs, for example).[6]

[5]Prolific is an opt-in platform which relies on methods such as online advertising and referrals (e.g. via word-of-mouth, friends, and university partnerships) to recruit participants, and thus Prolific samples are unlikely to be representative of the population.

[6]To provide some insight on the survey composition, our email invitations provided separate survey links

Auxiliary Survey

We conducted an additional survey on Prolific between April 30 and May 8, 2024 with 1,914 participants. The auxiliary survey sought to study the mechanisms underlying treatment effects. This survey was identical to the original survey but also randomized a cue that altered the degree to which participants felt the researchers were observing them, and added two questions at the end of the survey to validate the randomized cue's intended effects.

2.2 Primary Survey Design and Randomization

Figure 1 summarizes the survey design. Appendix D presents the detailed survey instructions and prompts.

2.2.1 Policy descriptions

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

> (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. The descriptions in these questions used a different wording than the explanations we provided participants so participants would not immediately recognize

to some groups (e.g., NBER CEPR affiliates, or individuals with academic appointments). In the second expert survey, we also randomized some of the survey questions. For our main analysis, to make the survey comparable, we focus on 181 experts who saw the same questions that our main sample saw.

the correct answer due to identical text. A participant who answered a question incorrectly received a second opportunity to answer it. In each question, participants could click a link to review descriptions of the policy instruments. We automatically screen participants out of the survey who twice failed to match all policy instruments with correct definitions.

2.2.2 Outcomes: 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.[7] We randomized the order of the policy instruments across participants.

After the survey explained each policy scenario, we elicited participants' beliefs about how each policy would impact monthly household electricity bills and inequality. We focused on these two outcomes because pilot surveys indicate, and the main survey confirms, that consumers primarily care about electricity bills. Additionally, 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 the perceived effect of each policy on inequality, we asked participants whether they thought the effect of the instrument on inequality would be a substantial decrease, modest decrease, no effect, modest increase, or substantial increase.

We then used 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 reduce emissions by 40% or more. The survey reminded participants that a larger reduction in emissions implies a stricter policy.[8] 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 in an open-ended question to describe the reasoning behind

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

[8]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?"

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 assigned 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 associated videos at the beginning of the survey, just 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 also had the control group view the videos so that we could understand and potentially address any attrition the videos themselves introduce.

The pass-through video (Jiang et al. 2025b) 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 explained 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.

The allocative efficiency video (Jiang et al. 2025a) explained the concept of cost effectiveness in non-technical language. The video compared a tax on emissions with a standard. The video defined cost-effectiveness as the lowest-cost way to achieve an outcome. The video then explained that a tax or cap-and-trade have greater cost effectiveness than a standard because price-based policies 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 marginal costs to decrease emissions.

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. We then 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 under which environmental tax system (tax on consumers or producers) would consumers end up paying more for gas. We then asked them under which environmental tax system would companies' profits be higher.

The randomization successfully balanced observed characteristics. Table 2 shows that covariates have similar values in the AmeriSpeak treatment and control groups, and an F test fails to reject the hypothesis that all covariates are equal (p=0.269). Appendix Table A1 shows that the Prolific sample is balanced as well.

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. We asked whether participants 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).

2.3 Additional Surveys

Expert survey

The expert 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 elicited beliefs on the effects on electricity bills, effects on inequality, and whether the respondent would support each policy. We also asked questions about respondents' expertise (educational attainment and publishing an environmental economics paper).

Auxiliary Survey to Address Experimenter Demand

To test for experimenter demand effects, we conducted an additional experiment where we manipulated the degree to which participants felt that the researchers were observing them, building on the design of Bursztyn et al. (2020). 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) from our main survey experiment.

The scrutiny treatment showed participants the following message after the consent form and before the rest of the survey:[9]

> 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:

[9]The bold formatting was in the version participants saw. See figures A57 and A58 in Appendix D.

> 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, but they induce variation in participants' perceptions of the extent to which the experimenters scrutinize their responses. To ensure that the treatments had their desired effect, we included a manipulation check at the end of the survey. The question 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.[10]

To analyze additional mechanisms that could mediate the effect of the videos, at the end of this survey, we also asked participants how much they trust experts.

2.4 Quality controls

We took several steps to ensure that responses had high quality. First, the beginning of the survey validates that participants can see video and hear audio while taking the survey.[11] 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, the survey automatically ended for participants who, in both of two attempts, incorrectly answer comprehension questions on the policy instruments. 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.[12]

Most participants felt that the survey was clear and impartial. Although the survey addresses complex policies, among all AmeriSpeak and Prolific participants, 88% of them thought that the survey was somewhat or very easy to understand, 81% of them perceived

[10]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 tradeoff 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.

[11]Specifically, we presented respondents with a short test video and asked whether participants were able to see the video and hear the audio. The survey automatically ended for those who did not respond that both audio and video worked.

[12]The member agreement of AmeriSpeak requires panelists to have the option to skip questions. Therefore, no AmeriSpeak questions require responses. To keep the surveys similar, we also did not require Prolific respondents to answer questions, besides demographics. 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 those about support, preferred emissions reduction, and impact on electricity bills of each policy.

the videos as somewhat or very trustworthy, and only 19% thought that the researchers had a left-wing or right-wing bias.[13]

3 Support for Environmental Policy Instruments

This section presents descriptive 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.[14]

3.1 Policy Preferences and Beliefs

Policy Support

Figure 2 presents various measures of opinions about the four policy instruments—consumer taxes, producer taxes, cap-and-trade, and standards, which were all described as decreasing emissions by 20 percent. Panel a reports the share of participants that support each policy instrument, as opposed to stating "not sure" or "oppose." Consumer taxes receive the least support, while standards and producer taxes receive the most support. Standards receive more support than any market-based instrument ($p < 0.05$ for all comparisons). All policy instruments, however, are supported by less than forty percent of participants.

The significantly lower support for consumer taxes (14% of respondents) compared to producer taxes (27%) suggests that respondents do not believe that these taxes have identical incidence ($p < 0.01$). This contrasts with conventional economic wisdom on physical neutrality that tax incidence is independent of who physically remits payment to the government (Jenkin 1871; Weyl and Fabinger 2013), although unequal incidence 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 of Figure 2 presents a variation on panel a. For each policy, panel b reports the difference between the fraction of participants supporting the policy minus the fraction opposing the policy (net support). A similar number of individuals support versus oppose standards, implying net support of zero. Cap-and-trade, producer taxes, and especially

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

[14]We present unweighted results, for simplicity and transparency, and since Table 1 shows that weights do not substantially change sample composition. Appendix Figures A1, A2, A13, and A14 show that we obtain similar estimates of preferences over policy instruments and the effects of interventions when using AmeriSpeak's survey weights.

consumer taxes, in contrast, receive negative net support. Overall, the patterns of net support in panel b closely mirror the patterns of overall support in panel a.

Panel c of Figure 2 instead summarizes people's rankings of the four policy instruments. Recall that a separate survey prompt asked participants to rank the four policy instruments from most preferred to least preferred (again, under the assumption that each policy instrument would reduce emissions by 20 percent). To summarize this data, 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 middle two. We then take the average rank for each policy instrument. The pattern in panel c resembles that of panels a and b, with an even more pronounced preference for standards. About half of participants rank standards first and 80% rank them first or second. In contrast, only 6% of participants rank consumer taxes first.

Our finding in panels a-c that standards receive more support than taxes is consistent with findings from several other surveys.[15] Because our questions fix the sector and the magnitude of emissions reduction across the different policies, our results show that this preference for standards over taxes is not simply due to different perceptions about sector or impacts on emissions reduction. Rather, our results suggest that this is due to respondents perceiving that standards are less economically and socially costly *per unit of emissions reduction*—an issue we explore further below when analyzing the other survey elicitations. Perhaps even more importantly, our results show that how the tax is administered—in our case, whether the statutory incidence is on consumers or producers—makes an enormous difference in its support. In our data, the difference in support for consumer versus producer taxes is much larger than the difference in support for producer taxes versus standards.

Panel d of Figure 2 studies the intensity of support and shows that participants prefer more strict policy (greater emissions reductions) under standards than under market-based instruments. With a standard, respondents desire an average 13 percent reduction in emissions. Respondents' desired emissions reductions are only slightly weaker with producer taxes ($p = 0.000$) or cap-and-trade ($p = 0.457$) . By contrast, respondents on average prefer far weaker stringency with consumer taxes ($p < 0.01$)—only a 1 to 2 percent emissions reduction. These findings reinforce the implication that all else equal, people believe consumer taxes to be far more economically and socially costly than the other policy instruments.

[15]For example, an AP-NORC/EPIC survey finds that 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). Dechezleprêtre et al. (2025)'s international survey finds higher support for bans on polluting cars and mandatory and subsidized insulation of buildings than for a tax on flying and a tax on fossil fuels. Douenne and Fabre (2020) find greater French support for insulation standards and vehicle pollutions standards than for carbon taxes, a higher tax on diesel, a meat tax, or urban tolls. Leiserowitz et al. (2025)'s survey of US registered voters finds slightly greater support for regulating carbon dioxide than for requiring fossil fuel companies to pay a carbon tax.

Figure 3 presents CDFs of the preferred emission reductions for each instrument, which more flexibly convey the distribution of these preferences. Under a consumer tax, nearly half of respondents 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. More generally, 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 slightly prefer larger emission reductions for standards than for producer taxes.

These preferences over emission reductions illustrate political tradeoffs between stringent and efficient climate policy and 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. Implementing an environmental tax on consumers would be 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. The CDFs in Figure 3 indicate that policymakers could then only implement a consumer tax reducing emissions by 5%, or a standard reducing emissions by approximately 15%. Alternatively, Figure 3 also shows that cap-and-trade and producer taxes can reach desired support at nearly the same levels of intended emissions reduction.

Broad drivers of preferences over policy instruments

To provide insights into the factors influencing support for environmental policies, we asked respondents what considerations influenced their rankings of the policy instruments. We find that the impacts on electricity bills are the most important consideration, listed by 69.8 percent of participants. Fairness and effects on inequality are also considered important variables and listed by 54.9 and 39.6 percent of participants. Only 32.1% of participants mention the policy instruments' enforceability and only 10.5% list effects on government revenue.[16]

Figure 4 summarizes participants' beliefs about how the different policies influence electricity bills and inequality, again holding the emissions decrease fixed across policy instruments at 20%. Panel a shows that participants believe that consumer taxes will have by far the largest impact on electricity bills of any of the policy instruments ($p < 0.01$ for all

[16]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.

comparisons).[17] These beliefs can help explain the unpopularity of consumer taxes.

Additionally, Figure 4 shows that participants believe that producer taxes will increase electricity bills more than standards or cap-and-trade ($p < 0.01$ for both tests), but there is no statistical difference between standards and cap-and-trade.

Panel b of Figure 4 shows that beliefs about how each policy affects inequality resemble beliefs about how each policy affects electricity bills. Consumer taxes are believed to increase inequality more than any other instrument ($p < 0.01$ for all comparisons), producer taxes are believed to increase inequality more than standards and cap-and-trade ($p < 0.01$ for both comparisons), but cap-and-trade and standards are statistically indistinguishable ($p = 0.429$).

It is arguably not surprising that respondents' beliefs about the policies' impacts on energy bills resemble beliefs about the impacts on inequality. If 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), then a uniform increase in consumers' bills would lead to lower-income households devoting a larger share of their budget to energy expenditure.

3.2 Heterogeneity in support for policy instruments

Expert preferences and beliefs

Our results so far show that people believe standards to be more cost-effective policies than market-based instruments, and that people also believe that consumer taxes are the least desirable instrument, compared even to producer taxes. While these beliefs seem inconsistent with classic arguments from environmental economics, they may be correct under certain markets with specific frictions or if participants focused on tax-inclusive costs. Therefore, to better understand whether consumers suffer from misperceptions, we benchmark the survey results with our expert survey.

Appendix Figure A3 presents the difference between the perceived impact of standard and market based instruments on electricity bills, for different samples. While the control groups in both our representative AmeriSpeak sample and the Prolific sample believe that standards increase costs less than market based instruments, experts believe the opposite. This suggests that experts are more likely to understand and consider allocative efficiency principles.

[17] 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 most environmental experts do not believe that consumer taxes increase consumer bills more than producer taxes.

Appendix Figure A4 compares the difference in perceptions of how consumer and producer taxes affect 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 believe that consumer and producer taxes have similar effects on bills). Panel b shows that the corresponding value among experts is 61%.[18]

While experts were more likely to think consumer and producer taxes have similar effects, 33 percent of experts did forecast that consumer taxes increase electricity bills more than producer taxes.[19,20]

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, while other groups have relatively low support for all instruments. For example, higher-income, college-educated individuals, and non-Black/non-Hispanic individuals have relatively high support for all these instruments. To give another 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).

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 have the strongest support (orange triangles), consumer taxes have the lowest support (blue circles), 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 more easily than preferences for the level of environmental policy overall.

Unobservable selection into study participation

Although AmeriSpeak provides a high-quality sample where participants cannot simply opt in, but instead are recruited via a representative, probability-based selection procedure, there

[18] Appendix Figure A6 presents the same data as a distribution (CDF).

[19] If the difference in perceived impacts of consumer and producer taxes is within ±$5, we count the response as believing the impacts are the same. Therefore, what we report here is the percent of experts who perceive the impact of consumer taxes on electricity bills to be at least $5 larger than producer taxes.

[20] Several dozen experts sent informal emails 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.

may still be unobservable selection into agreeing to become a member of AmeriSpeak. This could affect the national representativeness of our findings, even when we weight responses to match US demographics. To study selection on unobservables in survey platforms, and to clarify the extent to which high-quality probability-based samples yield different conclusions than commonly used convenience samples, we compare the AmeriSpeak and Prolific samples. Any systematic differences that remain between the AmeriSpeak and Prolific samples after we control for demographics—and which therefore are attributable to unobservable covariates of willing to take our survey—provide insight into the extent to which policy support might differ between AmeriSpeak and the US population. If, for instance, environmental policy support is typically slightly lower in the AmeriSpeak than the Prolific sample—indicating that unobservable correlates of willing to participate in surveys are negatively related to support of environmental policies—then we might similarly expect environmental policy support among all Americans to be slightly lower than in the AmeriSpeak sample. On the other hand, if we find no differences between AmeriSpeak and Prolific samples conditional on observable demographics, then that would suggest that the (reweighted) AmeriSpeak sample well approximates the views of American adults.

Figure 2 for AmeriSpeak and Appendix Figure A7 for Prolific show separate results for each survey sample; the two graphs have similar layout. To facilitate the comparison, Figure 5 graphs the difference between the two surveys. 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, race, 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 5 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. Overall, panel a shows that Prolific respondents support all four environmental policy instruments by 5 to 15 percentage points more than AmeriSpeak respondents do, and panel d shows that Prolific participants prefer more aggressive emissions reduction. This is unsurprising, as Prolific has younger, more educated, and more liberal respondents. Reassuringly, the squares, diamonds, and triangles show that linearly adjusting for demographics and other respondent characteristics tends to close anywhere from half to all of the gap between the Prolific and AmeriSpeak samples. Ideology and political party affiliation have the most explanatory power.

Overall, the comparison between the Prolific and AmeriSpeak samples suggests that while

there may be some selection on unobservables predicting policy support, this selection is not large. Much of the difference is instead explained by observable demographics.

4 Effects of information on understanding of and support for policy

This section assesses how randomized exposure to informational videos affects support for different environmental policy instruments. The comparison to our expert sample suggests that many patterns of support that we have studied thus far may be due to a lack of economic literacy. To more directly study this possibility, we randomly expose participants to explanations of the key relevant economic principles.

4.1 Effects on policy support

Pass-through Video

Panel a of Figure 6 shows that the AmeriSpeak control group supports producer taxes 13 percentage points more than consumer taxes. Remarkably, the pass-through video closes this gap to 2 percentage points. Panels b through d show similarly large treatment effects, with the pass-through video closing much of the gap in support and desired emissions reduction.

Appendix Figure A8 provides a summary of how the pass-through treatment influenced support and beliefs about bills and inequality for each of the four policy instruments. Panel a of Figure A8, for instance, shows that the pass-through video increased support for consumer taxes and decreased support for producer taxes ($p = 0.04$ and 0.01, respectively). Panel a of Figure A8 also shows that the pass-through video reduced support for standards, though it had a statistically insignificant effect on support for cap-and-trade. This could be consistent with respondents absorbing deeper principles from the pass-through video. Respondents may have come to better appreciate that more generally, policies like standards increase prices by increasing production costs. The results in the remaining panels of Appendix Figures A8 and A9 mirror these findings. Appendix Figure A10 shows that the effects of the video on the difference between consumer and producer taxes is very similar in the Prolific sample

Panel c of Appendix Figure A4 shows that the pass-through treatment moves the percent of respondents that believe consumer and producer taxes have the same impact on electricity bills away from the control group ($p < 0.01$ for testing equal proportion of people believing consumer and producer taxes have the same impact between the two groups) and closer to the experts ($p = 0.536$).

Allocative Efficiency Video

The allocative efficiency video had largely insignificant and small results on difference in support for standards versus market-based instruments in the AmeriSpeak sample. Figure 7 shows that the effects of the allocative efficiency statistically indistinguishable from zero for all outcomes other than the normalized average ranks of all policies. Panel c shows that for the normalized average rank, the video closed some of the gap in support for standards versus market-based instruments. Appendix Figure A8 provides a more detailed summary of how the allocative efficiency video influenced support for each of the four policy instruments.

In the Prolific sample, the allocative efficiency video had a stronger effect on beliefs and policy support (in expected directions); see Appendix Figure A11. These differences between the AmeriSpeak and Prolific samples could be explained by Prolific respondents being more attentive, better trained at comprehending short experimental interventions, and generally more educated.[21] Consistent with this hypothesis, we provide evidence in Section 4.3 that the allocative efficiency video was more complex and that the video had a stronger effect among more educated people in AmeriSpeak.

4.2 Perceived policy impacts on bills and inequality

Figure 6, panel e, shows that the control group believes producer taxes cost $4 less per month than consumer taxes. The pass-through video completely eliminated this difference. Figure A9 shows that the pass-through video achieved this result by decreasing the perceived impact of consumer taxes on electricity bills.

Overall, the three-minute pass-through video led AmeriSpeak respondents to hold similar beliefs about incidence as do participants in our expert survey. In the AmeriSpeak control group, 43% of participants thought the difference in the effects of consumer and producer taxes on electricity bills was below $5/month (Appendix Figure A4), and the pass-through video increased this share considerably, to 64%. Remarkably, the expert environmental economists had nearly the same share (61%). If everyone in the treatment arm watched the video, then the video had a relatively high persuasion rate (DellaVigna and Gentzkow 2010) of 36%. In other words, for respondents who did not initially believe that consumer and producer taxes have similar effects on bills, the video changed the minds of one in three.

As with policy support, Figure 7 shows that the allocative efficiency video did not have a statistically significant effect on beliefs about the impacts of standards versus market-based policies on electricity bills and inequality. This lack of significant effects is perhaps due to the

[21] Appendix Figure A12 shows that controlling for observables closes some of the gaps between the effects found on Prolific and AmeriSpeak but not all of them, highlighting that online samples may not be sufficient to understand how interventions affect people's preferences, even when controlling for demographics.

concepts in the allocative efficiency video being more complex and therefore more difficult to quickly comprehend.

4.3 Mechanisms and robustness

The videos could affect beliefs and preferences via three potential mechanisms. First, *economic literacy* may explain results. Economic literacy may operate through knowledge–participants may learn the principles that the video explains. Economic literacy can also operate through salience–the control group may understand how behavioral responses affect outcomes, but the videos could decrease equilibrium neglect (Dreyfuss 2025). Second, *expert persuasion* could explain results. 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. 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). Third, *experimenter demand* may explain results. Participants may not believe or understand the videos, but still understand what message the videos seek to convey and then repeat that message to please the researchers

These three mechanisms have different implications. If experimenter demand primarily accounts for results, then the results have limited external relevance. On the other hand, if economic literacy or expert persuasion drive the effects, policymakers can implement policies to increase support for cost-effective instruments. 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.

Comprehension

Results from Section 4.2 suggest that participants at least partially understood the pass through video, as it closed most of the gap between the perceived impact of producer and consumer taxes on electricity bills (Figure 6, Panel e).

To analyze whether participants paid attention to the allocative efficiency video, we 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 which factory would reduce pollution more in response to a tax. Participants could answer Factory 1, Factory 2, or "Same" for each

question. The correct answer is that Factory 2 should respond more to a tax.

The allocative efficiency video increased the share of individuals giving the correct answer from 64% to 71% (Appendix Figure A15). While these results suggest that at least some participants paid attention to and recalled some of the lessons from the videos, they are far from stark. First, answering these comprehension questions requires less sophisticated reasoning than fully working through how a tax or a standard would influence electricity bills or inequality. Many of the respondents who answered the question correctly (in both the treatment and control group) still preferred standards over taxes. Second, the treatment effects on these simple comprehension questions are not large.

As another source of evidence on the comprehension of our videos, we apply text analysis to open-ended questions. After each video, we asked respondents, "in one or two sentences, describe what the video is about." We provide a large language model, Claude Opus 4.6, with links to each video. We then share the text responses to the aforementioned questions and request classification of each response based on video understanding (1 = poor, 2 = partial, 3 = sufficient), based on a grading rubric included in the prompt. Appendix C provides more details on the classification.

Appendix Table A3 summarizes the score distributions. We find that in the AmeriSpeak sample, the allocative efficiency video is mostly poorly understood (45.4%) with little high understanding (12.9%), while the pass-through video yields a majority with high understanding (55.5%). These stark differences in comprehension across the two videos are consistent with the larger treatment effects of the pass-through video.

Consistent with the allocative efficiency video being more complex, we find that the while the treatment effects of the pass-through video differ little by education level (Appendix Figure A16), the treatment effects of the allocative efficiency video different significantly (Appendix Figure A17). The allocative efficiency video has significant effects on policy ranking and on the perceived impacts on electricity bills for college graduates, but not for non-college graduates ($p<0.01$ versus 0.64). An F-test also finds that treatment effects on all outcomes are jointly significant for the college graduates but not for non-college graduates. Treatment effects on all outcomes are also somewhat greater for college graduates compared to non-college graduates ($p = 0.04$).

Experimenter demand Our auxiliary survey, which experimentally varied participants' perceived anonymity, allows us to examine the extent to which experimenter demand may have contributed to the videos' effects on respondents' answers. Appendix Figure A18 shows that the scrutiny and anonymity treatments substantially manipulated perceived anonymity. 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 scrutinized. The

difference between the treatments is 1.8 points on the 5-point scale (s.e.=0.08). Participants in the control group, who received no message about anonymity or scrutiny, responded similarly to the anonymity treatment, implying that participants in the main sample believed their responses to be mostly anonymous.

Figure 8 shows that despite substantially altering perceived anonymity, the treatment effects of both videos are essentially identical across the scrutiny, anonymity, and control conditions. This suggests that experimenter demand neither amplified nor diminished the effects of the videos.[22]

Expert persuasion

To provide some direct evidence on the role of expert persuasion in accounting for the videos' treatment effects, we separate results by whether participants indicate that they trust experts completely or not. Appendix Figure A19 finds that the pass-through video treatment effect does not vary by trust in experts ($p = 0.75$). The effects of the allocative efficiency video, in contrast, are larger among participants who trust more in experts ($p = 0.02$). Because we do not experimentally vary trust in experts, this variable may correlate with other forces that determine treatment effects. Thus, we cannot rule out that expert persuasion may drive some of the effects of the allocative efficiency video, though the evidence from this channel is observational.

Overall, we conclude that experimenter demand is unlikely to be a major mechanism; that comprehension of the videos mediates their effects; and that some combination of economic literacy and perhaps expert persuasion are the mechanisms by which our treatments influence preferences and beliefs.

5 Conclusions

Economists often lament that environmental policy relies on 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

[22] A final piece of evidence against the potential importance of experimenter demand effects comes from text analysis of responses to the open-ended question in the auxiliary survey, "What do you think was the purpose of the survey?" Again we prompt Claude Opus 4.6 with clear definitions to classify responses into those likely influenced by experimenter demand, expert persuasion, or neither. We find that 3.5% of the responses suggest experimenter demand. A larger share of responses, 7.9%, indicate expert persuasion. Manually checking the responses that the large language model labeled as showing experimenter demand effects, fewer than 20 responses mentioned that the purpose of the survey was to see how the video with biased information would affect their decision making, which is closer to the definition of experimenter demand effects.

change and invest in renewable energy, and many major environmental policies in high- and middle-income countries rely heavily on standards.

We study the extent to which people's beliefs and preferences might explain these patterns because they diverge from textbook economics. 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. Our survey of environmental economists, by contrast, shows that experts believe the opposite. Informational videos that are reasonably easy for participants to understand move people's beliefs and preferences closer to those of economic experts.

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 that governments implement? Finally, what forces have led governments in specific settings to still adopt market-based environmental policies?

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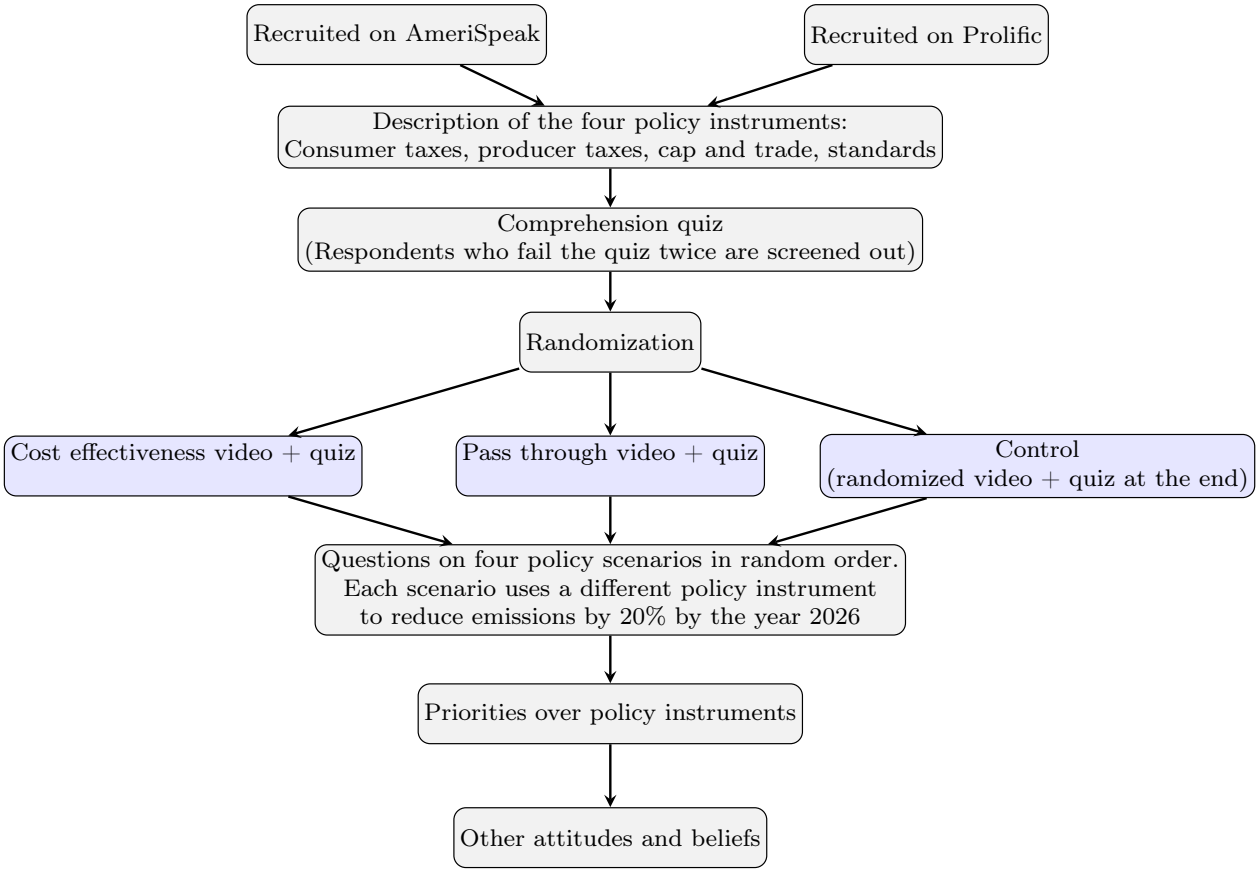
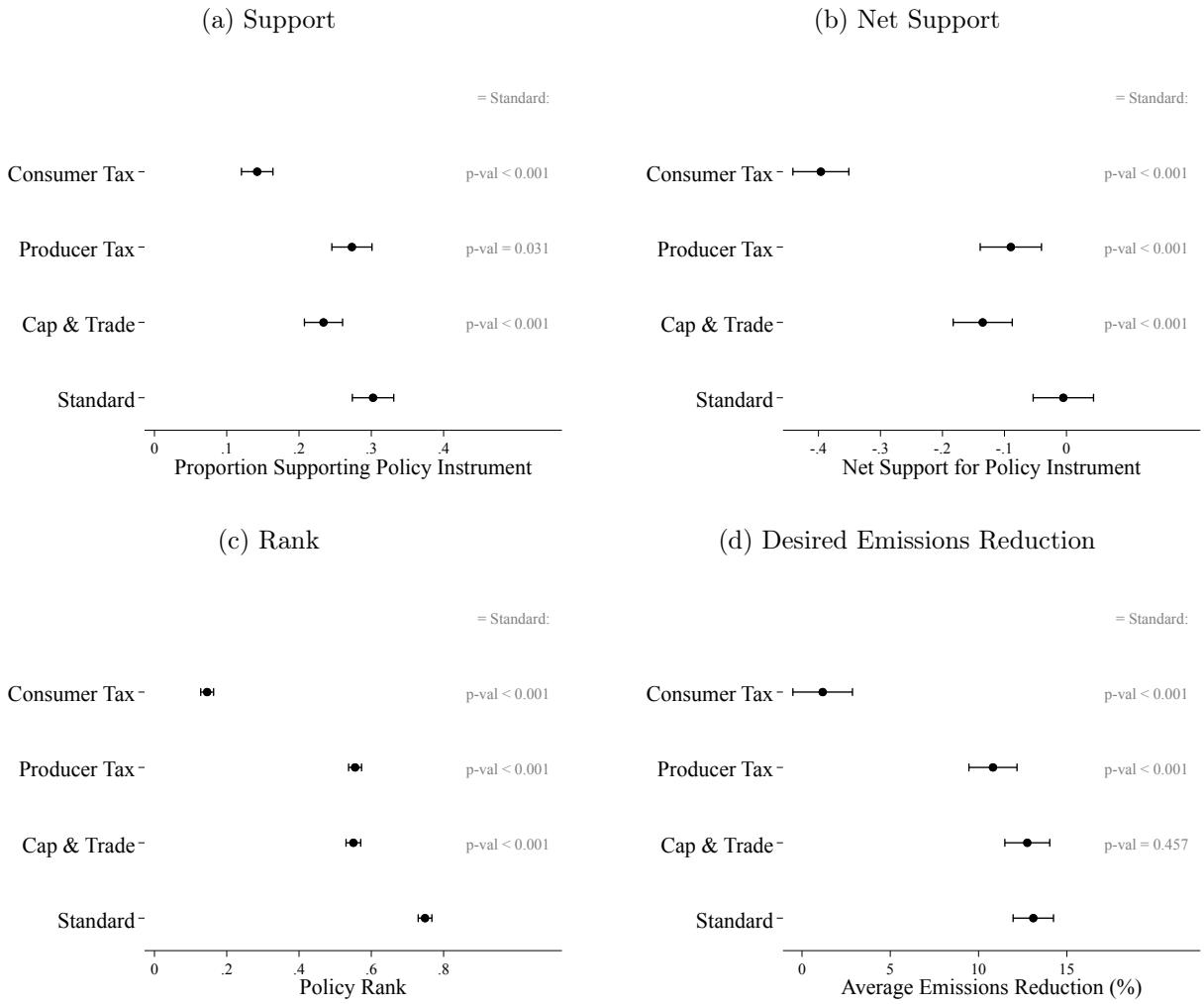
Figure 1: Consort Diagram for Main Surveys



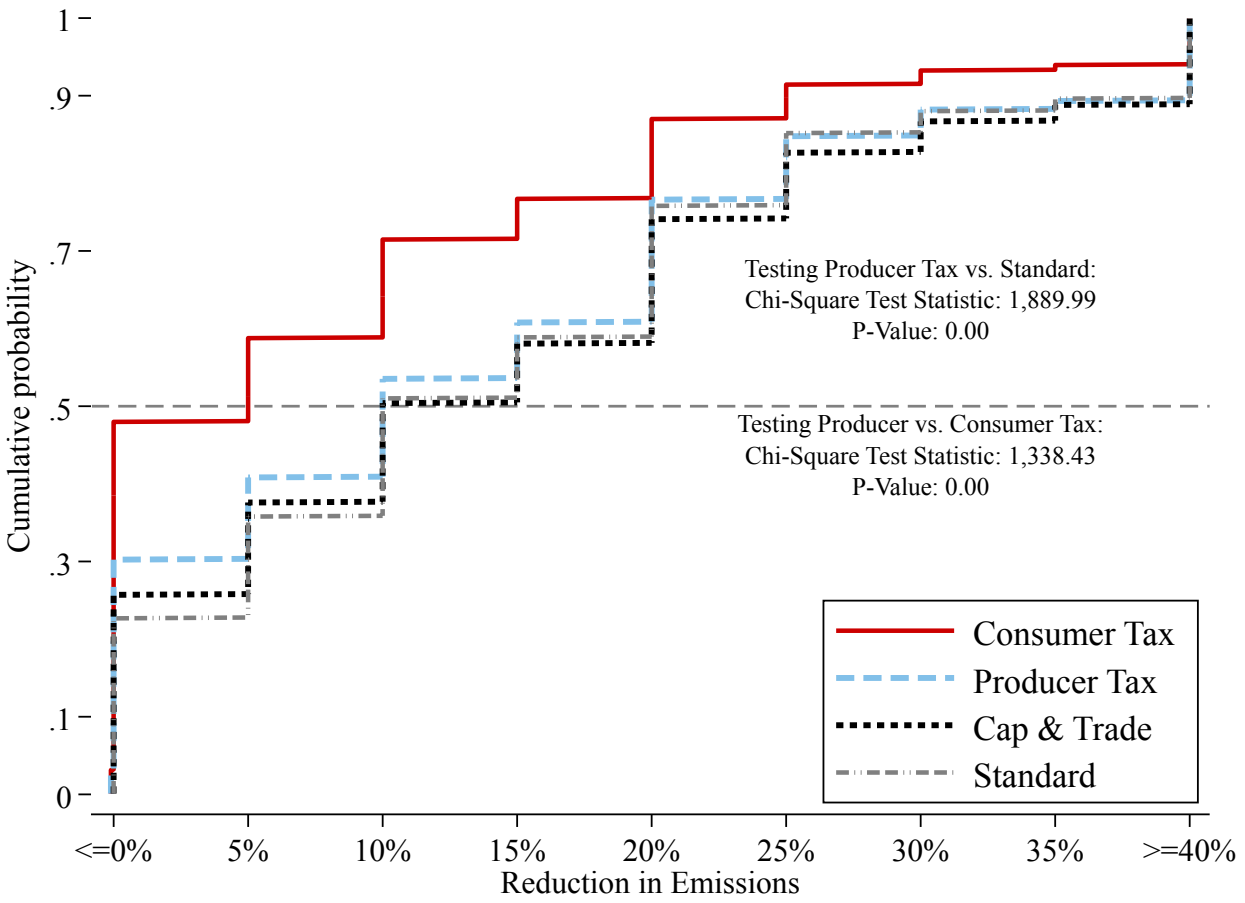
Notes: This figure summarizes our main survey design. The survey was conducted in March-May, 2023. Our final analysis sample includes 1,817 AmeriSpeak and 1,899 Prolific participants. Appendix D presents the detailed survey instructions and prompts.

Figure 2: Preferences Over Policy Instruments



Notes: Figure uses the AmeriSpeak control group. In Panel a, the outcome is an indicator for supporting each policy. In Panel b, the outcome 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 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 is the percent reduction in emissions the respondent prefers 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. We show the p-values of testing equality in means between each market-based instrument and standard. When pooling market-based instruments, the average support is 0.216 (vs. 0.302 for standard, p-value = 0.000); the average net support is -0.207 (vs. -0.005 for standard, p-value = 0.000); the average adjusted rank is 0.417 (vs. 0.749 for standard, p-value = 0.000); and the average desired emissions reduction is 8.691 (vs. 12.837 for standard, p-value = 0.000).

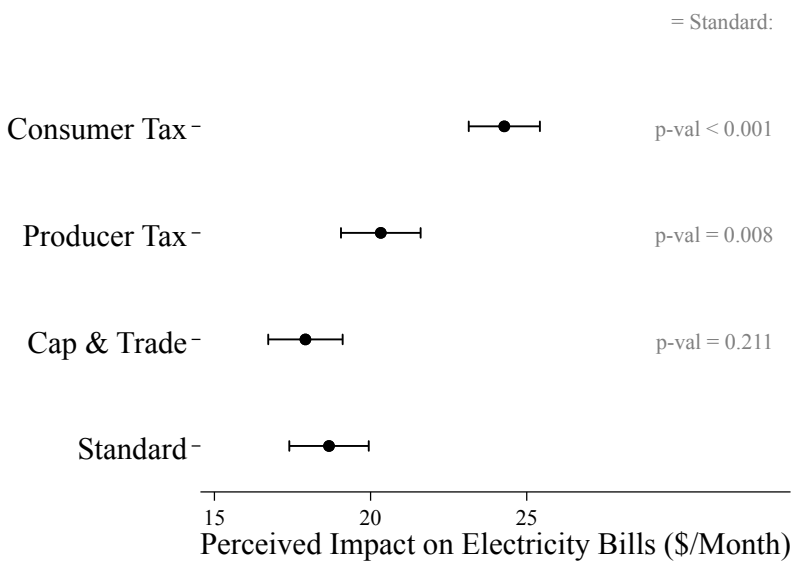
Figure 3: Distribution of Preferred Emissions Reduction, by Policy Instrument



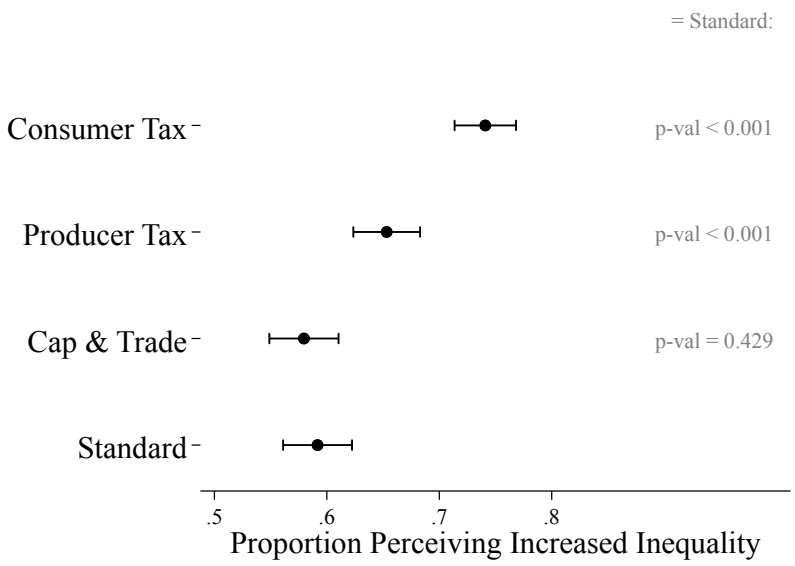
Notes: Figure uses the AmeriSpeak control group and shows the CDFs of participants' preferred emissions reductions. The text shows the p-values from chi-square test of independence between pairs of policies. About 1-5% of the respondents indicated preferring an increase in emissions across policies;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

Figure 4: Perceived Effects of Policy Instruments on Electricity Bills and Inequality

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

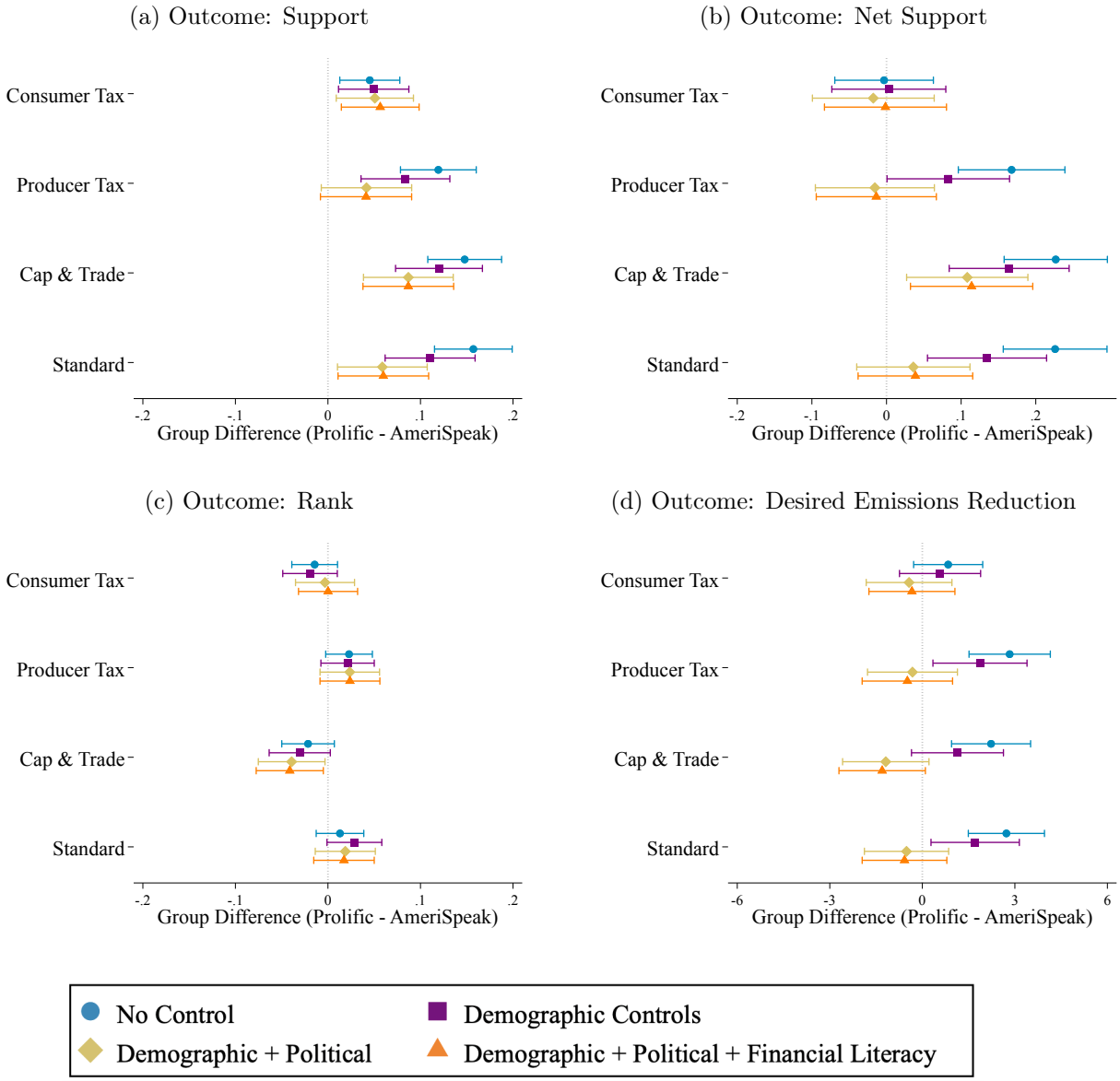


(b) Impact on Inequality



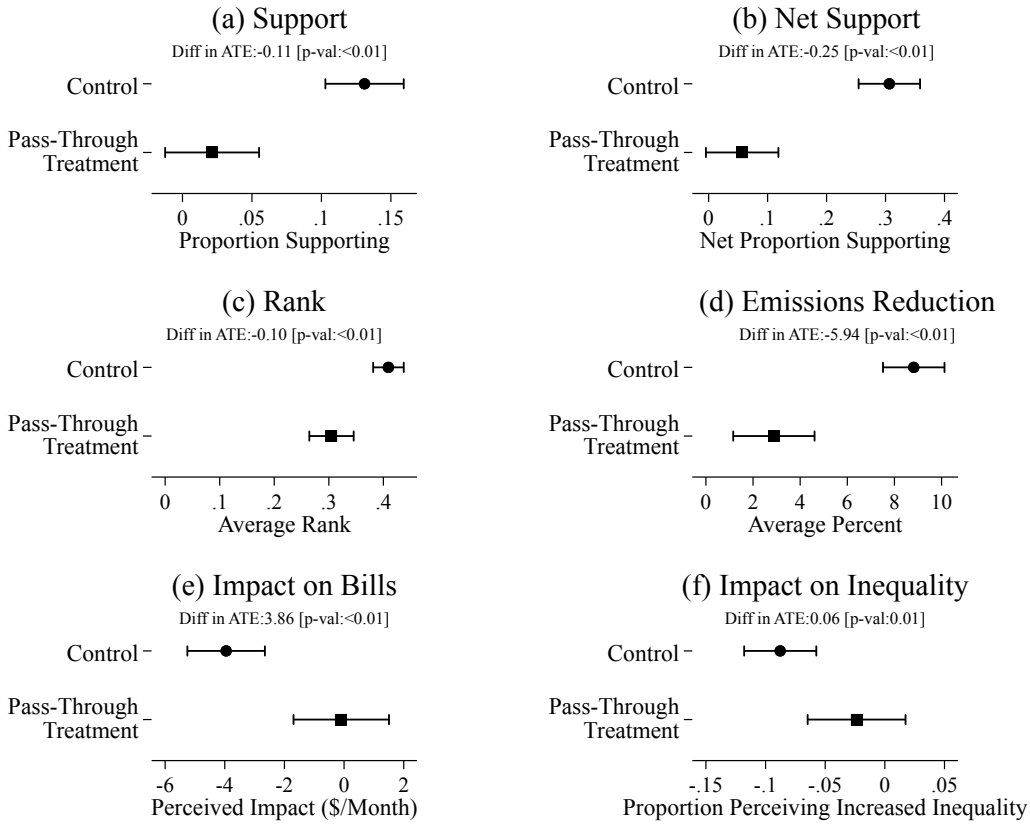
Notes: Figures use the AmeriSpeak control group. In panel a, the outcome is the perceived impact of each policy instrument on electricity bills (in dollars). In panel b, the outcome is an indicator for believing that a policy instrument increases inequality.We show the p-values of testing equality in means between each market-based instrument and standard. When pooling market-based instruments, the average perceived impact on electricity bills is 20.841 (vs. 18.669 for standard, p-value = 0.000); the average perceived impact on inequality is 0.658 (vs. 0.592 for standard, p-value = 0.000).

Figure 5: Preferences Over Policy Instruments, AmeriSpeak Versus Prolific



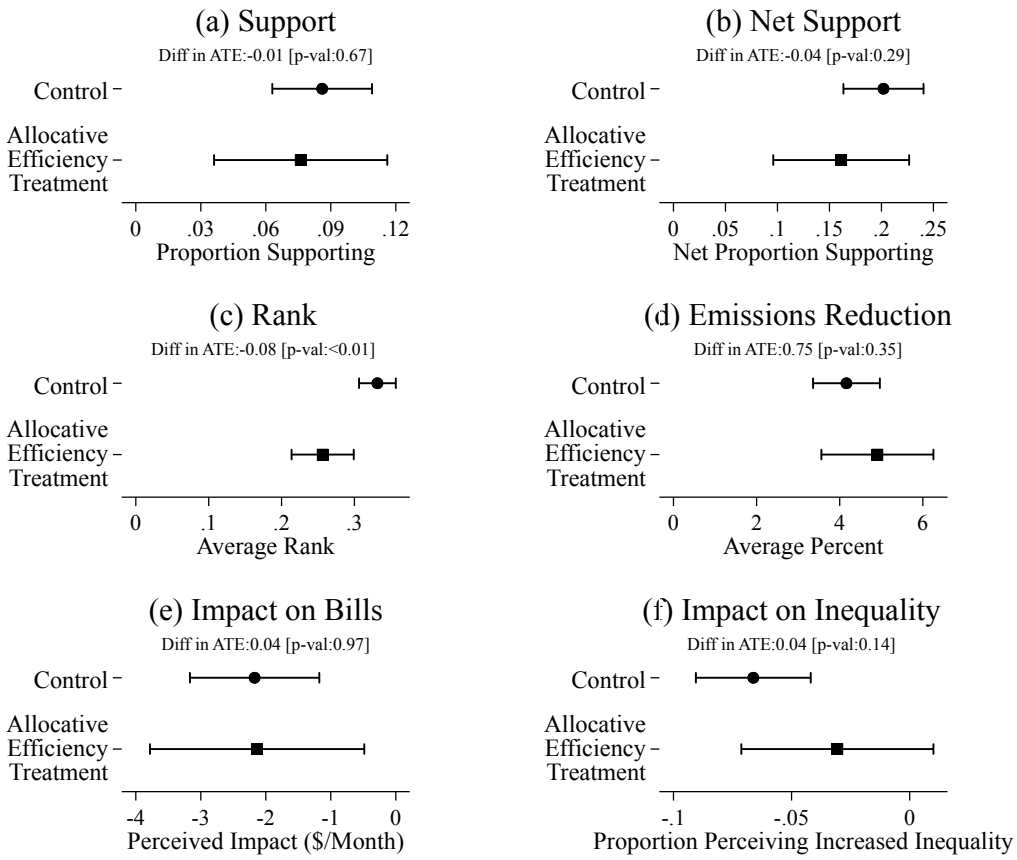
Notes: Figures pool AmeriSpeak and Prolific control groups. We regress the outcomes on an indicator for Prolific sample with different sets of controls to estimate the group difference. In Panel a, the outcome is an indicator for supporting each policy. In Panel b, the outcome is an indicator for supporting each policy minus an indicator for not supporting this policy (1=yes, 0=not sure, -1=no). In Panel c, the outcome 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 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 controls include political party affiliation, ideology, beliefs about the role of government intervention on environmental protection and the cause of global warming. Financial literacy controls check participants' basic understanding of interest rates, inflation, and returns. We also tested no difference in the baseline of all policies (all four coefficients = 0). For support, net support, and desired emission reduction, 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 6: Effects of the Pass-Through Video on the Gap between Producer Tax and Consumer Tax



Notes: 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. In Panel e, the outcome variable is the perceived impact on electricity bills for each policy (in dollars). In Panel f, the outcome variable is an indicator for believing whether a policy increases inequality. For each outcome we calculate the difference between the answers for producer tax and consumer tax and show the results for participants in the control group and the pass-through treatment. In each panel, the p-values are derived from testing the hypothesis that the differences between the producer tax and consumer tax is equal in the control group and the treatment group watching the pass-through video. The p-value for testing zero treatment effects across all outcomes is displayed at the bottom of the figure.

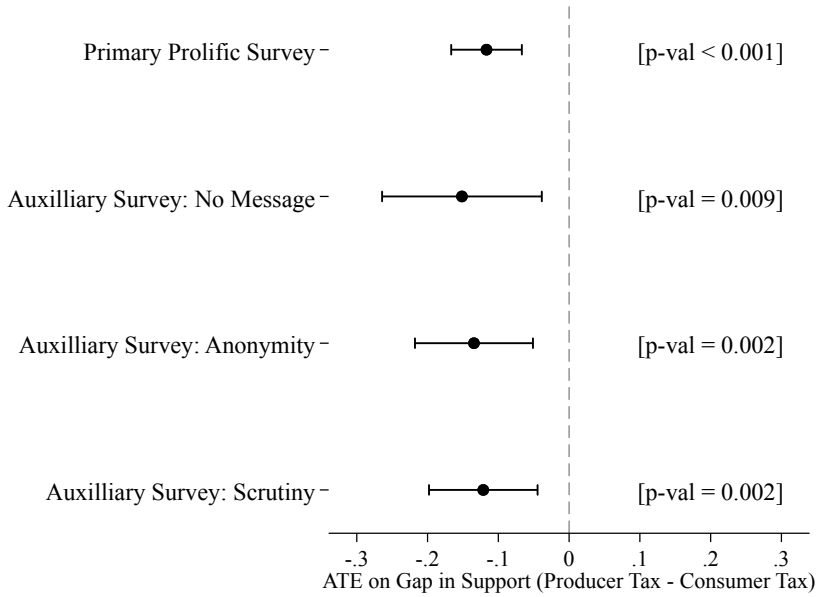
Figure 7: Effects of the Allocative Efficiency Video on the Gap between Standards and Market-Based Instruments



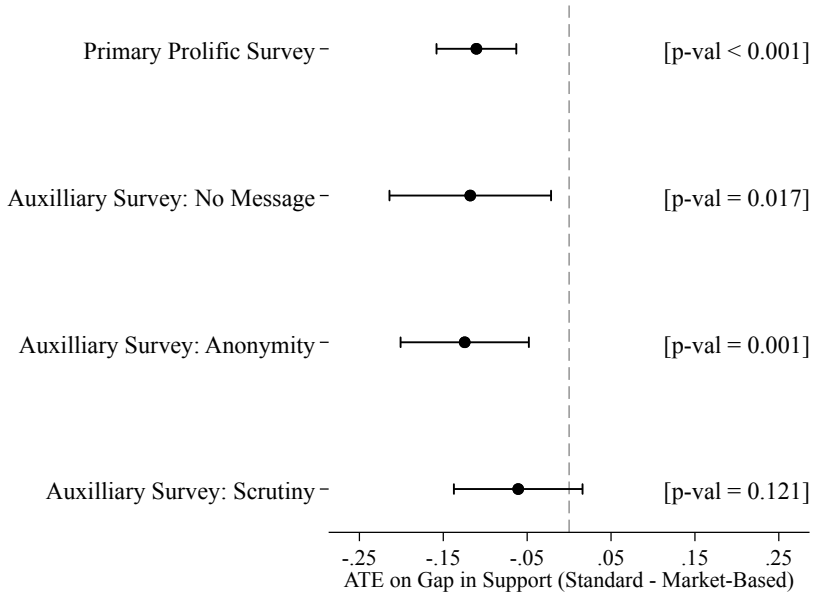
Notes: In Panel a, the outcome variable is an indicator for supporting each policy. In Panel b, the outcome variable is an indicator for supporting each policy minus an indicator for not supporting this policy (1=support, 0=not sure, -1=don't support). In Panel c, the outcome variable is rank, which 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. In Panel e, the outcome variable is the perceived impact on electricity bills for each policy (in dollars). In Panel f, the outcome variable is an indicator for believing whether a policy increases inequality. For each outcomes, we calculate the difference between the answers for market-based instruments (consumer taxes, producer taxes, and cap-and-trade) and for standards and show the results for participants in the control group and the allocatvie efficiency treatment. In each panel, the p-values are derived from testing the hypothesis that the differences between market-based instruments and standards is equal in the control group and the treatment group watching the allocative efficiency video.The p-value for testing zero treatment effects across all outcomes is displayed at the bottom of the figure.

Figure 8: Impact of Anonymity Treatment on Video's Effects on Support for Different Policy Instruments

(a) Effect of Pass-Through Video



(b) Effect of Allocative Efficiency Video



Notes: Figures shows effects of the indicated videos on the support gap between the policy instruments of interest. Panel a shows the effect of the pass-through video on the support gap between taxing consumers and producers. Panel b shows the effect of the allocative efficiency video on the support gap between standard and other market-based policies aggregated. In each panel, the first row shows the treatment effect in primary Prolific sample, and the other estimates 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 (Auxiliary Survey)	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 protect enviro. more	69%	77%	78%	68%	-	56%
Human activity causing climate change	61%	77%	76%	59%	-	62%
Median age	45	38	38	47	47	-

Notes: Columns (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 ideology, political party affiliation, and environmental opinions use the 2023 Gallup poll.

Table 2: Balance Table for the AmeriSpeak Sample

	Control	Pass Through (PT)	Allocative Efficiency (AE)	Control - PT	Control - AE
	Mean	Mean	Mean	T-test	T-test
	(1)	(2)	(3)	(4)	(5)
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 activity	0.598	0.559	0.598	0.039	-0.000
Gov. should protect enviro. more	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 groups. 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. *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. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Online Appendix

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A Supplementary Figures and Tables

Table A1: Balance Table (Prolific Sample)

	Control	Pass Through (PT)	Allocative Efficiency (AE)	Control - PT	Control - AE
	Mean	Mean	Mean	T-test	T-test
	(1)	(2)	(3)	(4)	(5)
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.

Table A2: Pairwise Tests of Equal Baseline Preferences and Perceived Effects

	Support	Net Support	Rank	Emissions	Bills	Inequality
Standard - Cap & Trade	0.069***	0.130***	0.198***	-0.146	0.755	0.012
Standard - Producer Tax	0.029**	0.085***	0.194***	0.870***	-1.658***	-0.061***
Standard - Consumer Tax	0.160***	0.391***	0.603***	5.684***	-5.613***	-0.149***
Cap & Trade - Producer Tax	-0.039**	-0.045*	-0.005	1.016***	-2.413***	-0.074***
Cap & Trade - Consumer Tax	0.092***	0.261***	0.405***	5.830***	-6.368***	-0.161***
Producer Tax - Consumer Tax	0.131***	0.306***	0.409***	4.814***	-3.955***	-0.088***

Notes: For each outcome in the column, we test pairwise whether the outcome for two policy instruments are equal in the AmeriSpeak control sample. The differences are shown in the cells. We use * for p-value $<$ 0.1, ** for p-value < 0.05, and *** for p-value < 0.01.

Table A3: Video Understanding Across Samples and Videos, Free Entry Responses

(a) Pass-Through Treatment

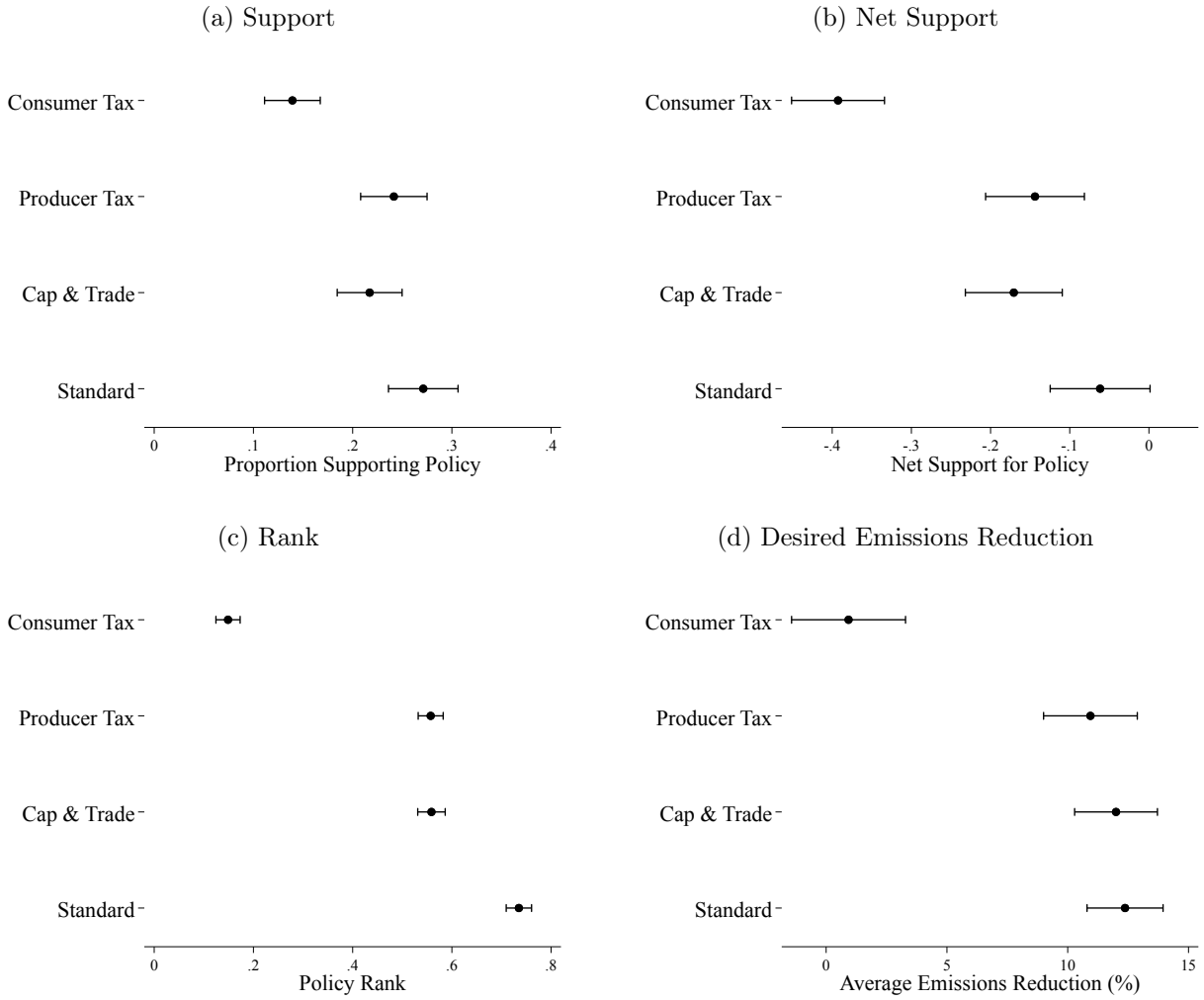
	Understanding = 1	Understanding = 2	Understanding = 3
AmeriSpeak	19.58%	24.91%	55.50%
Prolific	12.51%	18.87%	68.61%

(b) Allocative Efficiency Treatment

	Understanding = 1	Understanding = 2	Understanding = 3
AmeriSpeak	45.42%	41.68%	12.90%
Prolific	29.94%	42.49%	27.58%

Notes: Each cell displays the percent of respondents categorized in an understanding score in AmeriSpeak / Prolific sample. We use Claude Opus 4.6 to analyze responses to the question "in one or two sentences, describe what the video is about" after each video. Our prompt includes the link to the video and requests the model to rate the demonstrated level of video understanding (1=poor, 2=partial, 3=sufficient). Appendix C provides more details on the classification.

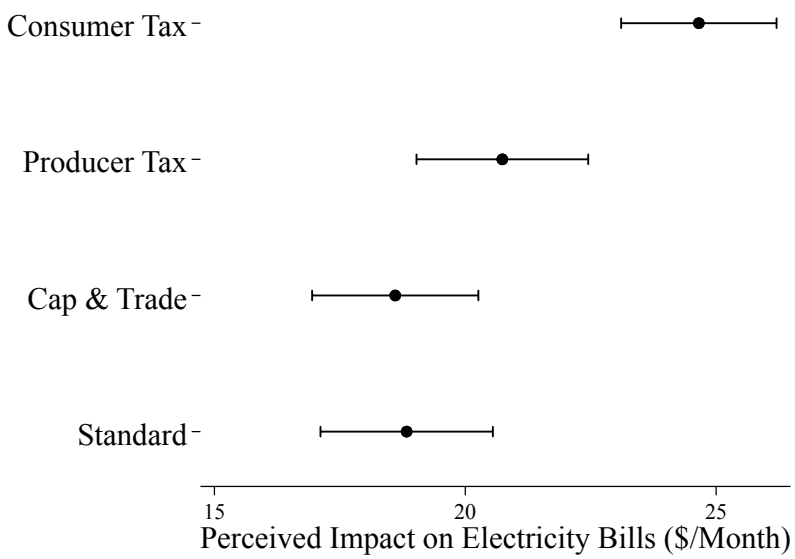
Figure A1: Policy Preferences: Control Group (AmeriSpeak Control Group, Weighted)



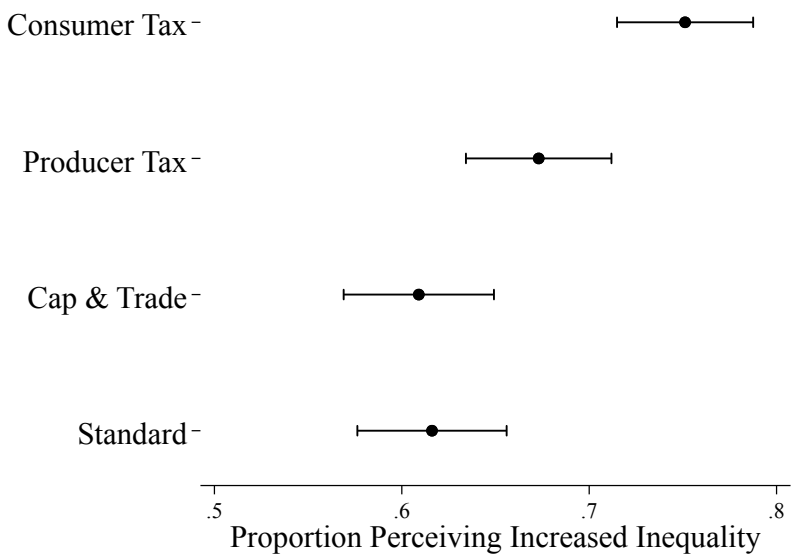
Notes: Figure uses the AmeriSpeak control group and apply the weights provided by NORC. In Panel a, the outcome variable is an indicator for supporting each policy. In Panel b, the outcome variable is an indicator for supporting each policy minus an indicator for not supporting this policy (1=yes, 0=not 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 A2: Perceived Impacts of Policies on Electricity Bills and Inequality (AmeriSpeak Control Group, Weighted)

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

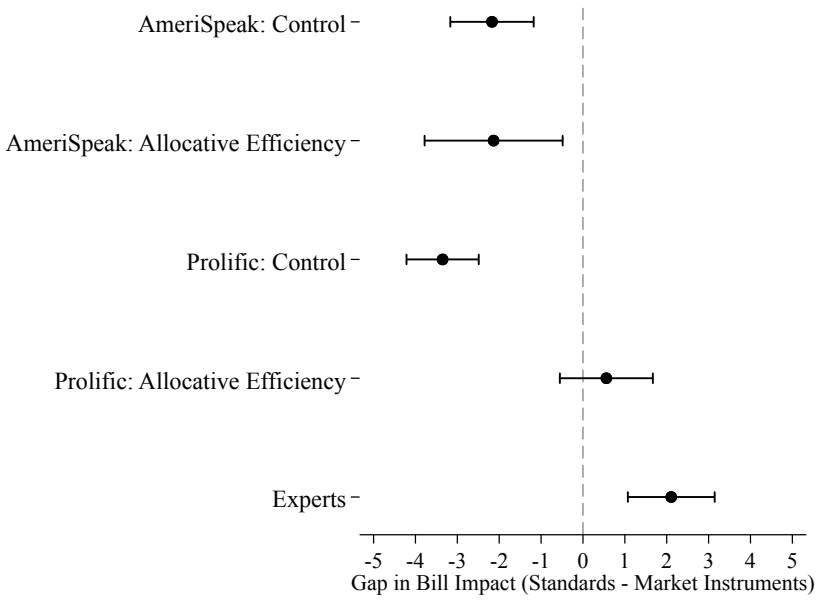


(b) Impact on Increasing Inequality



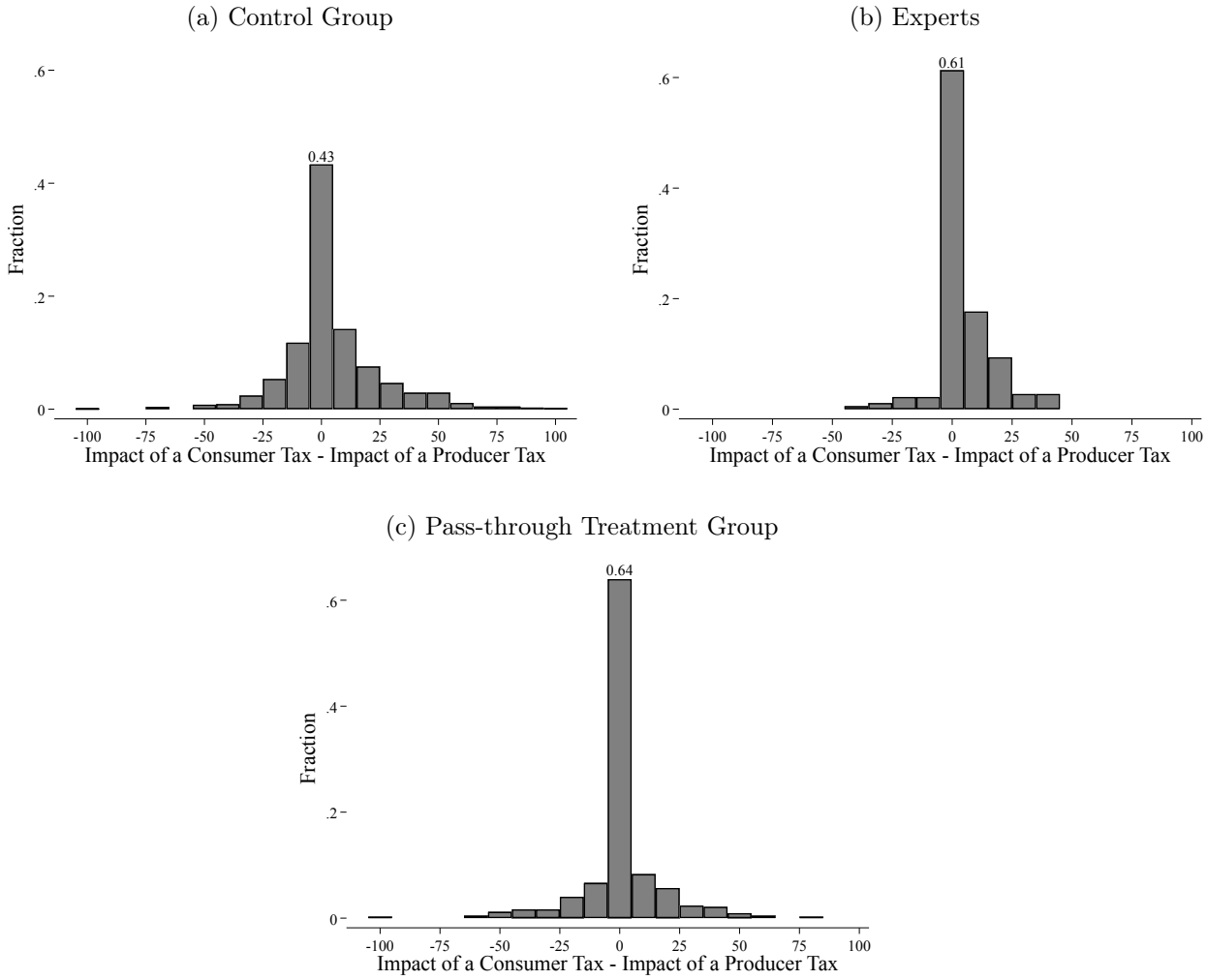
Notes: Figures use the AmeriSpeak control group and apply the weights provided by NORC. In panel a, the outcome variable is the perceived impact on electricity bills for each policy (in dollars). In Panel b, the outcome variable is an indicator for believing that a policy increases inequality.

Figure A3: Difference in Electricity Bills Between Standards and Market-Based Instruments, by Sample and Treatment



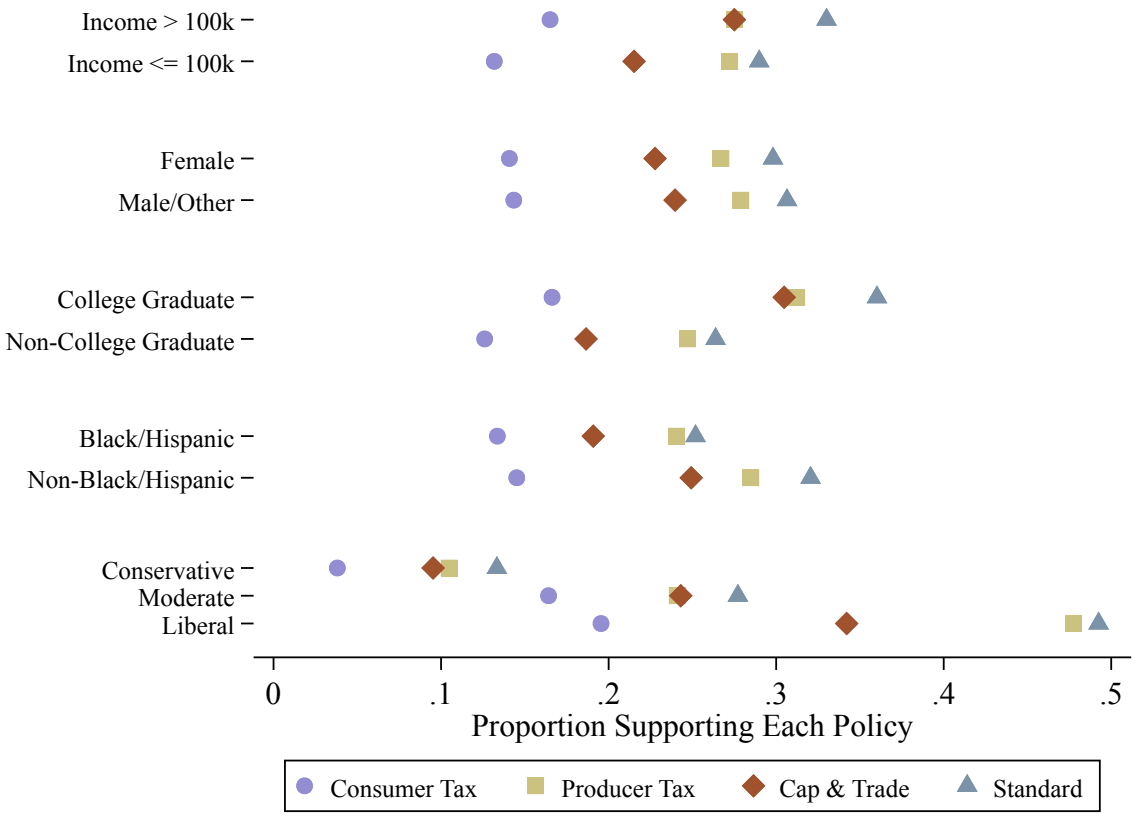
Notes: Figure shows the perceived difference in the impact of standards and market based instruments on consumer electricity bills in $/month across different samples. We pool all market-based instruments (consumer taxes, producer taxes, and cap-and-trade). "Allocative Efficiency" represents the treatment group that watched the allocative efficiency video.

Figure A4: Perceived Impacts of Consumer Versus Producer Taxes on Electricity Bills



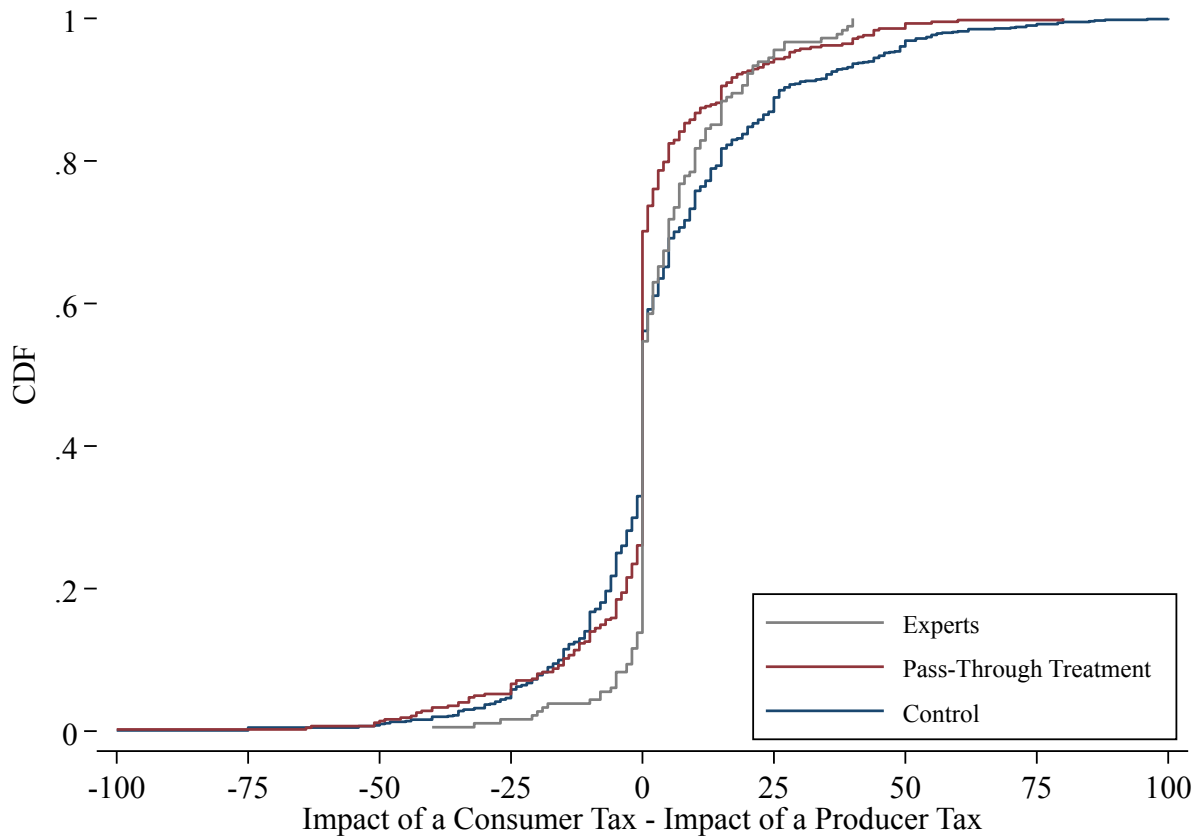
Notes: Values are in \$/Month. Figures show the within-person difference in perceiving the impact of a consumer tax and a producer tax across different groups / samples. Each bin has width of \$5. The total number of expert responses we analyze is 181. The p-value of testing equality in mean between the control group and experts is <0.01; the p-value of testing equality in mean between the control group and the pass-through treatment group is <0.01; the p-value of testing equality in mean between experts and the pass-through treatment group is 0.536.

Figure A5: Policy Support: Heterogeneity by Demographics



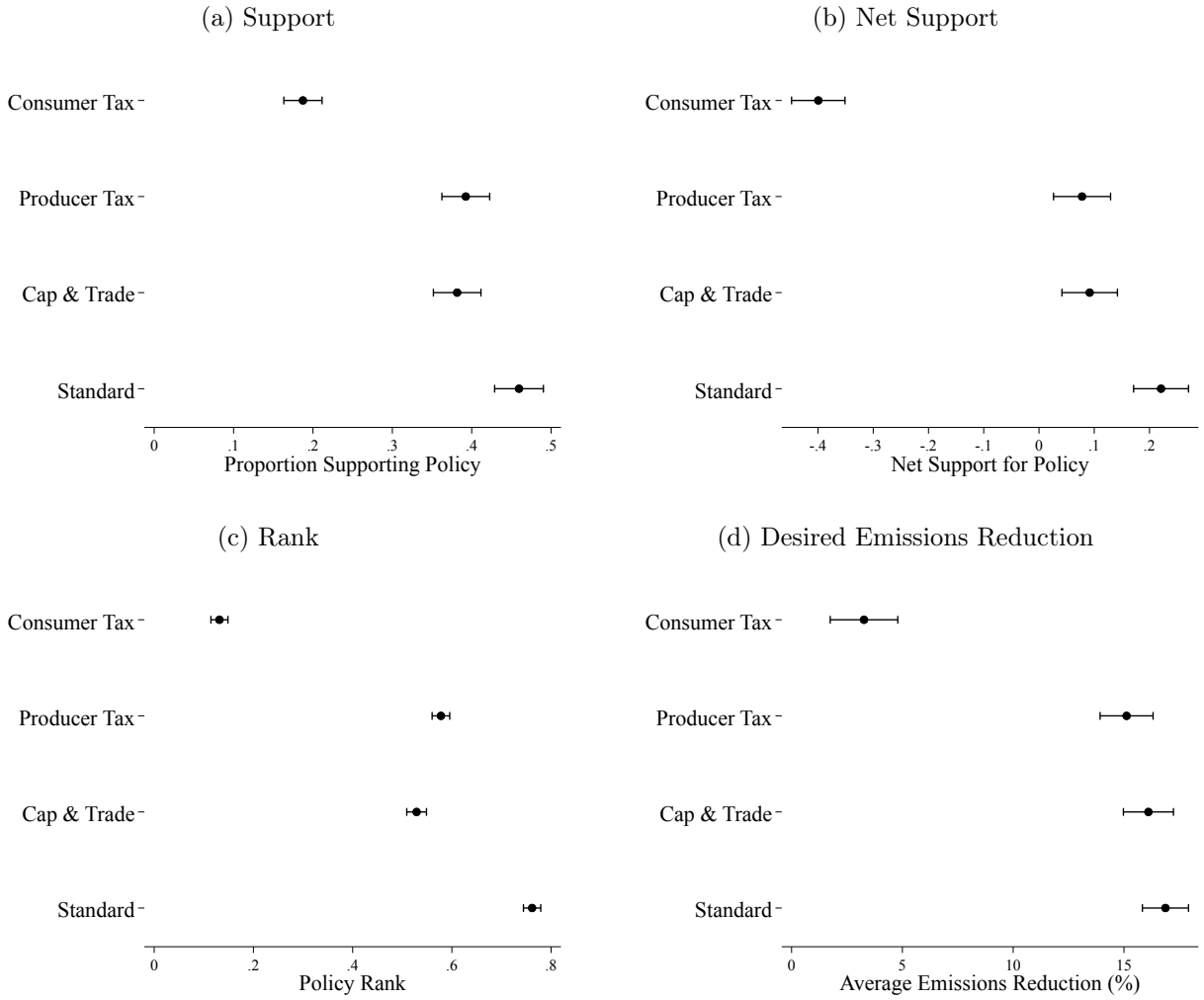
Notes: The figure uses the AmeriSpeak control group. The outcome variable is an indicator for supporting each policy and the figure show the support for each policy instrument by demographic group.

Figure A6: Perceived Impact of Consumer Versus Producer Taxes on Electricity Bills, CDF



Notes: Values are in $/month. 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 A4). The total number of expert responses we analyze is 181.

Figure A7: Preferences Over Policy Instruments (Prolific Control Group)



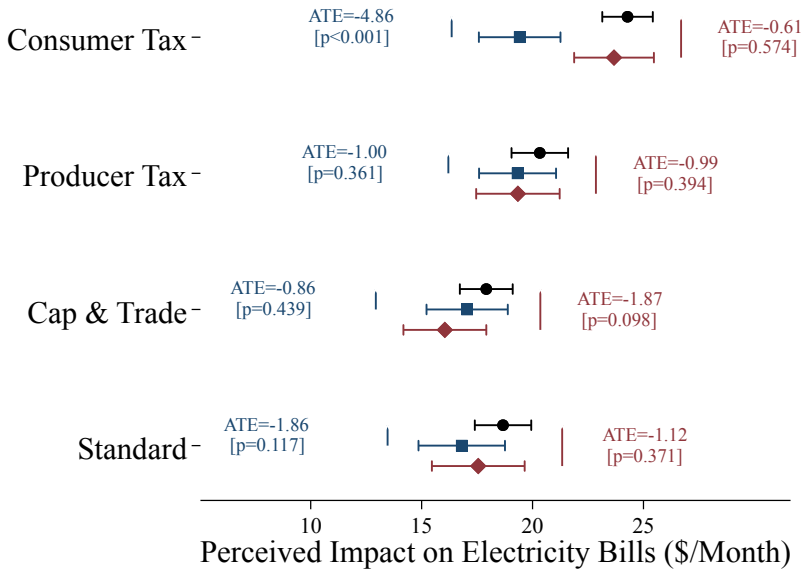
Notes: In Panel a, the outcome variable is an indicator for supporting each policy. In Panel b, the outcome variable is an indicator for supporting each policy minus an indicator for not supporting this policy (1=yes, 0=not sure, -1=no). In Panel c, the outcome variable is rank, which originally ranges 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 A8: Effects of Informational Videos on Policy Preferences

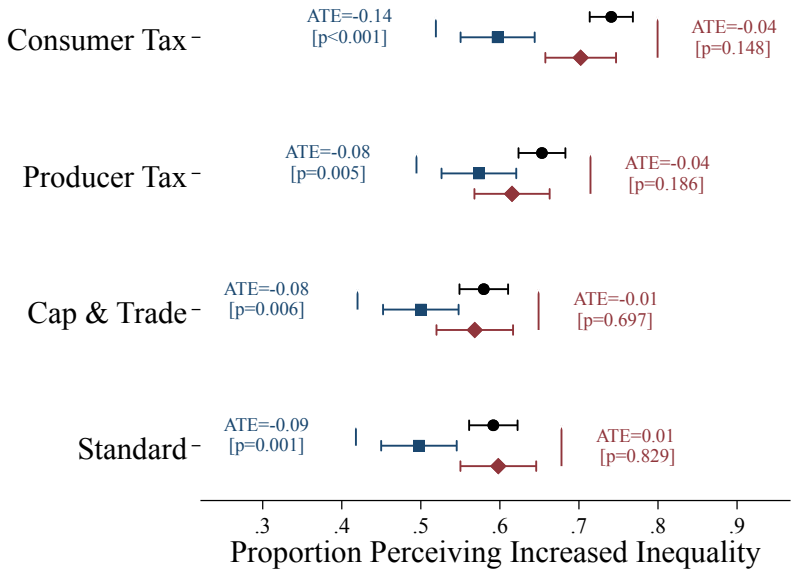
Notes: Each panel shows the effect of the indicated treatment on respondent preferences for each policy. In panel a, the outcome variable is an indicator for supporting each policy. In Panel b, the outcome variable is an indicator for supporting each policy minus an indicator for not supporting this 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.

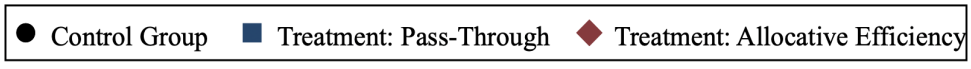
Figure A9: Effect of Informational Videos on Perceived Impact of Policy Instruments on Electricity Bills and Inequality

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



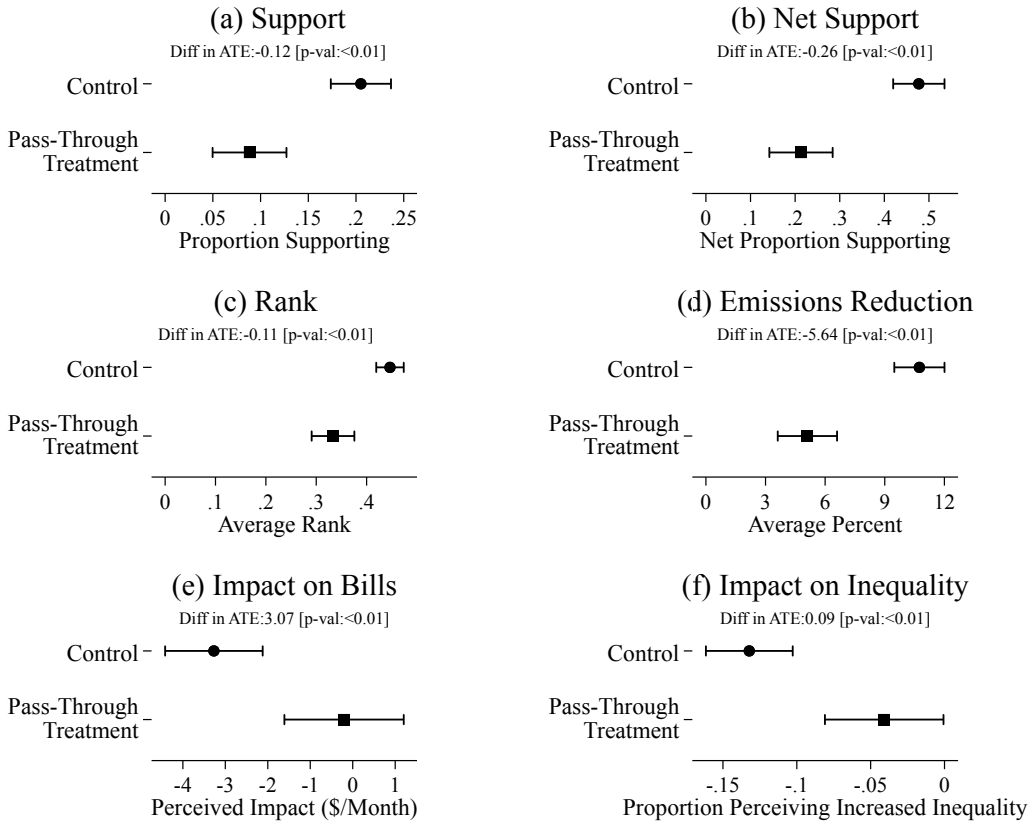
(b) Policy Impact on Inequality





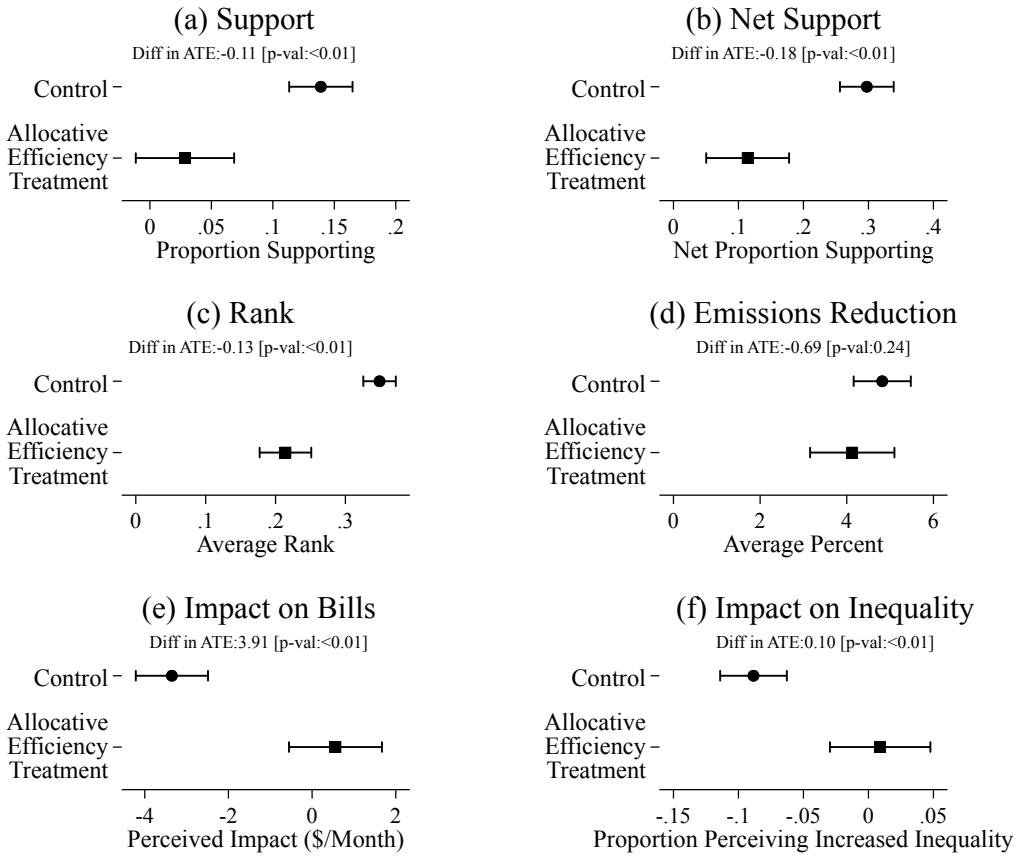
Notes: Each panel shows the effect of the indicated treatment on respondents' beliefs about how the policies impact electricity bills and inequality. For panel a, the outcome variable is the perceived impact on electricity bills for each policy (in dollars). For Panel b, the outcome variable is an indicator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

Figure A10: Effects of the Pass-Through Video on the Gap between Producer Tax and Consumer Tax (Prolific)



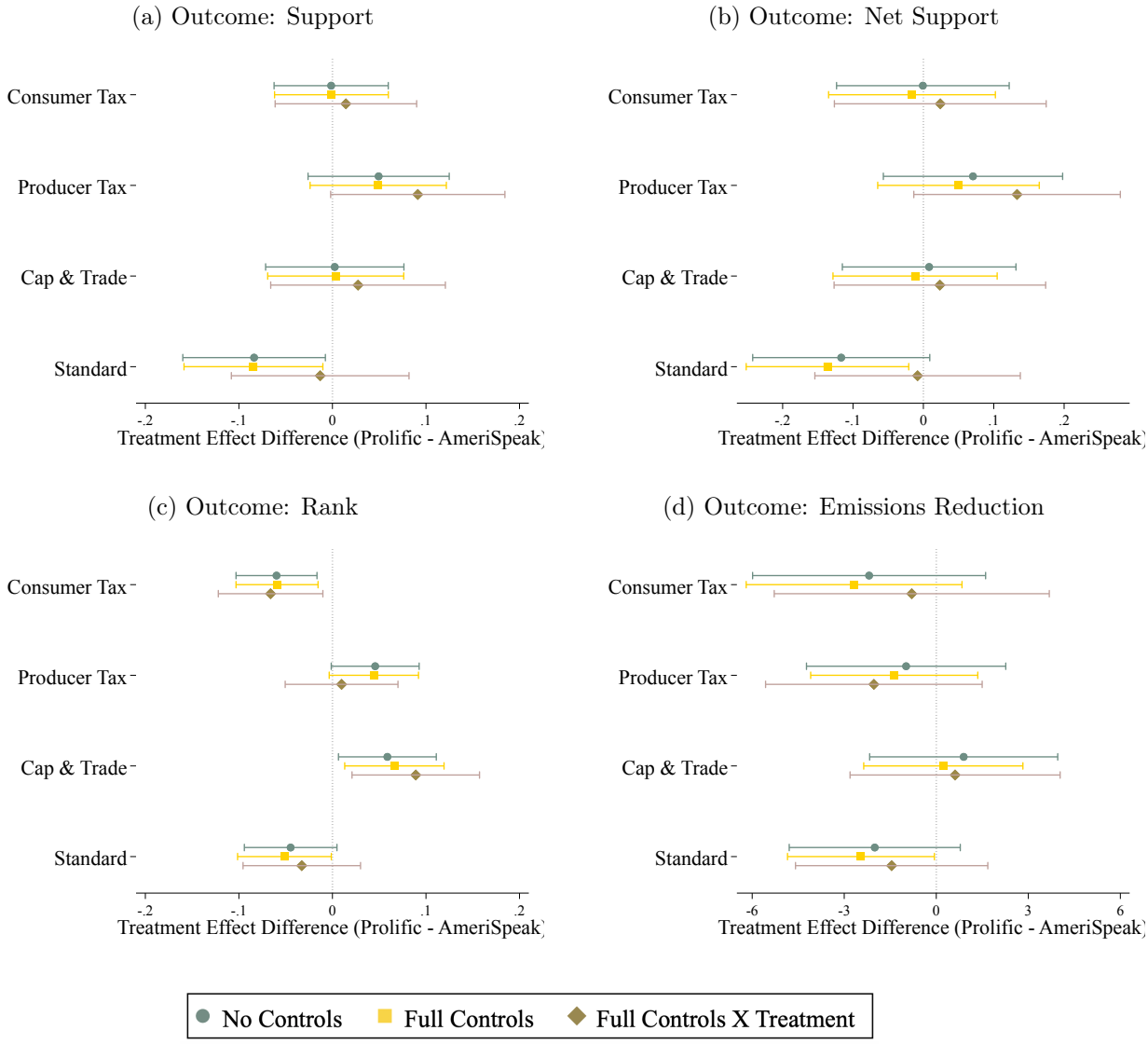
Notes: In Panel a, the outcome variable is an indicator for supporting each policy. In Panel b, the outcome variable is an indicator for supporting each policy minus an indicator for not supporting this policy (1=support, 0=not sure, -1=don't support). In Panel c, the outcome variable is rank, which 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. In Panel e, the outcome variable is the perceived impact on electricity bills for each policy (in dollars). In Panel f, the outcome variable is an indicator for believing whether a policy increases inequality. For each outcome we calculate the difference between the answers for producer tax and consumer tax and show the results for participants in the control group and the pass-through treatment. The p-values are derived from testing the hypothesis that the differences between the producer tax and consumer tax is equal in the control group and the treatment group watching the pass-thourgh video. The p-value for testing zero treatment effects across all outcomes is also displayed under each panel.

Figure A11: Effects of the Allocative Efficiency Video on the Gap between Standards and Market-Based Instruments (Prolific)



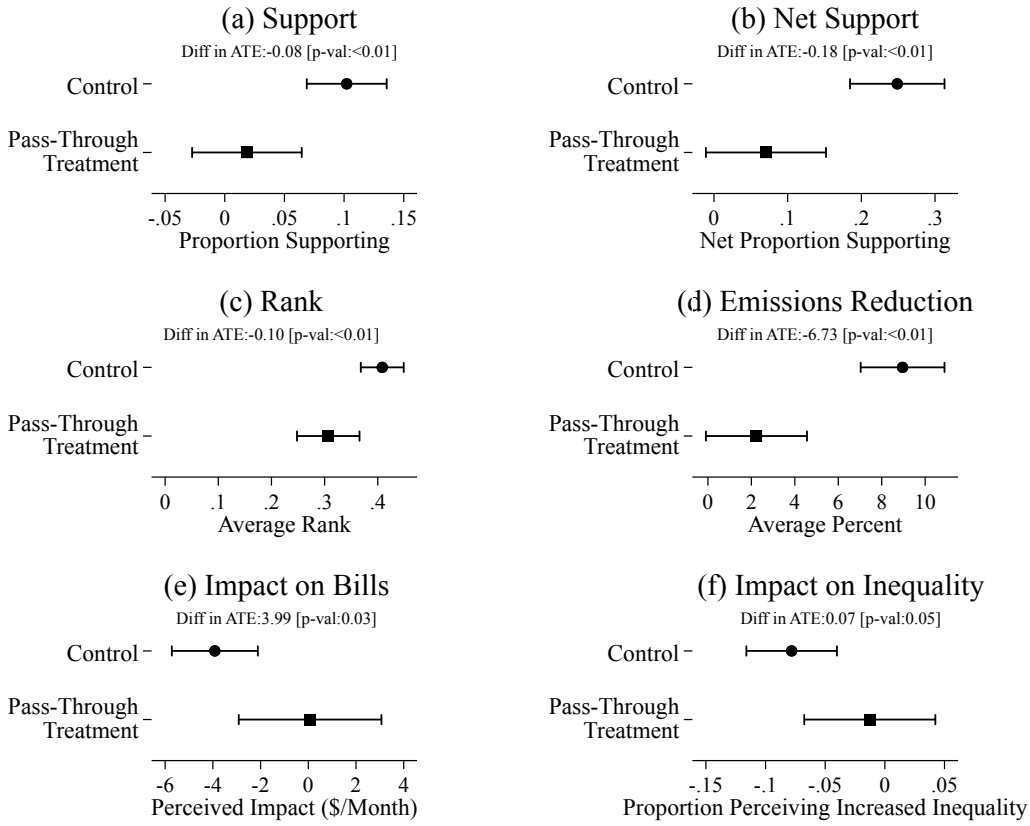
Notes: In Panel a, the outcome variable is an indicator for supporting each policy. In Panel b, the outcome variable is an indicator for supporting each policy minus an indicator for not supporting this policy (1=support, 0=not sure, -1=don't support). In Panel c, the outcome variable is rank, which 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. In Panel e, the outcome variable is the perceived impact on electricity bills for each policy (in dollars). In Panel f, the outcome variable is an indicator for believing whether a policy increases inequality. For each outcomes, we calculate the difference between the answers for market-based instruments (consumer taxes, producer taxes, and cap-and-trade) and for standards and show the results for participants in the control group and the allocative efficiency treatment. The p-values are derived from testing the hypothesis that the differences between market-based instruments and standards is equal in the control group and the treatment group watching the allocative efficiency video. The p-value for testing zero treatment effects across all outcomes is also displayed under each panel.

Figure A12: Effects of Allocative Efficiency Informational Video, by Platform and Controls



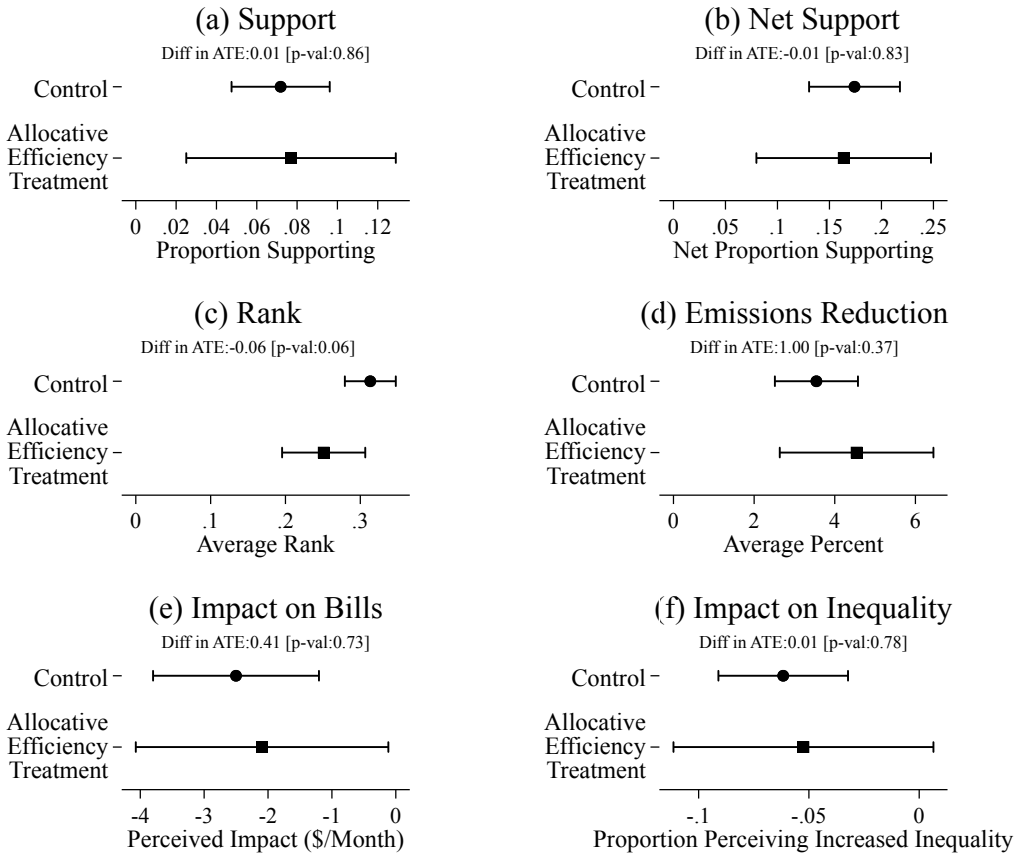
Notes: The figures above show the difference in treatment effect between the two samples (Prolific - AmeriSpeak). In Panel a, the outcome variable is an indicator for supporting each policy. In Panel b, the outcome variable is rank, which originally ranges from 1 to 4 for each policy and is normalized to 0-1 range (0 for ranking last and 1 for ranking first). In Panel 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 Panel 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.

Figure A13: Effects of the Pass-Through Video on the Gap between Producer Tax and Consumer Tax (Weighted AmeriSpeak)



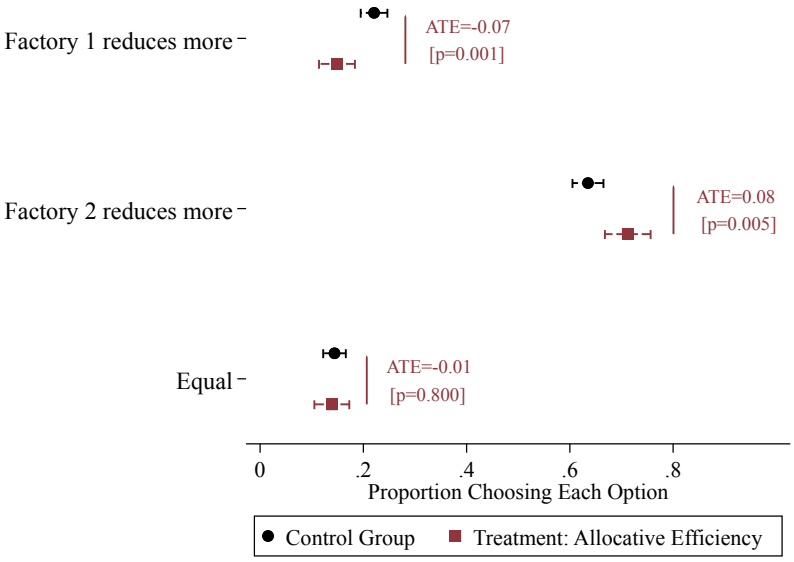
Notes: In Panel a, the outcome variable is an indicator for supporting each policy. In Panel b, the outcome variable is an indicator for supporting each policy minus an indicator for not supporting this policy (1=support, 0=not sure, -1=don't support). In Panel c, the outcome variable is rank, which 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. In Panel e, the outcome variable is the perceived impact on electricity bills for each policy (in dollars). In Panel f, the outcome variable is an indicator for believing whether a policy increases inequality. For each outcome we calculate the difference between the answers for producer tax and consumer tax and show the results for participants in the control group and the pass-through treatment. The p-values are derived from testing the hypothesis that the differences between the producer tax and consumer tax is equal in the control group and the treatment group watching the pass-thourgh video. The p-value for testing zero treatment effects across all outcomes is also displayed under each panel. We apply the final weight variable provided by NORC.

Figure A14: Effects of the Allocative Efficiency Video on the Gap between Standards and Market-Based Instruments (Weighted AmeriSpeak)



Notes: 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. In Panel e, the outcome variable is the perceived impact on electricity bills for each policy (in dollars). In Panel f, the outcome variable is an indicator for believing whether a policy increases inequality. For each outcomes, we calculate the difference between the answers for market-based instruments (consumer taxes, producer taxes, and cap-and-trade) and for standards and show the results for participants in the control group and the allocatvie efficiency treatment. The p-values are derived from testing the hypothesis that the differences between market-based instruments and standards is equal in the control group and the treatment group watching the allocative efficiency video. The p-value for testing zero treatment effects across all outcomes is also displayed under each panel. We apply the final weight variable provided by NORC.

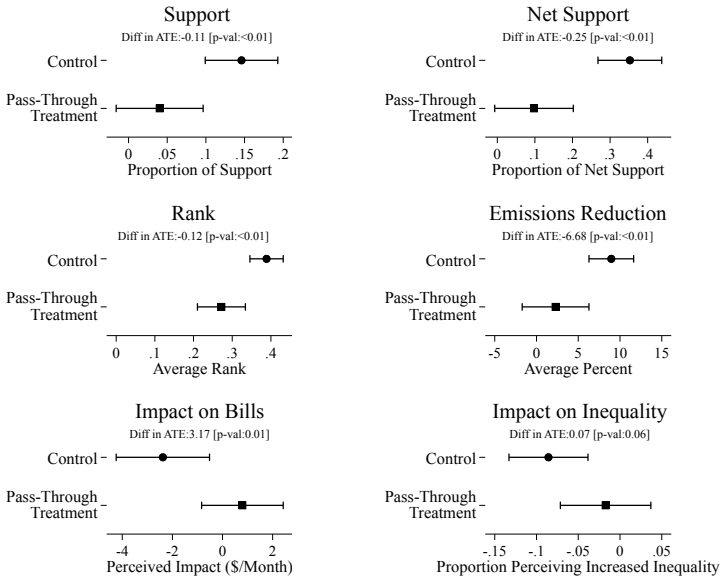
Figure A15: Effect of Informational Videos on Comprehension of Allocative Efficiency



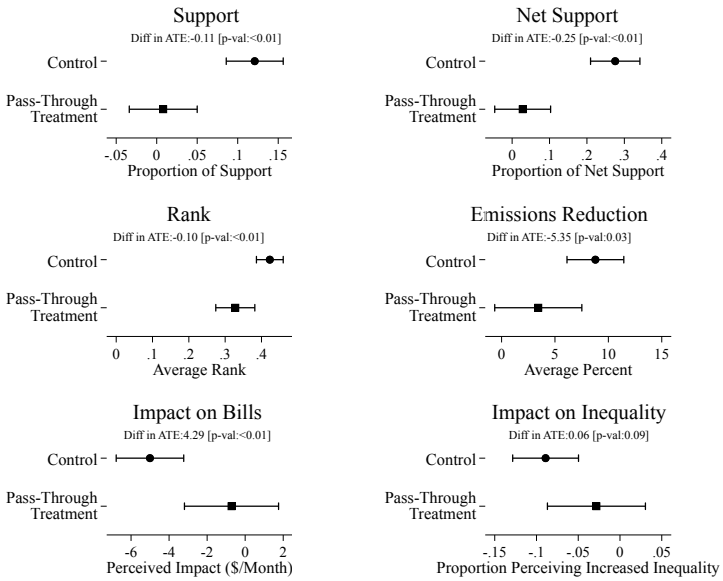
Notes: Figure uses responses from AmeriSpeak control and allocative efficiency treatment group to show the effect of the allocative efficiency video on understanding the concept of allocative efficiency. Participants were asked to consider two factories: Factory 1 is high pollution and high mariginal 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 A16: Impacts of Pass-Through Video, by Education Level

(a) College or Above



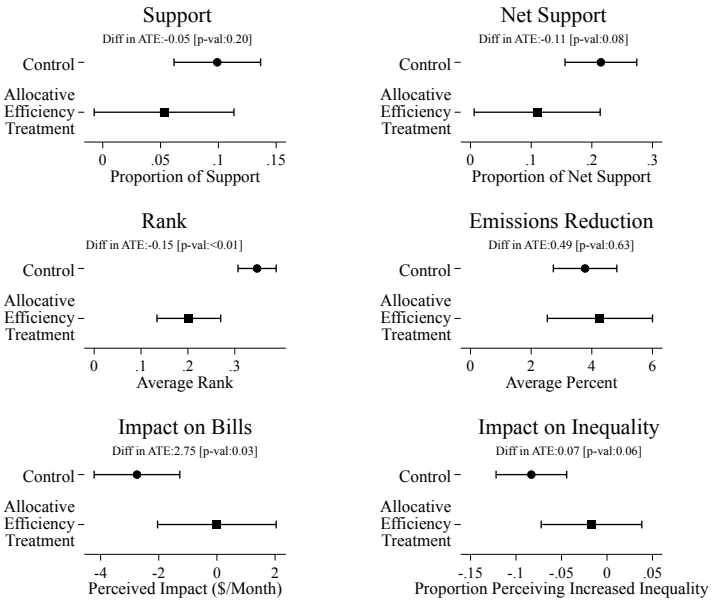
(b) Non-College



Notes: The panels show the effect of pass-through videos on each outcome for college vs. non-college AmeriSpeak respondents. The p-value for testing zero treatment effects across all outcomes is also displayed under each panel. We also test whether the treatment effects across all outcomes are different for college graduates than non-college, and the p-value from the F test is 0.48.

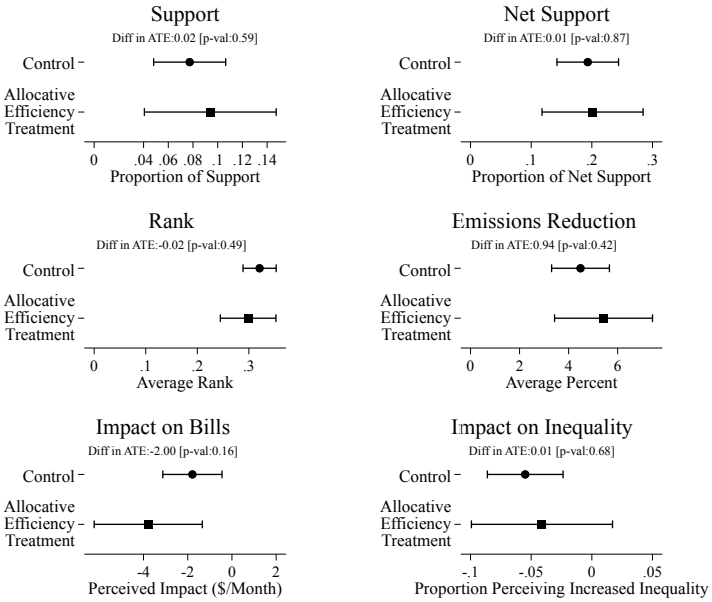
Figure A17: Effects of Allocative Efficiency Video on Policy Preferences and Beliefs, by Education

(a) College or Above



Average Difference: Standard - Market-Based Instruments (p-val < 0.01 from F-test)

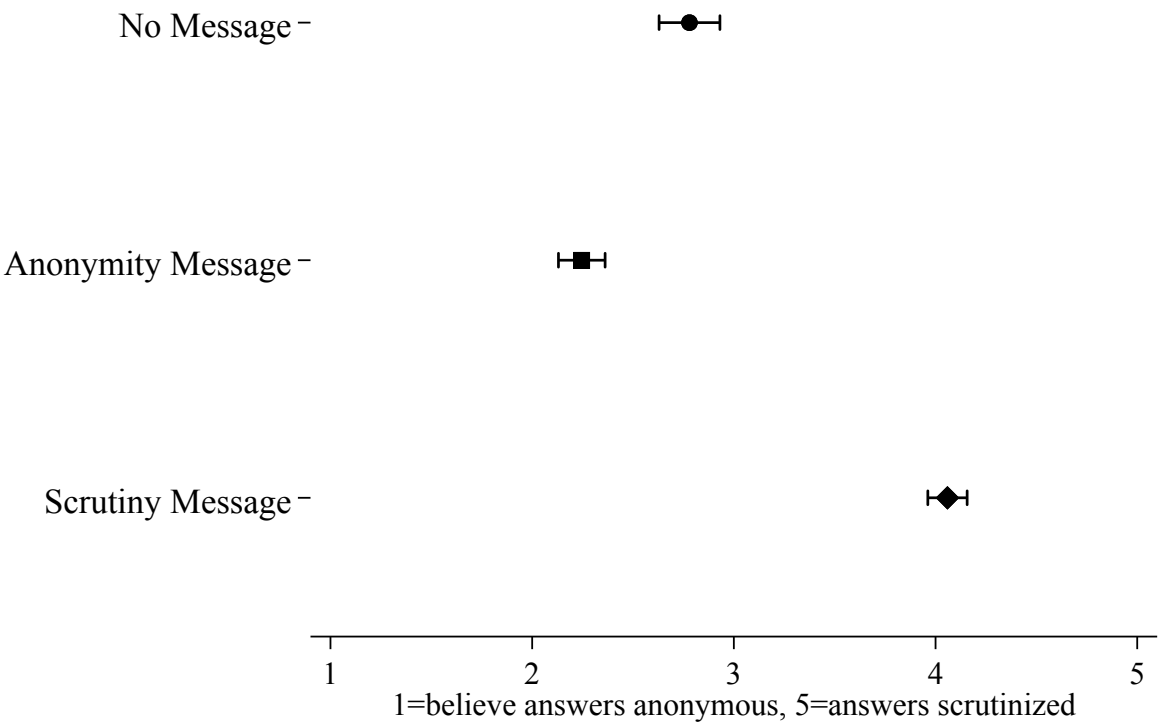
(b) Non-College



Average Difference: Standard - Market-Based Instruments (p-val = 0.64 from F-test)

Notes: The panels show the treatment effect on each outcome for college vs. non-college AmeriSpeak sample. The p-value for testing zero treatment effects across all outcomes is also displayed under each panel. We also test whether the treatment effects across all outcomes are different for college graduates than non-college, and the p-value from the F test is 0.04.

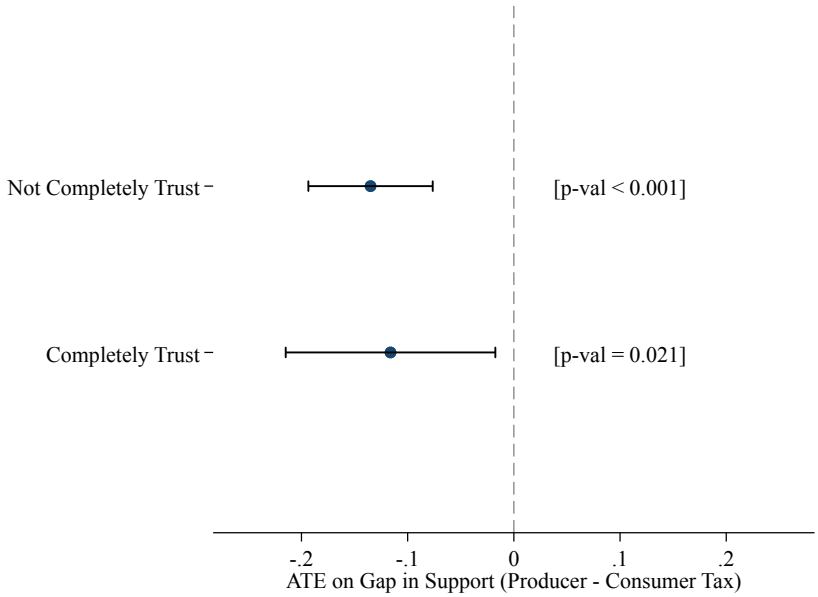
Figure A18: Effects of Anonymity and Scrutiny Treatments on Perceived Scrutiny



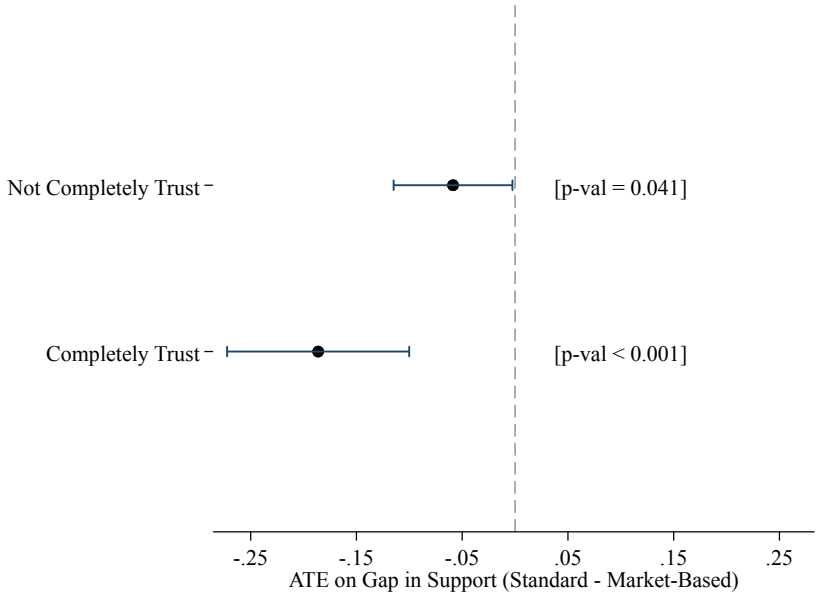
Notes: The figure shows the average belief of how much the researchers scrutinize responses (1 = believe answers are completely anonymous and 5 = believe answers are carefully scrutinized) across the three groups.

Figure A19: Effect of Informational Videos 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.

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 LLM Prompt

Analyzing understanding of the pass-through video

Context

You are a research assistant analyzing open-ended questions in a survey. Use an LLM-based approach (Opus 4.6) with the claude CLI programmatically via subprocess calls to score each response based on semantic understanding. Participants were shown the following video: https://www.dropbox.com/scl/fi/uynse65wgr48ng28qf5pt/Pass-through-Debiasing-v4.mp4?rlkey=va45of7
They were then asked the following quiz questions:

Q1 When will consumers have to pay more, in total, for each gallon of gasoline?

A. When consumers who purchase gasoline have to pay the tax.

B. When gas stations that sell gasoline have to pay the tax.

C. It does not matter who procedurally has to pay the tax. [correct answer]

Q2 The government has decided to set a new tax on vehicles. When will companies have higher profits?

A. When the tax is set on companies producing vehicles.

B. When the tax is set on households buying vehicles.

C. Company profits will be the same regardless of who pays the tax. [correct answer]

D. It depends if the companies producing vehicles are monopolies.

They were then asked "in one or two sentences, describe what the video is about." We want to rate to what extent participants understood the economic principles explained in the video.

Task

Rate to what extent each participant understood the economic principle explained in the video. Provide exactly one number (1, 2, 3, or 99) per response based on the rubric below. Interpret obvious typos and misspellings charitably—score based on the most likely intended meaning.

Scoring Rubric

1 – No / poor understanding. The participant does not seem to understand the video, or displays mistakes or misunderstandings.

Score 1 when the response:

- Does not mention tax or incidence at all.
- Gives a label-like answer with only generic terms and no explanation of any relationship (e.g., "tax on gas," "taxes," "how we are taxed," "basic economics").
- Explicitly states the wrong conclusion — that who pays the tax DOES matter for the outcome (e.g., "It does matter who pays the taxes on goods," "taxes will be different if companies pay or consumers pay").
- Is off-topic, sarcastic, political commentary, or a non-answer.

Examples:

- ‘‘Taxes.’’
- ‘‘Taxing Fuel’’
- ‘‘How we are taxed.’’
- ‘‘Basic economics’’
- ‘‘The government rise taxes on gas’’
- ‘‘Taxation is theft by the threat of force.’’
- ‘‘It’s about corporate greed and companies raising prices.’’
- ‘‘Brain washing the consumer.’’

2 – Partial understanding. The participant shows some understanding but does not clearly state that the outcome is the same regardless of who pays.

Score 2 when the response:

- Describes that the tax can be imposed on producers vs. consumers, but does not discuss whether the outcome, burden, or profits are the same or different.
- Gives a generally correct but vague description (e.g., "comparing a tax on companies and a tax on households").
- Describes the pass-through mechanism (companies pass the tax to consumers) WITHOUT also stating that both scenarios yield the same outcome. Describing pass-through alone is NOT sufficient for score 3.
- Asks or wonders who pays without stating a conclusion.
- Discusses the topic in generally correct terms but remains noncommittal about the key equivalence.

Examples:

- ''It is comparing the effect of a tax on both companies and households.''
- ''Taxes - whether they are applied at the gas station/pump or to the households.''
- ''Who pays the tax, corporate or individual.''
- ''Tax either on consumers or producers.''
- ''The video is about the difference between taxing households directly and taxing gas stations.''
- ''Who is responsible for paying the tax''
- ''The video was about how texting a gas station can still be paid for by the consumer'' [describes pass-through only, no equivalence stated]
- ''When companies get taxed they will add the tax on to what the consumer is buying so that way they can still profit.'' [describes pass-through mechanism only]
- ''Who actually pays a tax in the end, the company or the household.'' [poses the question without answering it]

3 – Clear understanding of the key economic principle. The participant conveys the idea that the economic outcome / tax burden / profits are the same regardless of who is charged / who pays / who writes the check. Synonyms and paraphrases count.

To qualify for score 3, the response must convey BOTH of these elements:

1. There are two possible policy instruments (tax on companies vs. tax on consumers), AND

2. The economic outcome is equivalent across those scenarios—whether stated as identical costs, identical profits, identical burdens, or the irrelevance of who formally pays.

Element 2 can be expressed in many ways, including:

- Explicitly stating equivalence ("the cost is the same regardless," "profits don't change," "it doesn't matter who pays").

- Stating that the consumer always/ultimately/inevitably bears the cost regardless of who is taxed—as long as the response makes clear this holds across BOTH scenarios, not just as a general statement about taxes.

Score based on whether the participant can articulate the principle, regardless of whether they agree with it. A response like "The video claims it doesn't matter who pays the tax, but I think that's wrong" should still receive score 3.

Examples:

- ''It doesn't matter who pays the tax; the burden is the same.''
- ''The outcome is the same whether consumers or companies are taxed.''
- ''Who writes the check doesn't change who really bears the cost.''
- ''Consumers end up paying even if companies are taxed.''
- ''The consumer still pays regardless of who's taxed.''
- ''Even if the business pays the tax, it is passed to the consumer.''
- ''Taxes are always passed onto consumers, regardless of whether the tax is levied on them or not.''
- ''The price is the same whether the gas station or the household pays the tax.''
- ''An errant hypothesis that procedural changes to taxes don't effect the total cost to the parties involved.'' [articulates the principle despite disagreeing]

- ‘‘It doesn’t matter who gets to pay the tax, price will be passed along.’’
- ‘‘Either way we pay higher!’’ [when context clearly implies both tax scenarios]
- ‘‘Taxes will always be paid by consumers in the end.’’ [implies this holds regardless of who is formally taxed]

99 — Blank

The response field is empty or contains only whitespace.

Output Format

Return only the score (1, 2, 3, or 99) next to the column of responses.

Analyzing understanding of the allocative efficiency video

Context

You are a research assistant analyzing open-ended questions in a survey. Use an LLM-based approach (Opus 4.6) with the claude CLI programmatically via subprocess calls to score each response based on semantic understanding. Participants were shown the following video: https://www.dropbox.com/scl/fi/xfxl9nsxq133an97jbv44/Allocative-Efficiency-v4.mp4?rlkey=qurr171eotl They were then asked the following quiz questions:

Q1 Please indicate the correct definition of cost effectiveness.

A. The cheapest way to achieve a goal [correct answer]

B. The simplest way to achieve a goal

C. The fastest way to achieve a goal

Q2 Which of the following reasons is why economists find that pollution standards and pollution taxes have different cost effectiveness?

A. They lead to different allocation of electricity generation to power plants with high versus low costs to reduce pollution [correct answer].

B. They lead consumers to perceive production costs differently.

C. They lead engineers to innovate different levels of clean energy technology

D. They have different effects on the prices of fossil fuels.

They were then asked "in one or two sentences, describe what the video is about." We want to rate to what extent participants understood the economic principles explained in the video.

Task

Rate to what extent each participant understood the economic principle explained in the video. Provide exactly one number (1, 2, 3, or 99) per response based on the rubric below. Interpret obvious typos and misspellings charitably—score based on the most likely intended meaning.

Scoring Rubric

1 – No / poor understanding. The participant does not seem to understand the video, or displays mistakes or misunderstandings.

Score 1 when the response:

- Does not mention cost, cost-effectiveness, or any comparison of pollution policies.
- Gives a label-like answer with only generic terms and no explanation of any relationship (e.g., "pollution," "cost effective," "taxes," "fossil fuels," "energy").
- Explicitly states the wrong conclusion — that the pollution standard is more cost-effective or better than taxes/cap-and-trade.
- Is off-topic, sarcastic, political commentary, or a non-answer.

Examples:

- ‘‘Pollution’’
- ‘‘Fossil fuels’’
- ‘‘Cost effective’’
- ‘‘Reducing pollution’’
- ‘‘Pollution taxes’’
- ‘‘Taxing companies for the amount of pollution they produce.’’ [describes only one policy, no comparison or cost-effectiveness link]
- ‘‘The video is garbage.’’

- ‘‘Another way for the government to be over involved and make money.’’
- ‘‘Standards are the most cost effective way to reduce pollution.’’ [explicitly wrong conclusion]

2 – Partial understanding. The participant shows some understanding of the video's content—connects cost-effectiveness to pollution reduction, or describes/compares multiple pollution policies—but does not clearly state that taxes or cap-and-trade are more cost-effective than standards.

Score 2 when the response:

- Describes the concept of cost-effectiveness in the pollution reduction context but does not specify which policy is more cost-effective (e.g., "the most cost-effective way to reduce pollution" without saying what that way is).
- Describes HOW the pollution tax works (e.g., "low-cost plants reduce pollution, high-cost plants pay the tax") without explicitly comparing this to the standard or stating that the approach is more cost-effective overall. Describing the mechanism of a single policy alone is NOT sufficient for score 3.
- Gives a generally correct but vague description (e.g., "it's about the cost-effectiveness of different policies in controlling pollution").

Examples:

- ‘‘The cost effectiveness of different pollution-reducing strategies.’’
- ‘‘Comparing the cost effectiveness of standards, taxes, and cap-and-trade.’’
- ‘‘The most cost effective way to reduce pollution.’’ [does not state which method is most cost-effective]
- ‘‘The video is about the difference between pollution standards and a tax on pollution.’’ [compares policies but no conclusion about which is better]
- ‘‘How taxes versus standards affect pollution control.’’ [compares but no conclusion]
- ‘‘Some plants will reduce pollution because it's cheaper, others will pay the tax.’’ [describes tax mechanism only, no comparison to standard]
- ‘‘Cost-effective ways to reduce pollution from plants.’’ [mentions cost-effectiveness but vague]
- ‘‘The video was about different strategies for reducing power plant pollution and their effects.’’ [describes multiple strategies, no conclusion]

3 – Clear understanding of the key economic principle. The participant conveys the idea that market-based instruments (pollution taxes and/or cap-and-trade) are more cost-effective than pollution standards for reducing pollution. Synonyms and paraphrases count.

To qualify for score 3, the response must convey BOTH of these elements:

1. Understands the concept of cost-effectiveness (allowing pollution reduction to happen where it is cheapest or leading to different allocations across high-cost and low-cost plants), AND

2. States or clearly implies that taxes/cap-and-trade are more cost-effective than standards, OR equivalently that standards are less cost-effective than market-based approaches ("taxes are more cost-effective than standards," "cap-and-trade is cheaper than a standard," "standards are not cost-effective").

Score based on whether the participant can articulate the principle, regardless of whether they agree with it. A response like "The video claims taxes are more cost-effective than standards, but I think that's wrong" should still receive score 3.

Examples:

- ''Pollution taxes are more cost-effective than standards because taxes lead pollution reduction to happen where reduction is cheapest.''
- ''Charging firms for pollution is more cost-effective than standards.''
- ''The video shows why pollution tax is more cost effective than setting standards.''
- ''It explains why cap and trade and pollution tax strategies are able to reduce emissions more cost-effectively than standard emissions limits.''
- ''Standards are not the best way - taxing pollution is more cost effective.''
- ''Taxing pollution is more cost effective because plants that can cheaply reduce pollution will do so, while expensive plants pay the tax instead.''
- ''Charging companies for pollution is the most cost-effective way to reduce pollution.'' [implies tax is superior to alternatives]
- ''The video covered various ways to attempt to limit pollution, the most effective being cap and trade or tax on pollution.'' [ranks cap-and-trade/tax as best]
- ''Cost effectiveness is better than setting standards on power plants.'' [implies market mechanisms beat standards]

- ‘‘It’s about cost effectiveness. Taxes are better than standards.’’
- ‘‘The video says setting standards is NOT the best cost-effective way to reduce pollution.’’ [implies standards are inferior]

C.1 Score 99 — Blank

The response field is empty or contains only whitespace.

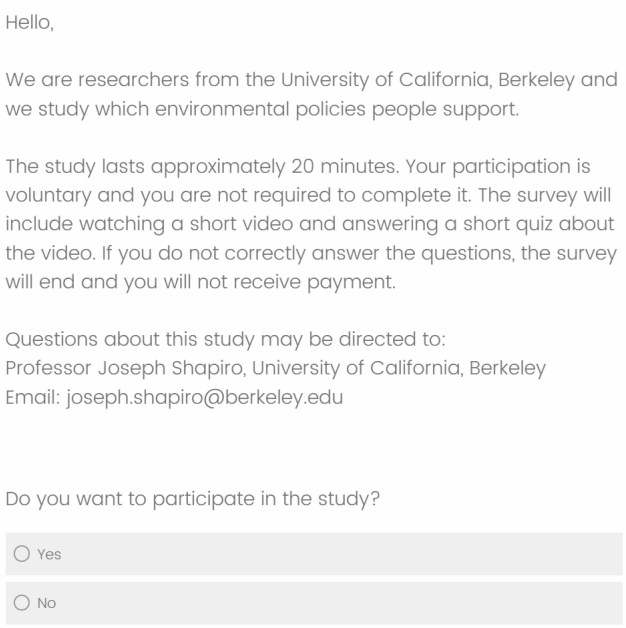
D Survey Instrument

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 D.1 shows the introductory screens of our survey. Section D.2 shows how the policies were explained to the participants. Section D.3 shows the quiz respondents had to take after reading the policy descriptions. Section D.4 shows screenshots shown to treated participants. Section D.5 shows the hypothetical policy scenarios and questions eliciting beliefs and support for policies. Sections D.6 and D.7 show additional allocative efficiency and opinion questions. Section D.8 shows the financial literacy questions.

D.1 Introduction

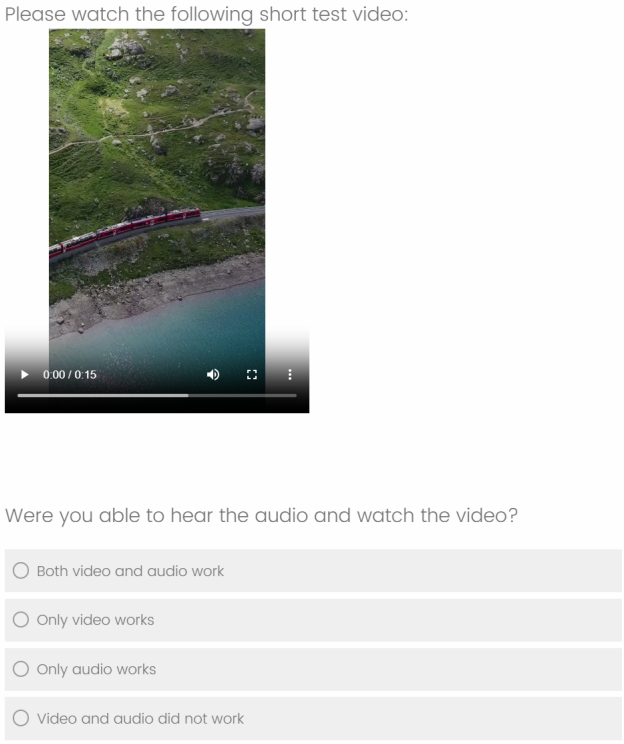
Participants were shown an introductory screen that gave them the expected duration of the study and informed them that participation was voluntary. Participants were informed that the survey required them to watch a video and that they should take it another time if they were unable to watch a video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

Figure A20: 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.

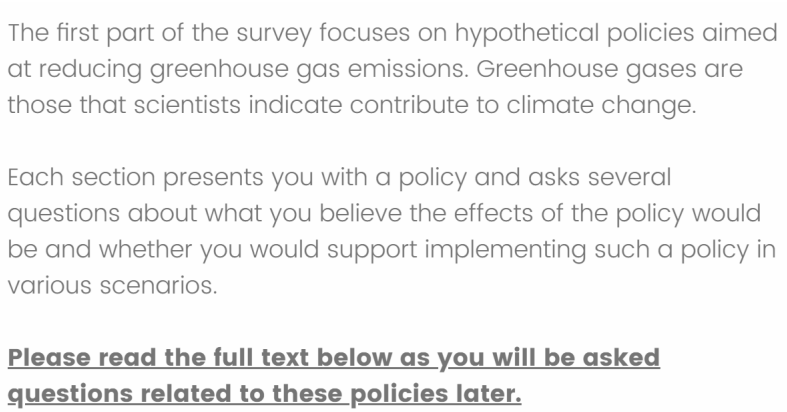
Figure A21: Test video



D.2 Policy descriptions

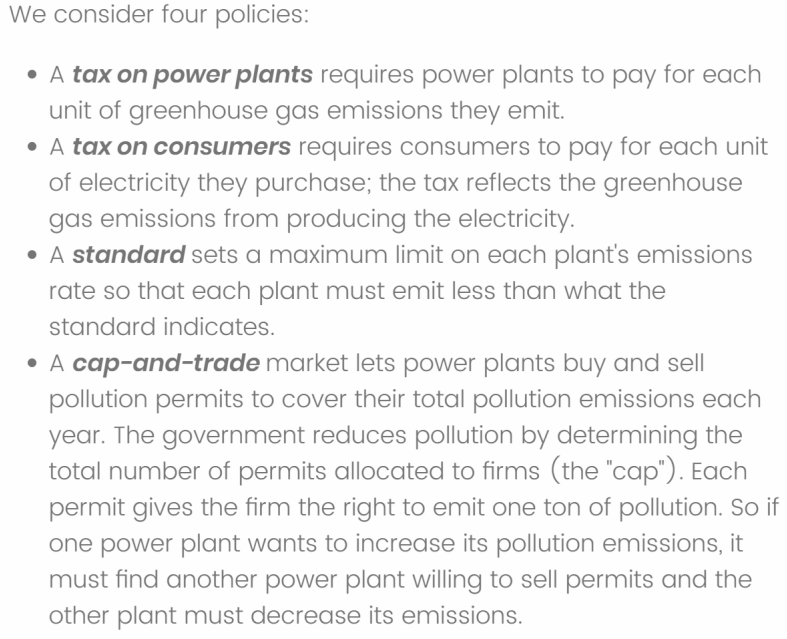
Participants were told that the survey would ask about their beliefs on the effects of a series hypothetical polices aimed at reducing greenhouse gas emissions. Participants were asked to carefully read the policy descriptions and informed that they would be asked questions regarding those policies later.

Figure A22: Policy descriptions 1



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

Figure A23: Policy descriptions 2



D.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 A24: Policy descriptions quiz 1

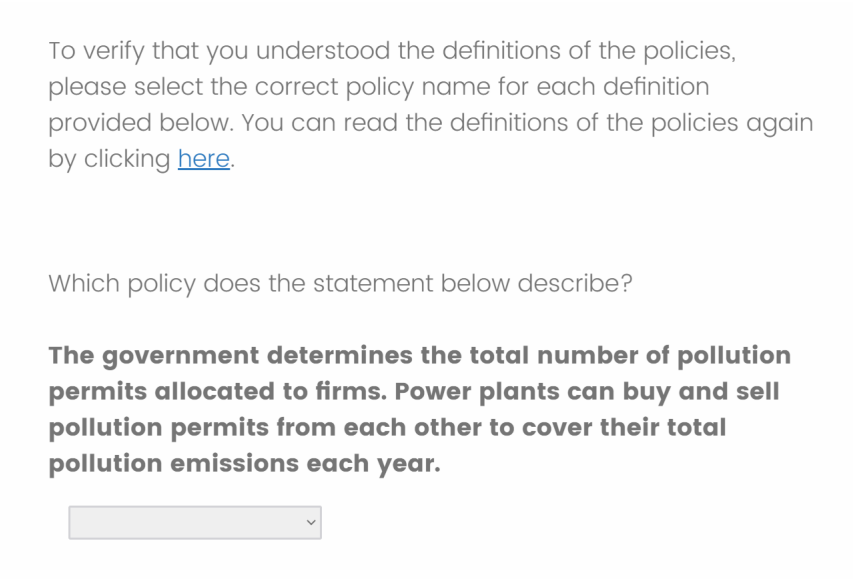
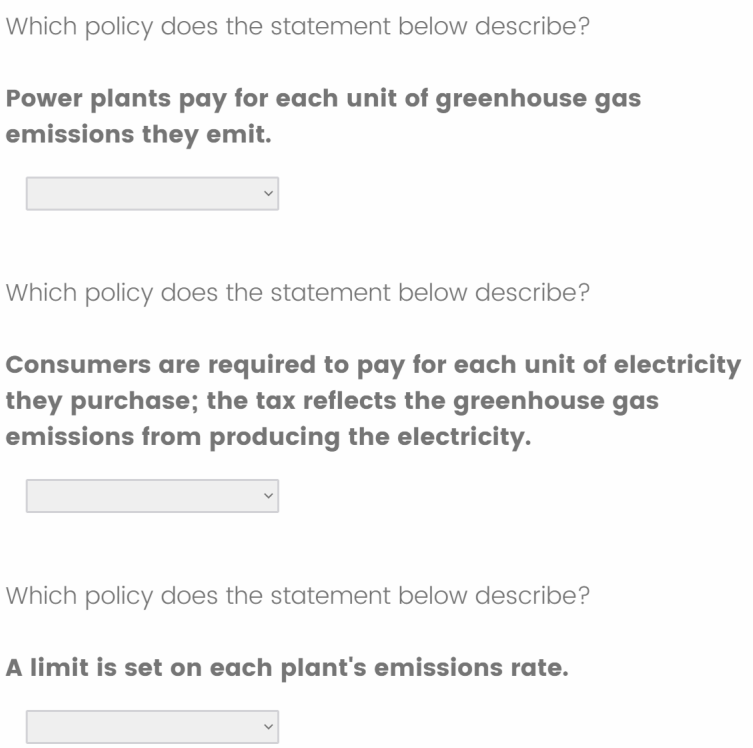


Figure A25: Policy descriptions quiz 2



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.

D.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 A26: Pass-through video

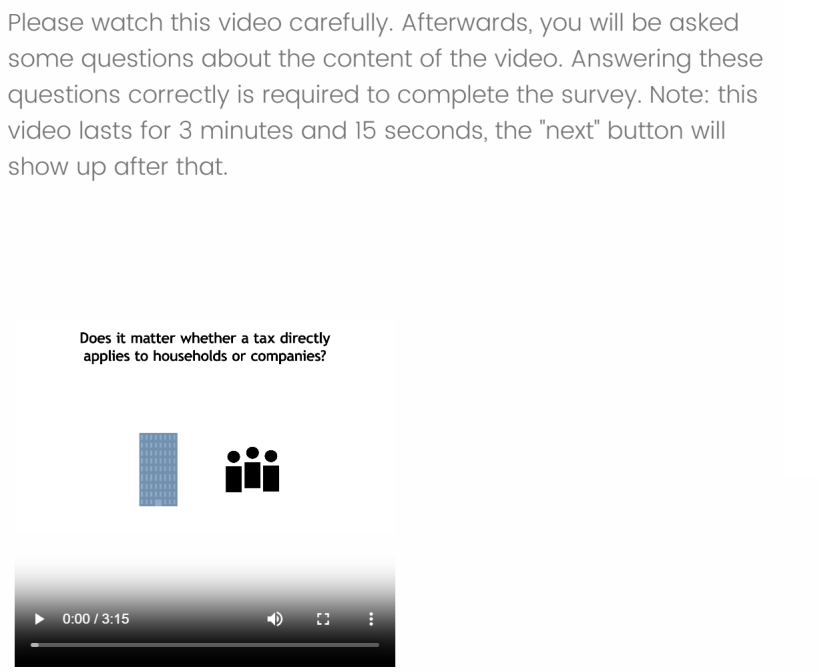
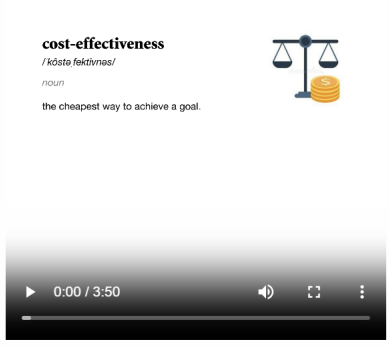


Figure A27: Allocative efficiency video



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

Figure A28: Allocative efficiency quiz

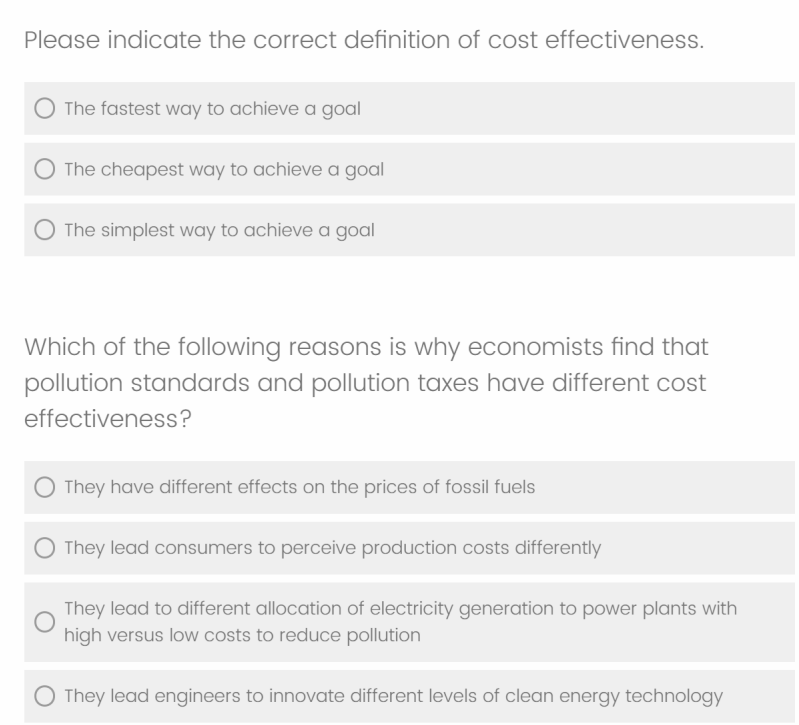
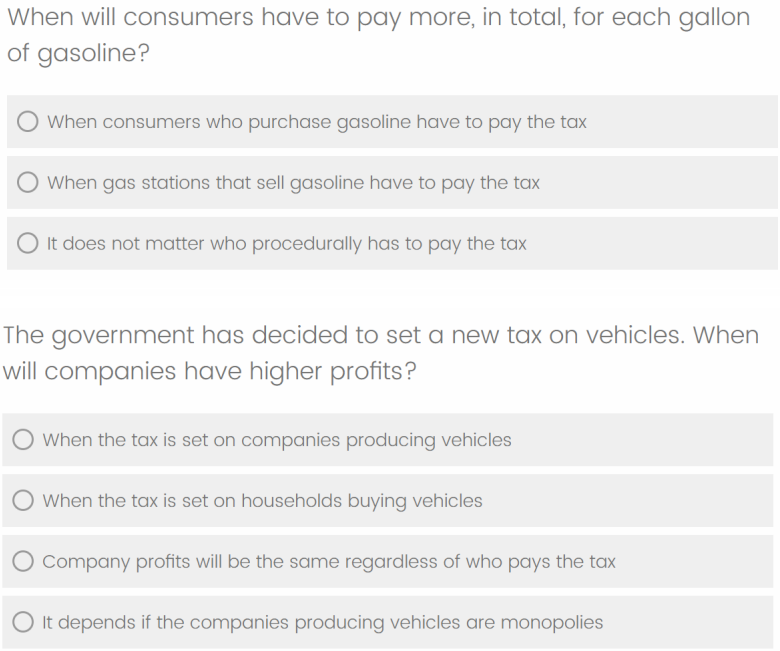
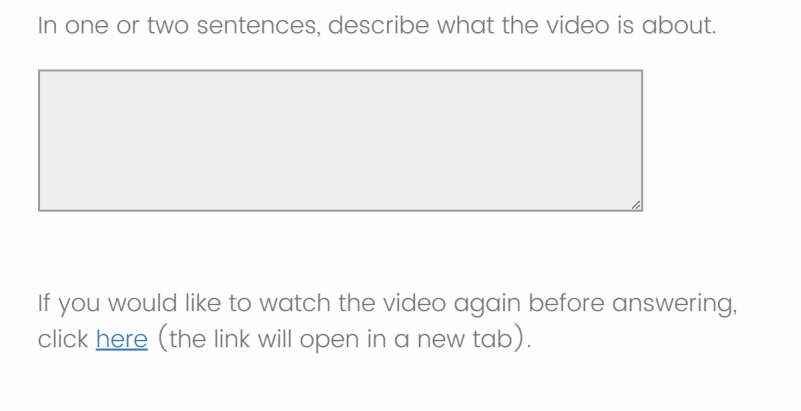


Figure A29: Pass-through quiz



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

Figure A30: Quiz text entry question



D.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 A31: Policy scenarios - Tax on power plants

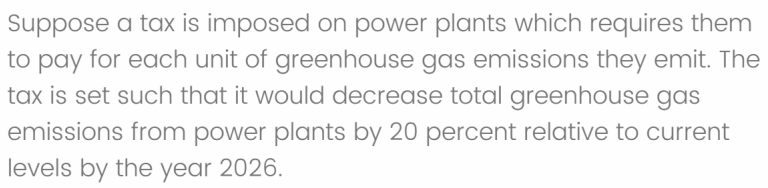


Figure A32: Policy scenarios - Tax on consumers

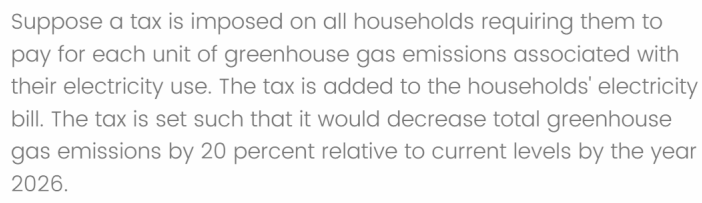


Figure A33: Policy scenarios - Standard

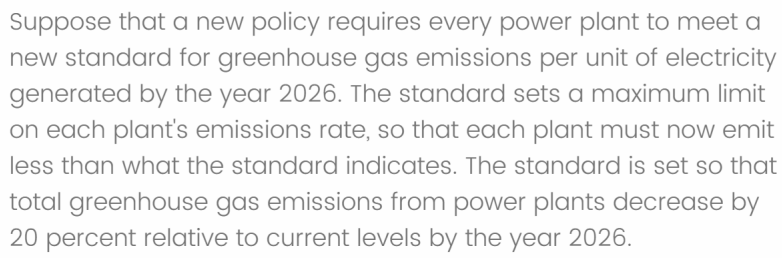
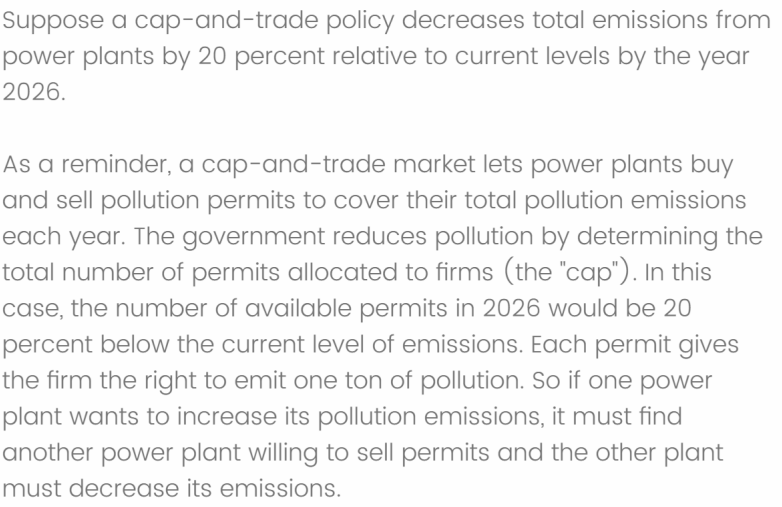
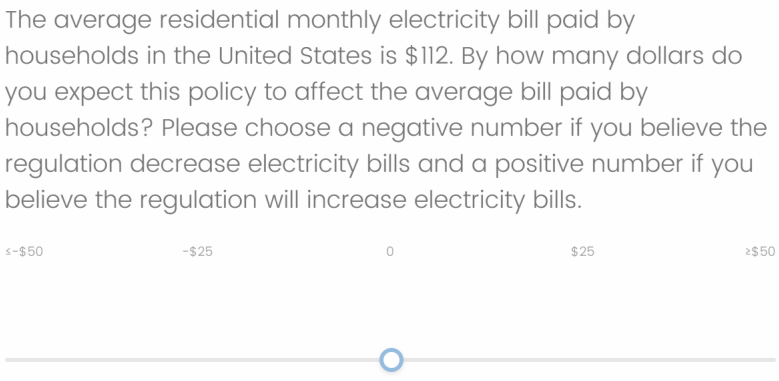


Figure A34: Policy scenarios - Cap and trade



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 A35: Effect on electricity bills



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

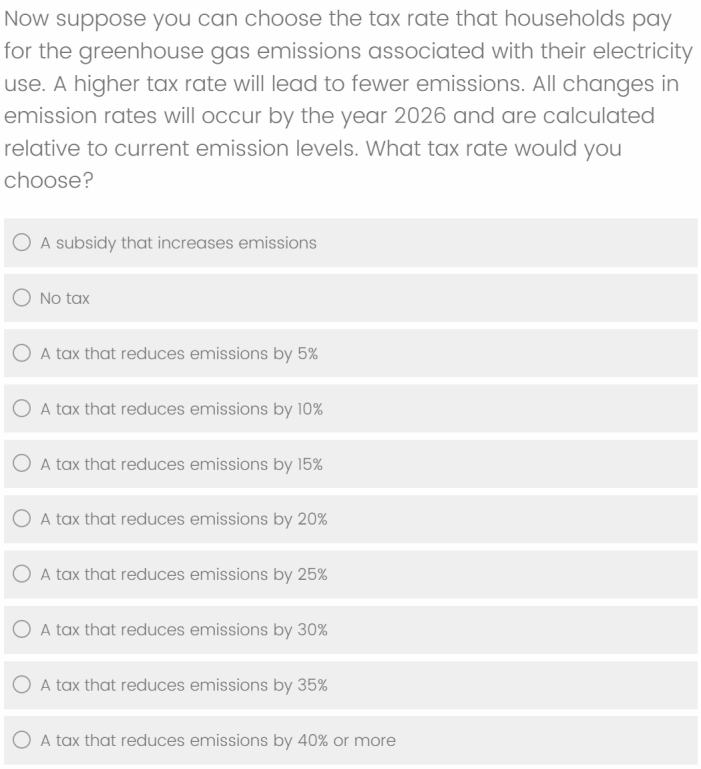
Figure A36: Effect on inequality

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

Figure A37: Policy support

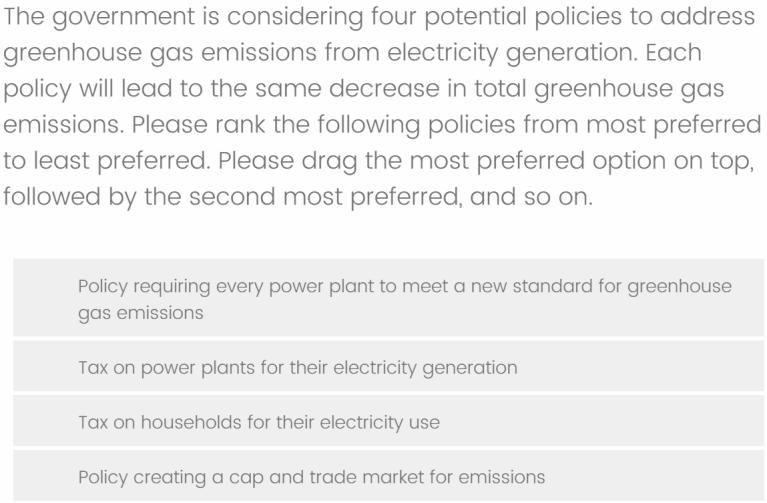
Finally, participants were asked what level of emissions reductions they would choose if they could implement each of the policies (this example is for a tax on consumers).

Figure A38: Emissions choice



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

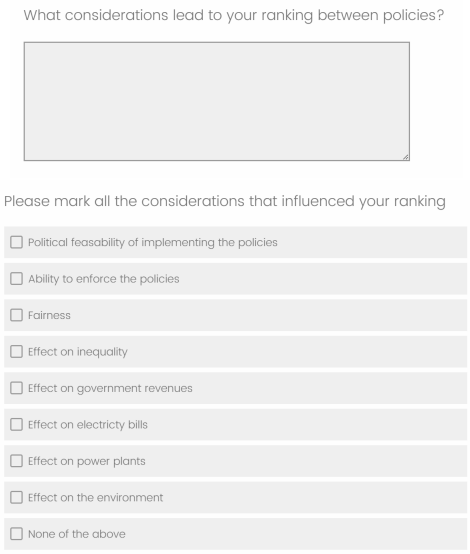
Figure A39: Ranking policies



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 A40: Ranking considerations



D.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 A41: Hypothetical scenario - standard

Suppose the government is going to reduce pollution from two factories by **implementing an emissions standard**. The standard will set a maximum limit on each plant's emissions rate so that each plant must emit less than what the standard indicates. The policy will result in a total reduction of 50 tons of emissions.

Factory 1 uses old technology that cannot be easily changed:

- the factory emits high levels of pollution
- the cost of reducing each additional unit of pollution is high

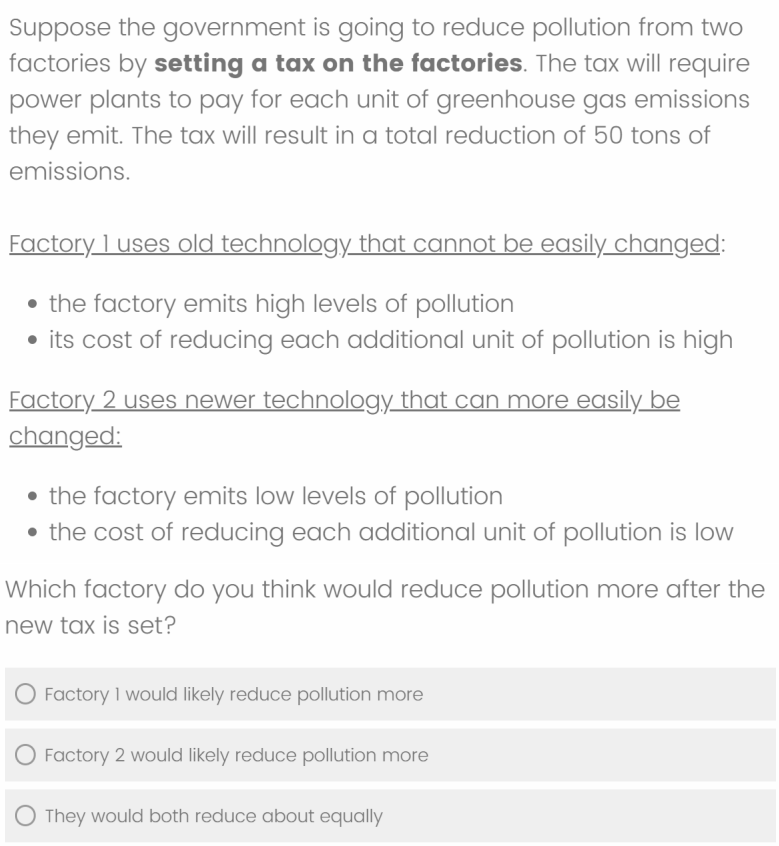
Factory 2 uses newer technology that can more easily be changed:

- the factory emits low levels of pollution
- the cost of reducing each additional unit of pollution is low

Which factory do you think would reduce pollution more after the standard is set?

- ○ Factory 1 would likely reduce pollution more
- ○ Factory 2 would likely reduce pollution more
- ○ They would both reduce about equally

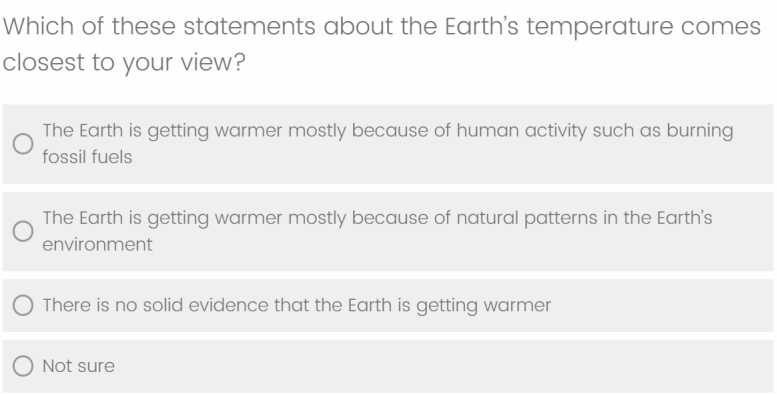
Figure A42: Hypothetical scenario - tax



D.7 Opinion questions

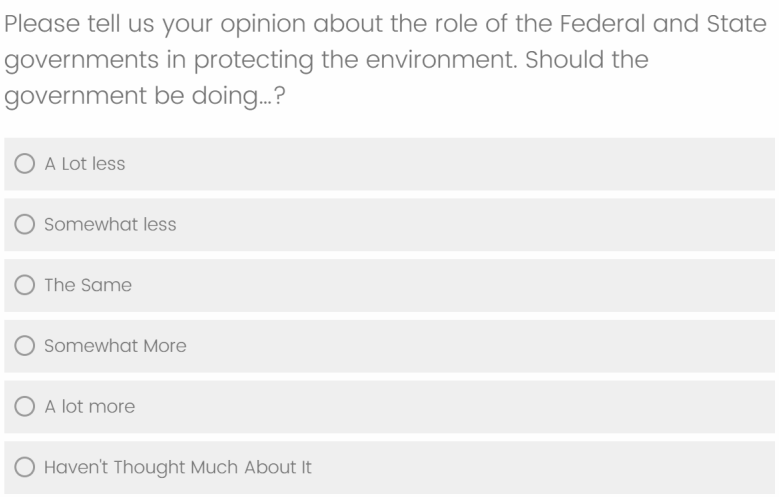
Participants then were asked several opinion questions regarding climate change and government policy. We first asked respondents whether they thought Earth's warming is caused mostly by human activity or natural patterns.

Figure A43: Opinion on climate change



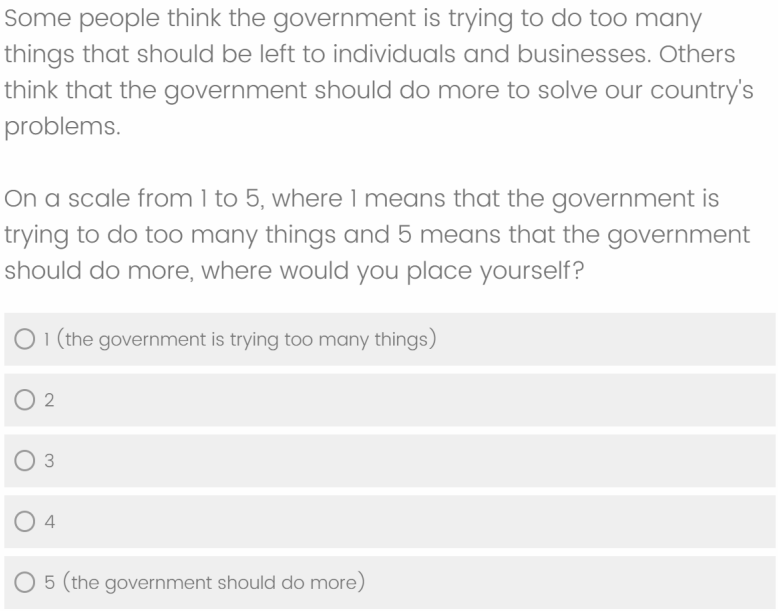
We then asked them whether they thought that the Federal and State governments should do more or less for protecting the environment.

Figure A44: 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.

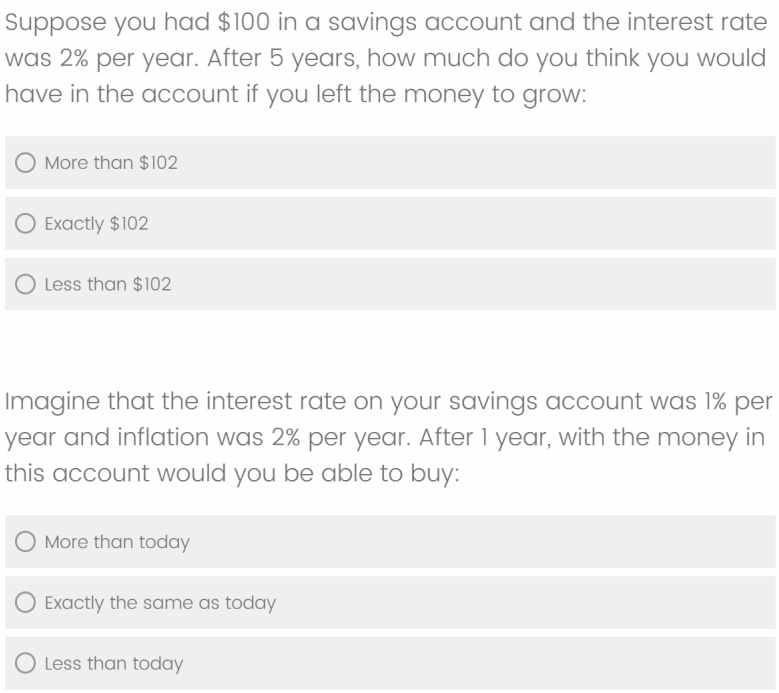
Figure A45: Opinion on government policy



D.8 Financial literacy questions

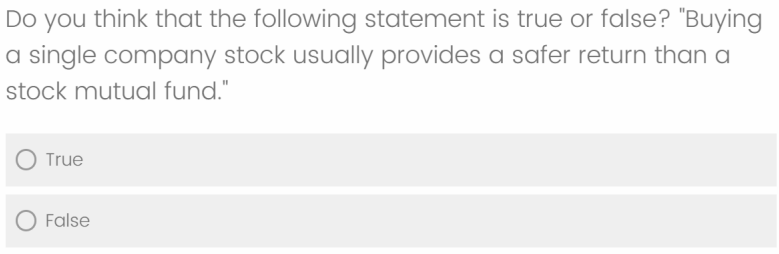
We then asked respondents a series of questions to assess their degree of financial literacy. We first asked them simple questions to assess their understanding of interest and inflation.

Figure A46: Financial literacy - interest



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

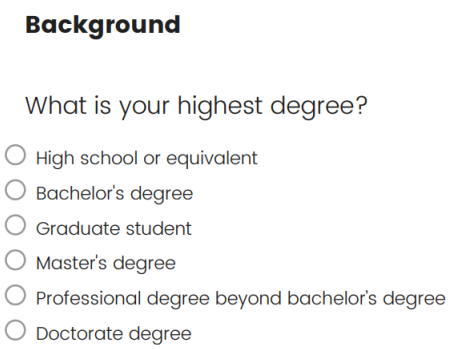
Figure A47: Financial literacy - risk



D.9 Expert survey additional questions

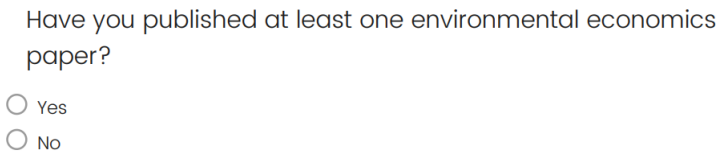
The expert survey included some additional questions. Participants were asked their degree of educational attainment:

Figure A48: Expert background



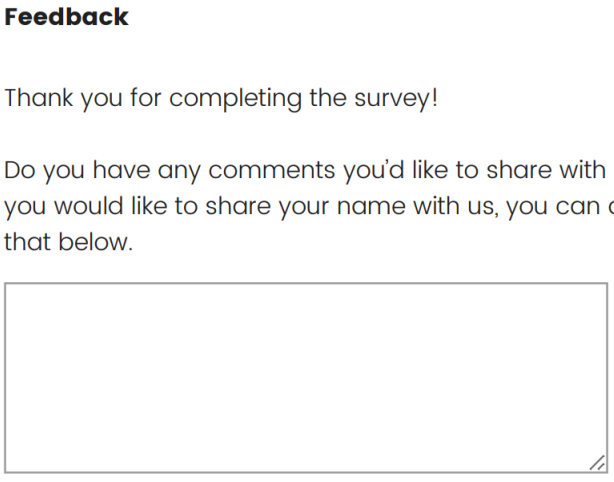
And whether they had published a paper in environmental economics:

Figure A49: Environmental economics publication



Then we requested feedback in an open-ended question:

Figure A50: 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 A51: Expert alternative effect on bills

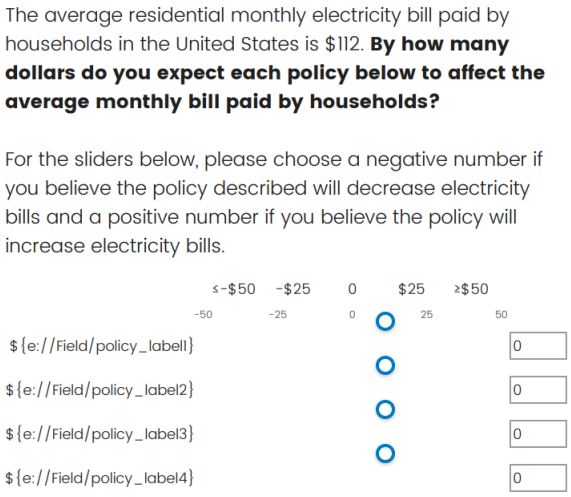
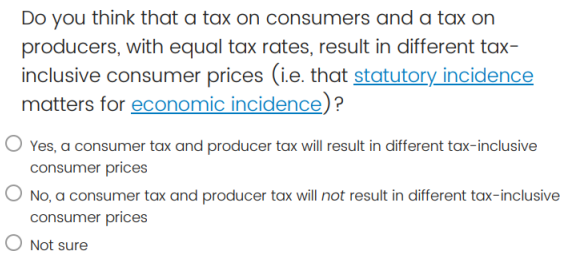


Figure A52: Expert alternative effect on inequality

Figure A53: Expert alternative support for policies

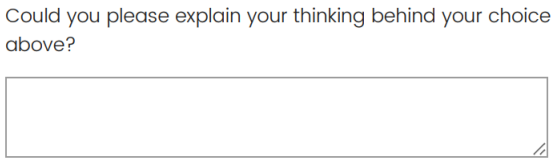
We then asked them if they expected a tax on consumers and a tax on producers to yield different tax-inclusive prices:

Figure A54: Expert additional incidence question



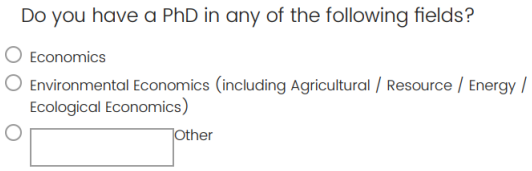
And gave them an open-ended question on their reasoning behind their answer:

Figure A55: Expert open ended incidence question



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

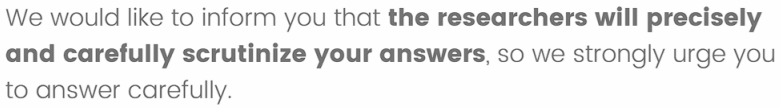
Figure A56: Expert PhD degree question



D.10 Auxiliary scrutiny survey questions

In the auxiliary survey, we randomized participants into a control group, a scrutiny treatment, and an anonymity treatment. The scrutiny treatment group was shown the following screen after the consent form and before the rest of the survey:

Figure A57: Scrutiny message



The anonymity treatment group was shown the following screen instead:

Figure A58: Anonymity message