

Embedded Liberalism from the Ground Up: Credibility and Climate Transitions*

Alexander F. Gazmararian
Princeton University[†]

Dustin Tingley
Harvard University[‡]

May 14, 2022

Abstract

Why has transition assistance such as local investment, compensation, and retraining often failed to redress economic and policy costs? Departing from the literature which answers this question from the top down by focusing on supply and targeting, we argue that a commitment problem structures individual perceptions of economic opportunities and preferences over economic assistance. This “from the ground up” perspective highlights uncertainty over local investment efficacy and policy reversal, which we theorize can be reduced through institutional constraints, second-order beliefs, investment design, and costly signals. We focus on decarbonization transitions and test our theory using surveys in the United States of the general population, regions undergoing economic transitions, and highly localized fossil fuel communities. We find that transition assistance can be structured to reduce commitment concerns, and that substantial heterogeneity exists in beliefs about the viability and credibility of green jobs thought to be crucial in facilitating economic development and climate transitions. This paper contributes to our understanding of how governments can better design investments and institutions to reduce credibility concerns, an unresolved challenge at the heart of economic transformations such as decarbonization and globalization.

*Tingley thanks the Roosevelt Project and the Andrew Mellon foundation (through the Harvard Fellows at the Forefront program) for supporting some of the survey work presented in this paper. Gazmararian thanks the Niehaus Center for Globalization and Governance at Princeton University for supporting the local survey work in Appalachia. Harvard University Center for the Environment and the Harvard Fellows at the Forefront program helped to provide research assistant support. We particularly thank Alison Hu and Jaya Nayar for research assistance. We thank Michelle Anderson, Stephen Ansolabehere, Ines Azevedo, Marshall Burke, Bruce Cain, Alison Hu, Robert Keohane, Nita Rudra, David Victor, and seminar participants at Princeton, Stanford, and the University of Pittsburgh for comments.

[†]Graduate Student, Department of Politics, Princeton University, Email: agazmararian@princeton.edu

[‡]Professor, Department of Government, Harvard University, Email: dtingley@gov.harvard.edu

The distributional consequences of economic transformations, such as automation, decarbonization, and globalization, have given rise to intense political conflict (e.g., Colgan, Green, and Hale 2021; Milner 2021; Polanyi 1944). For the losers, the stakes are often existential, with robots that replace workers, regulations that eliminate industries, and offshoring that shuts factories. To win political support for transformative policies, or smooth the costs of structural economic shifts, governments can offer transition assistance to those at risk of dislocation (e.g., Kono 2020; Rickard 2020; Gaikwad, Genovese, and Tingley 2022). A commonly cited approach is Ruggie’s (1982) “embedded liberalism,” the expansion of social insurance programs to insulate the public from global economic pressures. Yet transition assistance – defined as fiscal transfers to individuals and communities for local investment, compensation, retraining, and social insurance – has faced substantial challenges. Workers who perform routine tasks, rely on carbon-intensive industries, or face trade exposure have not embraced automation, climate policy, or globalization. Assistance has also proven ineffective at quelling political backlash to these trends, which scholars identify as contributing to the rise of far right populist parties (e.g., Walter 2021). Why has transition assistance often failed to redress economic and policy costs?

The literature explains the failure of embedded liberalism-style compromises from the *top down*, focusing on the supply and target of assistance (e.g., Bowen, Broz, and Rosendorff 2022; Broz, Frieden, and Weymouth 2021; Goldstein and Gulotty 2021; Mansfield and Rudra 2021; Rickard 2020). While these are meaningful considerations, they imply that abundant and well-targeted fiscal transfers would provide sufficient redress and assume that workers and communities uncritically accept assistance. However, despite support for compensatory policies (e.g., Bergquist, Mildemberger, and Stokes 2020; Gaikwad, Genovese, and Tingley 2022; Gazmararian 2021), there remains considerable political resistance to economic transformation such as decarbonization.

We argue that the *uncertainty* of assistance explains this resistance. Our theoretical reorientation views embedded liberalism from the *ground up*; that is, from the perspective of

workers and communities receiving aid. We delineate two dimensions of uncertainty: local investment efficacy and government commitment. First, there is uncertainty about whether industries targeted for investment and emphasized in retraining programs will endogenously grow, raise wages, provide long-lasting careers, and benefit local workers. Second, changing political control, hold up problems, the tax burden on the median voter, and low government trust create uncertainty about whether the government will reduce assistance in the future (e.g., Dixit and Londregan 1995; Shepsle 1991). However, we theorize how the design of assistance can ameliorate credibility concerns through institutional constraints (North and Weingast 1989), second-order beliefs (Mildenberger and Tingley 2019), investment structure (Alesina and Tabellini 1990), and costly signals (Fearon 1997).

After developing a theoretical framework, this paper proceeds empirically in three steps. First, we construct novel question batteries that probe individual perceptions of local investment efficacy. We emphasize green industries in our analysis since these jobs have broad theoretical and substantive relevance. Green jobs play a central role in national stimulus plans to recover from economic downturns (e.g., OECD 2020), place-based policies to revitalize deindustrializing regions (e.g., Economist 2009), and transition policies to ease the social costs of decarbonization (**sdsn2020**; e.g., Tomer, Kane, and George 2021). We field these questions in nationally-representative and targeted samples of citizens in regions of the United States particularly tied to the fossil fuel economy. Doing so reveals uncertain beliefs about the future of green jobs and effects of government investment, in addition to partisan, rural/urban, and regional perception gaps. People in locations thought to gain from green investments, such as the Gulf Coast and the Southwest Pennsylvania regions, are more likely to believe that green jobs benefit outside workers while providing careers that are less stable, lower paying, and more temporary.

Second, we explore the effect of government commitment on support for economic transition assistance using a *multi-attribute policy experiment*. We field this experiment, and subsequent ones, in a pre-registered nationally representative survey of the United States.

We find that people are sensitive to reversibility concerns, but that institutional design, second-order beliefs, investment structure, and costly signaling can reduce uncertainty.

Third, we evaluate the effect of uncertainty on individual willingness to incur transition costs. We focus on the two primary costs that individuals, workers, and communities confront when considering economic transitions: retraining for or entering into a new career, which entails time and resource trade-offs with an uncertain payoff; and policy-induced local job losses, which may result from government efforts to provide public goods like carbon pollution reduction. Our *retraining experiment* finds that individuals are more willing to enroll in workforce development programs for clean energy jobs if the government ties its hands with respect to investments aimed at expanding local renewable energy. Then, our *regulation experiment* reveals that people are more amenable to environmental policies that cause community job losses when the government provides credible compensation.

Our theory and results make contributions across multiple literatures. First, while research in political economy increasingly recognizes how regional economic distress impacts political behavior and necessitates local economic responses (e.g., Austin, Glaeser, and Summers 2018; Broz, Frieden, and Weymouth 2021; Rickard 2020; Shambaugh and Nunn 2018), there is a dearth of theory to understand the politics of place-based policies (for economic analyses, see e.g., Austin, Glaeser, and Summers 2018; Shambaugh and Nunn 2018). A related literature on active labor market policies emphasizes wages subsidies or behavioral solutions like nudges, but ignores the political context in which programs operate which shapes willingness to participate (e.g., Babcock et al. 2012; Kluve 2010; Martin and Grubb 2001). We provide a set of microfoundations to better understand these local development policies from the ground up – from individuals living in places – which complements top down considerations like supply and targeting.

Second, in terms of the expanding climate politics literature (e.g., Breetz, Mildemberger, and Stokes 2018; Colgan, Green, and Hale 2021; Gaikwad, Genovese, and Tingley 2022; Gazmararian and Milner 2022; Mildemberger 2020), we show how support for decarbonization

cannot be considered in abstract, but must be put in context: current energy communities and other localities may distrust or be cautious about federal government promises of transition assistance. However, while anticipated backlash is seen as a political barrier, our results indicate that people are willing to incur transition costs if they are provided with *credible* assistance.

Third, while past research on public opinion and clean energy has emphasized consumers (e.g., Ansolabehere and Konisky 2014), we flip the focus to workers and communities. This reveals that people in regions looking for new economic opportunities are uncertain about green industries. This suggests that to garner public support for new industries, which is especially relevant for climate transitions, local economic development should emphasize investments that generate durable, well-paying work, regardless of whether they are directly tied to the green economy. Furthermore, these investments should be coupled with institutional mechanisms that enhance their credibility. Building on cross-national studies indicating that effective institutions facilitate the deployment of renewable energy (aklin2021), we provide causal evidence of the effect of specific institutional design choices on public attitudes about green industries. We suggest that future research should develop additional ideas and study their effectiveness theoretically and empirically.

1 Why Has Transition Assistance Often Failed?

We situate our paper in the literature on embedded liberalism. Ruggie (1982), inspired by Polanyi (1944), developed the concept of embedded liberalism to refer to a compromise whereby nations balanced open monetary and trade policies with domestic programs that shielded the economic losers of global capitalism. Generalizing this concept, embedded liberalism-style compromises refer to when governments seek to redress economic or policy costs. The goal could be strategic, such as expanding a policy coalition, or normative, such as ameliorating economic stagnation in places “left behind.” Assistance may take the

form of income transfers, such as direct payments, healthcare, and pensions; place-based development, such as investments to create jobs in new industries; and retraining programs, such as subsidized college education or apprenticeships to build career skills for alternative industries.

Yet embedded liberalism-style compromises have faced significant challenges in prominent cases. This is well-documented for globalization, where a large body of scholarship has identified intense backlash among the economic losers despite the expansion of social insurance programs (Walter 2021). Existing research provides top down answers for why governments have been unsuccessful at redressing policy and economic costs. These explanations emphasize the supply and target of assistance. This implies that if governments had established well-funded compensatory mechanisms (Goldstein and Gulotty 2021), targeted communities (Broz, Frieden, and Weymouth 2021; Rickard 2020), or maintained the capacity to sustain social service provision (Mansfield and Rudra 2021), states would have succeeded in smoothing adjustment costs to economic transitions like globalization.

Such a counterfactual assumes that the political challenge lies in governments agreeing to provide assistance and that the losers then uncritically accept the bargain. However, groups may doubt the government’s incentives to follow through with its commitment to economic assistance (Dixit and Londregan 1995). Further, communities may doubt the quality of the investment itself; while many assume that the task of quelling opposition from the transition losers is simply a matter of creating jobs and retraining workers, people may be skeptical of the new careers they are offered. This is evident in the case of climate transitions, where green industries are emphasized as substitutes for coal, oil and gas workers who will be displaced by decarbonization (e.g., Rodrik 2014; Tomer, Kane, and George 2021).

Although studies find economic and policy vulnerability increase support for compensation (Scheve and Serlin 2021; Walter 2010; Iversen and Soskice 2001; Cusack, Iversen, and Rehm 2006; Rehm 2009; Gaikwad, Genovese, and Tingley 2022; Gazmararian 2021), and that broad assistance programs in turn increases support for costly policies (Bergquist,

Mildenberger, and Stokes 2020; Kono 2020), it is less clear under what conditions individuals and communities facing dislocation or seeking to diversify their economies to new sectors would accept *uncertain* transition assistance.¹

2 Embedded Liberalism and Decarbonization from the Ground Up

We theorize embedded liberalism from the *ground up*, through the lens of workers and communities that receive transition assistance. This reorientation centers questions, such as, under what conditions is government assistance credible? We differentiate between two dimensions of uncertainty: local investment efficacy and government commitment. This section elucidates these dimensions, providing a microfounded framework for thinking about the politics of local economic development.

2.1 Local Investment Efficacy

Local investment efficacy refers to the probability that an investment provides tangible and durable local benefits. This captures the logic that when governments promise to foster new industries in communities, especially transitioning ones, individuals must believe that these new jobs will last and support their standard of living. Otherwise, they will have strong incentives to defend the status quo.

Evaluations of whether transition assistance is effective will depend on beliefs about the quality of *jobs* created and effects of government *investment* programs. These beliefs should vary according to perceptions of industry growth, pay, temporariness, and imported workers. We concretize these concepts by exploring them in the context of decarbonization. Essential to this transition is understanding whether people — perhaps especially those in

1. The impact of uncertainty is not constrained to the domestic context. For example, Arellano et al. (2009) investigate the impacts of variability in foreign aid on development outcomes.

fossil fuel producing communities — view green jobs as credible alternatives to existing industries. While there exists research examining the types of energy consumers prefer (e.g., Ansolabehere and Konisky 2014), systematically little is known about what the public thinks of green energy jobs, let alone other employment opportunities. The emphasis here is on the first order question of the perceptions individuals hold. Future research should explore the origin of these beliefs, which may be the product of elite cues, interest group messaging, the media, and an individual’s own personal experiences.

Future Jobs. First, future jobs refers to whether people expect an industry to expand or contract. In the context of green jobs, people may perceive renewable energy industries as unstable due to a history of booms and busts driven by policy instability. While state policies have played a crucial role in deployment of clean energy (Stokes 2020), contentious partisan politics and design flaws can create the conditions for market downturns. For example, inflated solar tax credits in New Jersey caused a flood of projects that led to a subsequent price collapse (Walton 2018). Likewise, Illinois’ solar incentive programs spurred over-expansion beyond the program’s resources, resulting in layoffs once funding ran dry (SEIA 2020). Nevada also faced a self-imposed collapse of solar energy after the public utility commission allowed for an increase in rates and fees imposed on residential solar (Brady 2017; Hernandez 2016; Stokes 2020). At the federal level, there is a patchwork of programs that “are poorly optimized, characterized by a boom and bust cycle of aid and withdrawal” (Jenkins et al. 2012, 5). The wind production tax credit (PTC), in particular, has expired three times since the 1990s, leading to industry downturns (Barradale 2010). This relates to a broader concern that clean energy subsidies could be cut back during periods of fiscal restraint (Victor and Yanosek 2011).

Local Jobs. Investments designed to attract businesses to a location do not automatically guarantee that the job-creation benefits accrue to the community. The industry may require technical skills. If locals lack the required human capital, imported workers may reap the gains. For instance, counties in Wyoming experienced a surge in wind turbine instal-

lation, but the employment benefits largely accrued to outside labor (Hu 2021). In North Dakota, only an estimated 14 percent of wind construction jobs have gone to locals (Franco 2019). Unions in Minnesota echo this experience, raising concerns about traveling workers from Texas, Utah, and California taking the bulk of jobs created by new wind projects (Orenstein 2019).²

Pay. The next dimension is pay – whether individuals anticipate salaries to rise or fall. Green jobs may lack credibility due to their presently lower pay, especially relative to fossil fuel industries (Appendix D.1). Many of these jobs are on a contract basis, unlike coal miners who tend to be unionized (Scheiber 2021a).³ Even when the government leverages stimulus to create green jobs, wages often remain stagnant. For every \$1 million of green stimulus following the 2007-08 crisis, 15 new jobs emerged, nearly all in manual labor (Popp et al. 2020). People may not believe green jobs will provide employment that sustains a middle class lifestyle.

Temporariness. Temporariness is the perception that industry careers are short-lived, not due to layoffs but the nature of the work. This is a particular challenge for renewable energy, which is capital rather than labor-intensive. While the initial construction of wind farms and solar arrays generates employment, those jobs disappear upon project completion and it takes only a handful of people to operate facilities once online. As one developer noted of a project intended to create jobs in a coal community, “All but a dozen of the solar jobs will be temporary, lasting between 12 to 18 months...” (Buckley 2022). Even for clean sector jobs mirroring conventional industries, uncertainty abounds. Lordstown Motors, an electric car upstart, took over an old General Motors plant promising to vitalize the Ohio community, but a series of delays, scandals, and market changes left production in limbo (Domonoske

2. In a National Laboratory study of the Rush Creek Wind Farm in Colorado, “many [interviewees] reported several challenges from wind farm construction stemming from the influx of temporary workers to their communities...[challenges including] a small pool of qualified local candidates from which to hire” (Stefek et al. 2019, ix).

3. These considerations extend to people currently working in oil and gas industries. For example, at a wind power workforce development workshop in Wyoming, “many...expressed concern over what the jobs would pay, saying the salaries paled in comparison to what they could earn on an oil rig” (Cardwell 2017).

2021). Likewise, Rivian has struggled to convince communities that the jobs will last, since few electric car companies have succeeded in bringing vehicles to market (Scheiber 2021b). However, temporariness is not unique to green jobs; many oil and gas drilling operations are also capital-intensive and do not require substantial labor once operating.

Credibility should be increasing in growth and pay, but decreasing in temporariness and imported workers. For the former, jobs in industries that are expected to endogenously hire workers and raise wages, independent of government investment, should be viewed as more durable and livelihood-sustaining. For the latter, jobs that are not expected to last or industries seen as benefiting outside labor should not be perceived as credible due to uncertainty about the longevity and local benefits of investment.

Political and Geographic Heterogeneity. Individual and regional factors could attenuate or exacerbate the above considerations. Partisanship, in particular, could shape jobs and investment beliefs. In related contexts, scholars document a partisan gap in concern about climate change (Egan and Mullin 2017), how people respond to climate disasters (Hazlett and Mildemberger 2020), and perceptions of renewable energy (Ansolabehere and Konisky 2014, 93). We theorize that partisan gaps in the perceived urgency of climate change may differentially shape beliefs about the future of demand for renewable energy. If Republicans are less likely to see a need to address climate change and view incumbent fossil fuels as inexpensive and harmless, then they should be less likely to perceive endogenous demand for green jobs. Instead, they may assume clean industries depend on unreliable government support. The opposite pattern should occur for Democrats, who are more likely to understand the urgent need to decarbonize the economy, and consequentially think there will be abundant future demand for renewable energy.

Beliefs should also vary across space. Certain locations, due to natural resource endowments, may have comparative advantages in particular industries. Residents of Wyoming may be more optimistic about the future of coal given its local abundance. In contrast, people from New Mexico may think solar energy jobs are suitable given the region’s plentiful

sunlight. Regions may also have different historical experiences with industries and government investment. Rural versus urban differences might arise for similar reasons, in addition to the effect of place-based identities on political beliefs (e.g., Cramer 2016).

Relative Assessments. Finally, in the context of economic transitions, willingness to embrace new industries also may depend on a *relative* assessment comparing the new industry to incumbent job-providers. For example, if residents of West Virginia view coal as on the decline due to market trends, they might be more inclined to accept economic diversification toward renewable energy opportunities supported by federal investments despite local investment uncertainty.⁴ Conversely, if energy communities view status quo industries as reasonably stable or growing with investment, they might resist embracing new sectors. This might be especially the case for emerging industries like green energy that may be seen as in direct competition with fossil fuels.⁵ Compounding the situation is loss aversion, which may predispose people to prefer incumbents.⁶

2.2 Government Commitment

The second dimension of uncertainty is government commitment: how can governments overcome the general problem of credibly committing themselves to inter-temporal plans? We proceed by delineating principle sources of reversibility concerns, then theorizing mechanisms by which uncertainty may be attenuated or exacerbated.

4. Social identity plays a role in these relative assessments; coal miners in Wyoming expressed worries about losing their jobs after witnessing bankruptcies in the industry, but at the same time they feel a strong connection to coal and their communities which creates a status quo bias (Thuermer 2019). Other coal miners in Wyoming remain optimistic about the future of coal despite the layoffs (Ryssdal 2017), believing that jobs will rebound (Erickson 2021). Part of this stems from political promises that parties make, such as President Trump’s promise to bring back coal by slashing regulations (Bleizeffer 2016). We discuss the impact of political cycles in the next section.

5. For example, residents of energy communities in Wyoming expressed concern about wind energy because they worry it will speed up job losses in coal (Searcey 2021).

6. An additional perspective that we do not consider in this paper is the effect of individual uncertainty about whether one gains from policy, even if there is common knowledge that the policy will improve collective welfare (e.g., Fernandez and Rodrik 1991).

2.2.1 Sources of Reversibility Concern

There are at least four reasons why one might fear the government would renege on its promise of investment: changing political control, hold up problems, the tax burden on the median voter, and low government trust.

Changing Political Control. First, political control often alternates in democracies, creating the risk that a new coalition will win election and overturn the prior’s legislative accomplishments. For example, upon entering office, President Reagan cut Trade Adjustment Assistance to workers impacted by foreign competition, a program that labor unions demanded from the Kennedy administration in exchange for supporting trade liberalism (Alden 2017, 113). Such political control alteration also creates reversibility concerns around green energy policies. As described by a US Representative: “You’re an investor; you’re looking for predictability and certainty...and you’ve got all of this crazy pendulum swinging or uncertainty...we’ve got to look at devising strategies that are going to have the durability of different administrations or political winds” (Graves 2022). These concerns extend to the state level; a high profile issue in the 2022 Pennsylvania gubernatorial election is whether the state should remain in the Regional Greenhouse Gas Initiative, with Republican candidates pledging to exit the program which encourages clean energy deployment (Willson and Swartz 2022).⁷

Hold Up Problems. Second, in economic transitions that decarbonization entails, accepting the investment policy in exchange for moving away from one’s previous industry requires relinquishing bargaining power that came from being a concentrated interest in an economically influential sector such as fossil fuels. This is a version of the hold up problem, where firms fail to cooperate, despite potential efficiency benefits, because of the fear that one’s rival would gain in bargaining power. The problem is especially acute with economic transitions, as workers fear they must relocate. Dispersion renders the group less able to

7. Virginia is also contemplating exit from the regional cap-and-trade system following the surprise election of a Republican governor (Willson 2021).

overcome the collective action problem necessary to punish the government if it reneges on its promise (Dixit and Londregan 1995; Olson 1965), while also undermining the group’s position in simultaneous and future negotiations (Schelling 1956). Amplifying this concern is the possibility that future jobs may not be unionized. Coal miners, for example, are presently organized in unions like the United Mine Workers which provide them with political influence to enforce bargains, a concern present in trade negotiations (Alden 2017, 112).⁸

Median Voter Tax Burden. Third, government assistance imposes a fiscal cost that the public bears while the benefits go to private actors. If the median voter opposes higher taxes, then assistance recipients may fear that the public would support reversing the program. Compounding these factors is that the losers of transitions are more certain of their losses than of potential gains.

Low Government Trust. Fourth, low trust in government may make communities skeptical of promised assistance. Many transitioning communities, such as those in the Industrial Midwest or fossil fuel producing regions, have undergone economic declines over the past decades; this may contribute to the perception that politicians have broken their promises to create jobs that uplift communities. More generally, distrust in government is endemic in the United States (Citrin and Stoker 2018), although these dynamics may be less salient in other political contexts.

2.2.2 Variation in Reversibility Concerns

How might governments reduce commitment concerns? The literature on institutions and bargaining identifies four factors that might ameliorate or exacerbate credibility concerns: institutional constraints, second-order beliefs, investment structure, and costly signals.

Institutional Constraints. A rich literature stemming from North and Weingast (1989) identifies the importance of institutions in creating predictability for development. In the

8. Reflecting this concern, the AFL-CIO president articulated a unequivocal demand that new clean energy jobs are unionized: “we need to guarantee our rights to stand together in trade unions—so we can make sure clean energy jobs are good jobs...Offshore wind, solar, electric vehicles and more – no exceptions – every clean energy sector...” (Shuler 2021).

context of lawmaking, different rules, procedures, and norms can influence the ease with which a policy may be reversed by a future administration or legislature (Shepsle 1991). For example, in the United States, executive orders by the president can be overturned with the stroke of a pen, whereas rewriting a statute requires a majority in both the House of Representatives and the Senate. One prominent way that political actors, such as presidents, lawmakers, and governors, can leverage institutional structures to enhance credibility is through delegation to an actor with different preferences (North and Weingast 1989; Miller and Whitford 2016; Rogoff 1985). Actors could also create institutions that provide information that allows the public to hold politicians electorally accountable for outcomes. For example, Minnesota’s public utility requires wind energy project owners to file reports on local employment, which has led to an increase in the share of jobs going to communities (Franco 2019). In general, to the extent that a leader can tie her hands by employing a hard to overturn device, she may overcome commitment problems (Fearon 1997). Thus, in the absence of institutions that inhibit policy reversal, people should view government investment as less credible, while the presence of such credibility-enhancing institutions should have the opposite effect.

Second-Order Beliefs. The likelihood of policy reversal also depends on beliefs about actors’ preferences. This mechanism is psychological, rather than institutional. If investment recipients think other actors, especially politically consequential ones, oppose the program, they should be less likely to perceive assistance as credible. Second-order beliefs can have meaningful effects on individual attitudes (Mildenberger and Tingley 2019). Two relevant second-order beliefs are the preferences of political parties and the general public. First, if transfers to transitioning communities are viewed as clientelistic, recipients may believe the investment hinges on their party remaining in power. However, this need not be the case if investment has bipartisan support (Stokes and Warshaw 2017). Second, while the aforementioned median voter’s preference to avoid “pork barrel” spending may weaken credibility, the inverse could be true; if the public believes the transitioning community is deserving of

aid, then residents may believe there is support for a durable redistributive bargain.⁹

Investment Structure. The design of the government’s investment has meaningful implications for credibility. Investment can be structured along dimensions such as size, duration, and renewal procedure. The first two are straightforward. Larger investments should be preferred to smaller ones. For duration, although longer investments may be desirable, their value may be discounted due to uncertainty about the future. As a consequence, the interaction of size and duration matters. Larger short-term payments may be preferable in comparison to medium long-term payments under certain discount rates. Whether an investment must be renewed each year or is paid in full influences credibility. As demonstrated by the wind production tax credit, investments that require annual re-authorization inject uncertainty into both the government’s commitment and the perceived viability of the industry receiving financial support (Barradale 2010). Lastly, strategic governments can use the structure of investment as a commitment device; for example, accumulation of debt constrains the choices of future administrations (Alesina and Tabellini 1990).

Costly Signals. Taking inspiration from Fearon (1997), who develops costly signaling as a mechanism to overcome commitment problems in international relations, we apply this mechanism to local economic development. Costly signals refer to the act of making a threat that incurs a cost that the sender would not have paid if she were unwilling to fulfill the promise. For transition assistance, governments could make costly payments in areas unrelated to the investment that an uncommitted government would not pursue.¹⁰ Such an action changes the receiver’s evaluation of the sender’s type. Strategic leaders could also use sunk costs that contain the prospect of future installments to link issues. For instance, investments in schools may enhance the perception of the government’s commitment. Just as linking issues can enable international cooperation despite the constraints of anarchy (e.g., Axelrod and Keohane 1985), issue linkage could ameliorate domestic commitment problems in economic development.

9. See Gaikwad, Genovese, and Tingley (2022) for some evidence to this effect.

10. This expands Fearon’s (1997) concept to include costs paid that are not inherent in making the promise.

What might such a signal look like in practice? Visible investments in schools, infrastructure, and public services beyond what is anticipated as part of a local development policy could enhance commitment. To increase the costliness of a signal, expenditures should be guaranteed rather than contingent, and immediate rather than delayed. Previous work has argued that climate policy should be coupled with broader social programs (Bergquist, Mildenberger, and Stokes 2020). Our theory suggests that these extra investments are not only tools to expand the pro-climate coalition, but they are also signaling devices that enhance the government’s credibility.

In summary, this section has identified two dimensions of uncertainty that introduce bargaining frictions to embedded liberalism-style compromises: local investment efficacy and government commitment. Next we turn to our empirical analyses. First, we use a set of original surveys to measure jobs and investment beliefs central to local investment efficacy. Second, we study government commitment challenges using original survey experiments.

3 Capturing Local Investment Efficacy

3.1 Populations and Samples

To explore local investment efficacy – that is, what people think about the viability of new industries and the effects of government investments to create jobs – we collected new survey data on jobs and investment beliefs among adults in the United States. Public opinion is consequential for economic transitions since the public’s beliefs constrain the policy-making behavior of election-motivated politicians, potentially enabling or inhibiting local economic development.¹¹ We selected the United States because of its centrality to global decarbonization efforts. In total, we fielded four surveys during 2021 and 2022. The

11. Other actors such as interest groups and community leaders also influence bargaining over economic transitions, although they may ultimately be constrained by the bargains that impacted communities are willing to accept. These additional players, while meaningful, fall outside the scope of this paper. As part of a larger project, we document how these actors attempt to frame debates on issues discussed in this paper. We also survey local political officials to help understand their perspectives.

first two are nationally representative samples of the general population and aim to discover the beliefs of the average citizen. The next is a regional survey of New Mexico, the Industrial Midwest, Southwest Pennsylvania and surrounding counties, and the Gulf Coast. These regions were the targets of the Roosevelt Project¹² and are of theoretical relevance given their historical connection to the fossil fuel economy and need for economic development following decades of deindustrialization. To avoid urban bias in the regional samples, we calibrated our sampling strategy to have two-thirds of respondents come from outside of core urban counties. This required substantial resources and dramatically helped us reach more rural respondents who are often underrepresented despite their centrality to economic transitions like decarbonization.¹³ Figures B1 and B2 show the spatial distribution of the national and regional responses, respectively.

In addition to the online samples, we fielded two waves of an in-person survey at county fairs in parts of Appalachia home to coal, oil, and gas extraction. County fairs are culturally significant events that attract a wide cross-section of the community. Gazmararian (2021) contains details on the sampling strategy and also shows that, despite being a convenience sample, the respondents generally match local demographics in terms of the joint distribution of gender and age, in addition to party affiliation. The County Fair sample includes 249 participants, which reflects the maximum possible after expending considerable resources.

3.2 Measuring Jobs and Investment Beliefs

We devise a novel question battery to probe jobs and investment beliefs. We focus on ten industries: solar energy, wind energy, energy efficiency, automobile manufacturing, environ-

12. <https://ceepr.mit.edu/roosevelt-project/>

13. We contracted the survey firm Qualtrics to perform these national and regional samples. We targeted quotas for gender, age, education, and race. Subjects with unrealistically fast response speeds or those that failed to pass basic speed checks used by Qualtrics were dropped. National survey 1 was identical to the regional surveys. National survey 2 shared some questions that we focus on in this paper, but also contained additional questions analyzed below. For the shared questions we pool our analyses. National survey 1 targeted $n=2000$ and National survey 2 targeted $n=1100$. For the regional samples, all targeted $n=1000$ except for New Mexico which targeted $n=300$ due to sample availability. Actual samples in each case were slightly above the targets.

ment cleanup, coal mining, oil and gas, health care, trucking, and computer programming. Appendix D.2 explains the industry selection rationale. Each question corresponds to a theorized dimension along which beliefs may vary: growth, pay, temporariness, and imported workers. The questions are in matrix format, with each industry as a row.¹⁴

The first question measures perceptions regarding the regional growth of jobs:

This is a question about the future of jobs in the region where you live. Over the next 10 years, how likely do you think it is that businesses in your region will hire more than they fire or fire more than they hire in each of these industries. If you think there will be no jobs in this industry, please choose that option.

Answers include “Very Likely to Hire More,” “Somewhat Likely to Hire More,” “Somewhat Likely to Fire More,” “Very Likely to Fire More,” or “No Jobs in This Industry.” The question asks about jobs in the respondent’s *region* because our interest is in spatial variation of the perceived viability of industries. Individuals often care most about local employment opportunities, not industry growth elsewhere.

Second, to learn what people think about the share of jobs going to local labor, we ask:

Suppose the federal government makes an investment in the region where you live. The investment will create jobs in the following industries. For each industry, how many of the jobs do you think would go to local workers from the area versus workers from outside the area?

Answers include “Almost All Local Workers,” “Mostly Local Workers,” “Equally Local and Outside Workers,” “Mostly Outside Workers,” and “Almost All Outside Workers.” Responses should reflect, in part, a respondent’s assessment of the match between a region’s human capital and the requirements of jobs in different industries. Answers may also indicate one’s faith in the federal government’s prioritization of local job creation.

These first two questions were fielded on all of our surveys. The next two questions were only fielded on our second national sample.

Next, to measure beliefs about pay, we construct the following question:

14. Appendix D.3 discusses the protocol to ensure quality responses given this item design.

Think about the pay of jobs over the next 10 years in the region where you live. For each industry, do you think people will receive large pay raises, small pay raises, no raises, small pay cuts, or large pay cuts?

People often think of the quality of jobs in terms of pay raises, which eases the cognitive burden on the respondent and improves answer quality.

Finally, to capture beliefs about the temporariness, we crafted the following item:

Sometimes people take a job for a short period of time before they have to find a new one. Other times people take a job they will have until they retire. If someone took a job in one of the industries below, how short- or long-term do you think the job would be?

Respondents could answer with “Very Short-Term,” “Somewhat Short-Term,” “Somewhat Long-Term,” and “Very Long-Term.” The question evokes the idea that some jobs provide long-term careers while others are only an immediate source of employment. Of course, people switch careers, although many prioritize stability and seek industries in which they can work until retirement.

3.3 Descriptive Results

3.3.1 National Sample

Individuals in our survey evaluate the prospects for ten industries following federal investment in remarkably different ways. To show this, we linearly scale each of the variables between 0 and 1, then calculate the average response using our national sample data.¹⁵ Figure 1 presents the results for beliefs about the effects on job growth and on employment opportunities for locals. Figure 2 shows results for the questions on raises and job durability.¹⁶

At a high level, individuals had the most positive evaluation of healthcare and the weakest evaluation of coal mining. Industries like computer programming also tended to receive favorable assessments for most categories, though not for local jobs. Respondents in our

15. Appendix D.4 presents a more complete characterizations of the data.

16. As part of a larger project, we consider whether these expectations are realistic given actual employment trends. Here, we report subjective expectations.

national samples held reasonably optimistic evaluations of renewable energy jobs with respect to industry growth and potential for raises. These green sectors, however, received relatively more negative appraisals in terms of perceptions of employment by locals and job durability. Oil and gas jobs regularly lagged behind other industries in these national samples.

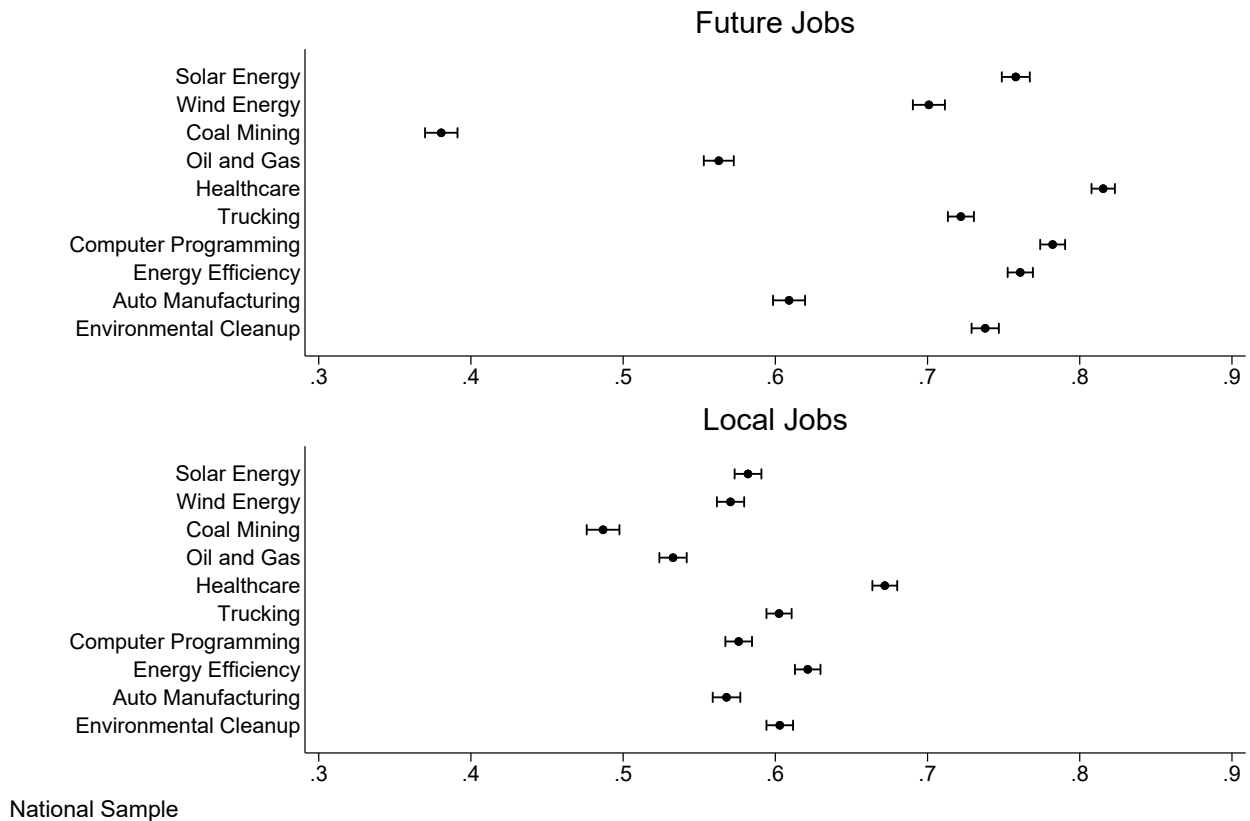


Figure 1: Average industry level evaluations for the effect of federal investment on future employment and job creation for locals. Higher values indicate better expected prospects. Results pool across both national surveys. 95% confidence intervals reported.

3.3.2 Regional Sample Contrasts

Exploring our regional samples reveals notable geographic variation. To show this, figure 3 calculates the difference in percentage of positive and negative responses to a question. For the local workers item, this would be the percent answering “Almost All Local Workers” and “Mostly Local Workers” minus the percent answering “Mostly Outside Workers” and “Almost All Outside Workers.” Positive values indicate a more optimistic evaluation whereas

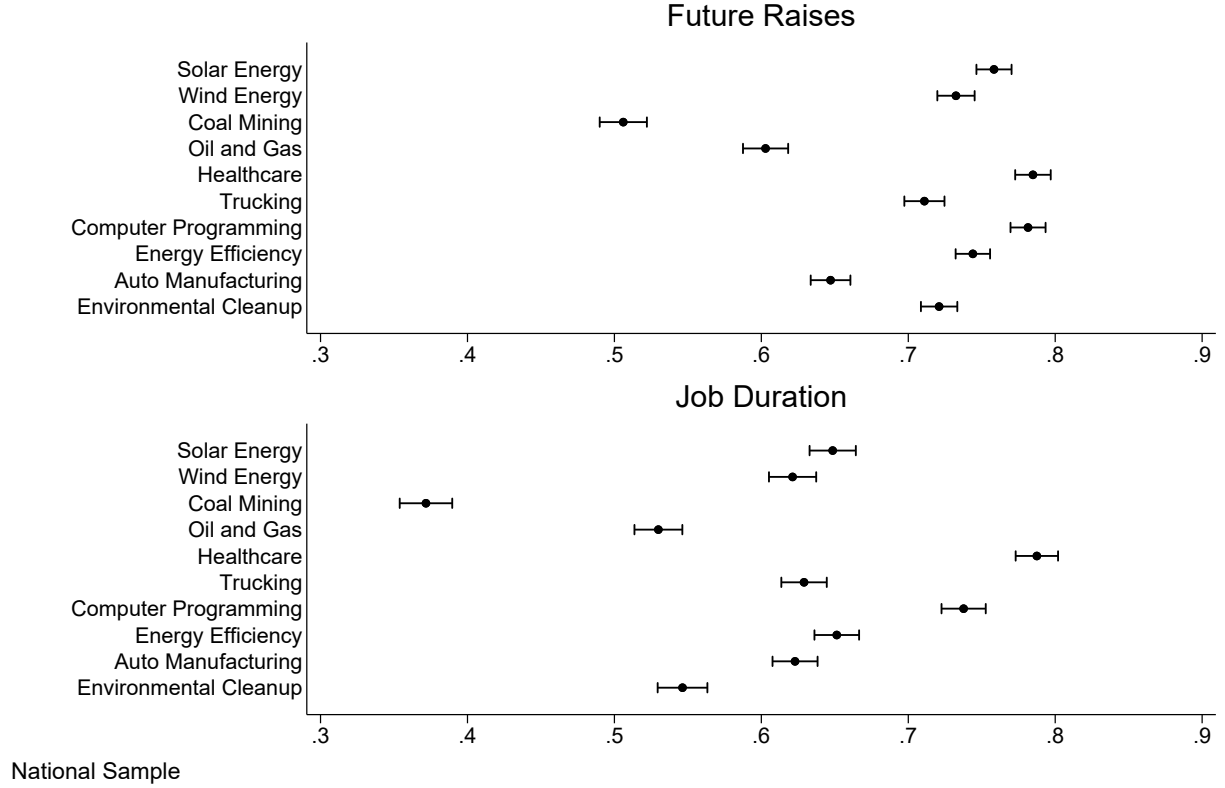
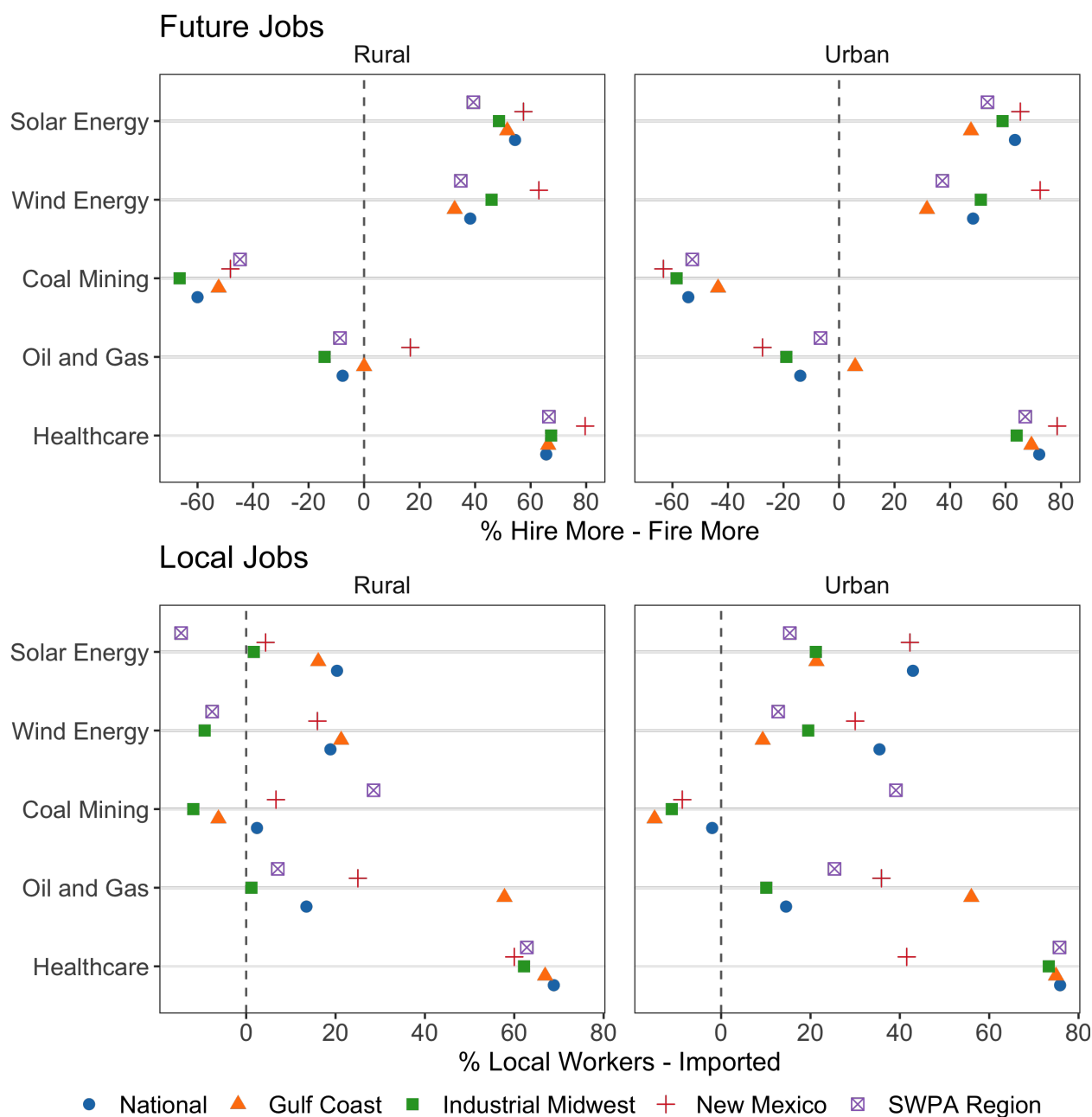


Figure 2: Average industry level evaluations for the effect of federal investment on future raises and job longevity. Results only use national sample 2. Higher values indicate better expected prospects. 95% confidence intervals reported.

negative values indicate a more pessimistic evaluation about the effects of federal investment. We do this for the pooled national sample and each regional sample, separating responses by their rural versus non-rural status using ZIP code-level data from the federal government.¹⁷

Several patterns quickly emerge. In terms of expectations of future job growth, respondents in both regional and national samples view healthcare as a high-growth industry. For green jobs, there is a net-positive assessment, but considerable heterogeneity by region. Relative to the national average, the Southwest Pennsylvania area and the Gulf Coast are most pessimistic about solar energy, wind energy, energy efficiency, and environment cleanup. While this difference appears in urban samples, it is most pronounced among rural respon-

17. See <https://www.hrsa.gov/rural-health/about-us/definition/datafiles.html>. While our regional samples targeted non-urban areas, this rural indicator enables an exploration of rural-urban differences among respondents in the national sample, some of whom reside in rural areas. Using the non-urban sample indicator produces largely similar results as they are highly correlated by design.



Notes: Difference in percent of positive and negative responses. For Future Jobs, positive responses include Somewhat Likely to Hire More, and Very Likely to Hire More, whereas negative responses include No Jobs in This Industry, Very Likely to Fire More, and Somewhat Likely to Fire More. For Local Jobs, positive responses include Mostly Local Workers and Almost All Local Workers, whereas negative responses include Almost All Outside Workers, Mostly Outside Workers, and Equally Local and Outside Workers.

Figure 3: Positive-negative response gap across samples

dents. With respect to incumbent industries like fossil fuels, regions with natural endowments in these energy sources, such as the Gulf Coast and Southwest Pennsylvania area, have more

positive expectations regarding future fossil fuel job growth.¹⁸

Expectations concerning the share of local jobs created by federal investments largely mirror the regional patterns uncovered above. Respondents perceive government investments in healthcare as yielding the larger local job-creation benefits, whereas there are large gaps between national and regional perceptions of the effect of federal efforts to expand green industries. The average citizen is more optimistic about the local share of jobs stemming from investments in the green economy than residents of the Southwest Pennsylvania, Industrial Midwest, and Gulf Coast regions. This gap is most evident in the rural samples. In contrast, people in energy communities around Southwest Pennsylvania are much more optimistic about local job benefits from investments in coal, while the same region along with the Gulf Coast and New Mexico are more optimistic about community jobs created by hypothetical government investments in the oil and gas industry. These regional results have direct implications for climate transitions and economic development more generally. While the average citizen nationally holds favorable views regarding the growth and local benefits of federal investments in green jobs, people in communities that might seek to diversify their economies with green jobs are currently more likely to think that these industries will layoff workers and that investments designed to attract green jobs will rely on imported labor. However, these regional differences are not the only sources of heterogeneity. Next we turn to unpacking this variation further at the individual level.

3.4 Within-Subject Analysis: Renewables Versus Fossil Fuel

Our final step deepens the analysis by analyzing the *relative* evaluation of the impacts of federal investment on renewable energy versus fossil fuel sources at the individual level. This is meaningful because, as discussed above, individual decisions occur against the backdrop of the status quo rather than in the abstract. Here, we again focus on the questions where we

18. Employing model specifications with objective local-level measures of fossil fuel employment and business establishments generates similar results. This is unsurprising because we selected these regions in part due to their reliance on fossil fuels. Future work explores objective measures of renewable energy potential to capture green comparative advantages.

have both national and regional samples (local workers and future hiring). At the individual level we take the difference between either the respondent’s evaluation of wind or solar energy and the subject’s evaluation of oil and gas. Positive values indicate a relatively more favorable assessment of the *effects of federal investment* in the renewable sector. Possible responses range along $[-4,4]$.¹⁹

Next we use this difference as an outcome variable in a linear regression model. We employ a battery of individual and regional covariates. We measure individual party affiliation (Republican, Democrat, Independent; Democrat as the omitted category); an individual’s concern about climate change, binary with 1 concerned (“We should take some action now/Immediate and drastic action is necessary”) and 0 not or less concerned (“This is not a serious problem/More research is needed before action is taken”); age; achievement of a 4-year college degree or greater; whether the respondent is currently employed; a categorical income variable (not displayed); and indicator variables for Black and Hispanic. To tend to differences between samples, we include a categorical variable for the regional sample (pooled national sample as the reference category), and an indicator for whether the individual comes from a ZIP code categorized as rural.²⁰ We estimate two models for each outcome: one includes climate change concern and one does not.

Figure 4 presents the contrasts between solar and wind energy with oil and gas.²¹ The results highlight partisan, rural, and regional divides in perceptions of the consequences of federal investment in these sectors. Republicans regularly evaluate the impact of federal investment in renewable sectors as having worse outcomes than in the fossil fuel sector. Importantly, this holds while controlling for regional variables which capture objective economic viability of industries. Compared to the national sample, the Gulf Coast and Southwest Pennsylvania regions on average are more pessimistic about positive local investment im-

19. In Appendix D.4 analyses we examine the original response scale for each industry separately using ordered logistic models, which shows similar results.

20. Appendix C describes the construction of these covariates.

21. In the appendix, Figure D6 presents the results for the contrast with coal and Figure D7 presents the results for healthcare. Both show similar patterns despite the contrast being with a declining versus rising industry.

pacts for wind and solar. Across all of the regions, respondents exhibit skepticism regarding whether investments would lead to local jobs. Rural regions were generally more doubtful about future hiring and local jobs.²²

Together, these results highlight credibility problems and the challenges that federal investment will face as part of a low-carbon transition.

3.5 Evidence from County Fairs

To further probe the perspectives of individuals in rural regions that can be difficult to capture, we fielded a survey at two county fairs in parts of Appalachia home to coal and gas extraction (Gazmararian 2021). This also enables us to examine the robustness of our green jobs results to different question formats and sampling techniques.

To measure attitudes about green job durability, a survey item asks for how long renewable energy jobs would last if they came to the respondent’s community. This measures the same concept as the first item in the battery asking whether an industry will hire or fire more workers over the next decade. To evaluate if the perceived quality of jobs depends on the messenger, we randomized whether politicians or power companies conveyed the message. The item reads as follows, with the manipulated text in brackets:

Some {politicians / power companies} say the growth of renewable energy like wind and solar will create new well-paying jobs. If these jobs come to your community, for how long do you think they would last?

Possible answers include “Very long,” “Somewhat long,” “Not very long,” and “Not long at all.” The question focuses on renewable energy jobs due to their salience and time constraints.

Figure 5 presents the results conditional on party identification. There was no difference by messenger, so we pool the results. Beginning with partisanship, Democrats are slightly more likely than Republicans to perceive renewable energy jobs as durable, but a considerable

22. These results hold if we control for responses to other job categories such as healthcare which helps to pickup more general views of economic prospects.

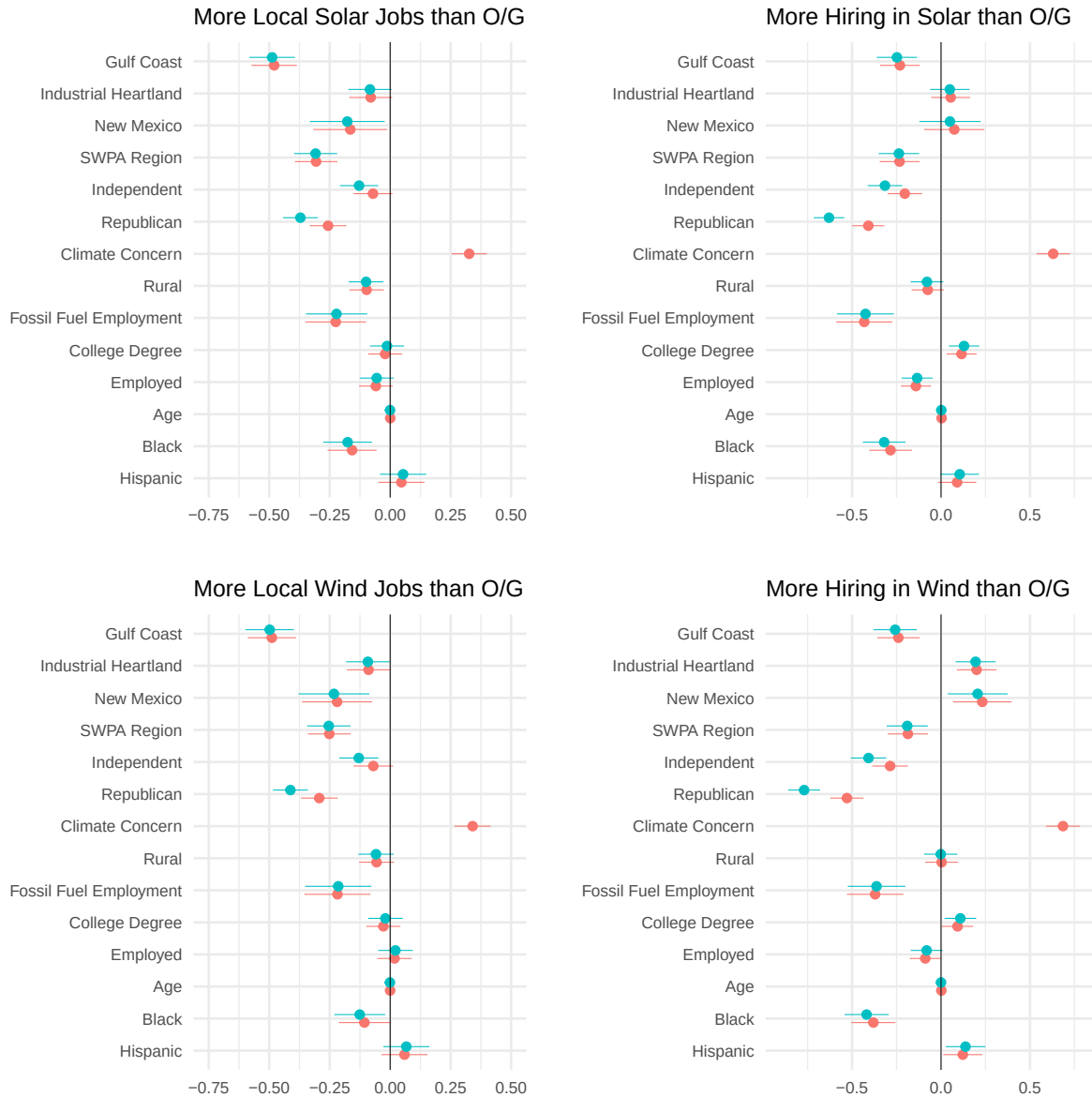


Figure 4: Individual and regional determinants of within-subject perceptions of renewable energy investment outcomes versus oil and gas (O/G) investment. Robust standard errors used and 95% confidence intervals reported. Positive values indicate better future hiring and local jobs assessments of wind or solar energy relative to oil and gas.

bipartisan share of respondents from this region think green jobs would not endure.²³ We also explore beliefs about the pay of green jobs, and find similar patterns with respect to

23. Individuals employed in fossil fuels exhibit greater skepticism of wind and solar jobs than those working in non-fossil fuel sectors; although this result is not as robust as party when controlling for other factors.

partisanship (appendix D.7). In all, these results corroborate the findings in the General Population and Regional samples.

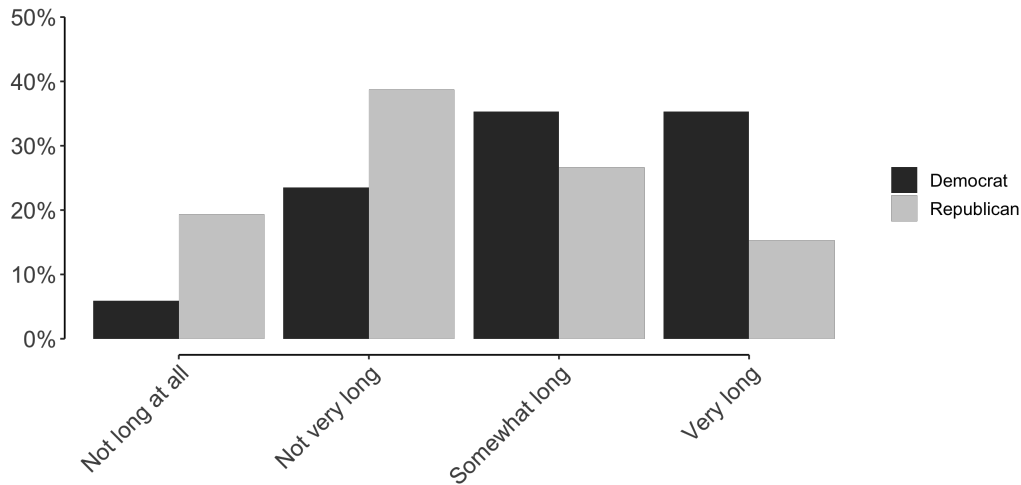


Figure 5: County fair beliefs about durability of green jobs

4 Enhancing Government Commitment through Investment and Institutional Design

We next employ three survey experiments to explore the effects of government commitment. The first experiment (4.1) randomizes different transition assistance program features in order to understand the effect of different credibility dimensions on policy support. The second experiment (4.2) considers how improving the credibility of retraining programs could lead to greater worker buy-in. The third experiment (4.3) explores how government commitment might increase community willingness to make a costly move away from incumbent industries in exchange for transition assistance. We field these experiments on the nationally representative sample 2 described above. These experiments provide early empirical evidence for how investments and institutions could be designed to increase credibility.

4.1 Multi-Attribute Policy Experiment

Our first experiment aims to measure the effect of credibility on support for government transition assistance. The experiment describes an investment policy that has multiple independent dimensions which we manipulate. This technique, known as a conjoint experiment, is well-suited for our research question since economic development programs are multi-dimensional, which forces both policymakers and citizens to make trade-offs between design features. In this context, conjoint surveys are a robust way to elicit public preferences and help to improve external validity (Hainmueller, Hopkins, and Yamamoto 2014).

4.1.1 Design

The survey presents the respondent with a choice between two government investment policies to create renewable energy jobs in counties facing economic decline. This framing reflects the context of transition assistance which often goes to economically distressed regions. We instruct the subject to adopt the perspective of a resident from an area receiving funds, since not all in the general population sample may live in such a county.²⁴ The mechanism of investment is targeted tax credits, which we select because it constitutes one of the most popular local development policy instruments (Bartik 2003). The respondent rates each policy on a seven-point Likert scale, the *ratings* outcome, and chooses her preferred policy, the *choice* outcome.²⁵ From the subject’s answers, we calculate the average marginal component-specific effects (AMCE) for each element of the policy packages, which we detail below.²⁶ This estimand represents the average causal effect of a given policy component on support for the investment proposal.

Table 1 provides an overview of the five attributes and their corresponding levels. Each attribute aligns with a theoretical mechanism described in Section 2.2. We checked to en-

24. See Appendix E.1 for further discussion.

25. We normalize the rating scale to run from 0 to 1.

26. We employ an “uniform” AMCE since our profiles are of policies, not candidates, so there does not exist a relevant distribution of real world profiles (de la Cuesta, Egami, and Imai 2022).

sure that each combination of attributes is logically consistent to rule out the possibility of implausible profiles.

Table 1: Conjoint attributes, levels, and theoretical relevance

Attribute	Levels	Theorized Mechanism
Reversible	Tax credits reversible by Law-makers	Institutional constraints
	Tax credits reversible by President/Governor	
	Tax credits not reversible	
Bipartisan Support	High	Second-order beliefs
	Medium	
	Low	
Tax Credit Amount	\$10 million per year	Investment structure
	\$15 million per year	
	\$20 million per year	
Tax Credit Duration	5 years	Investment structure
	10 years	
	15 years	
Additional Investment in County Schools	Guaranteed \$15 million	Costly signals
	Ability to apply for \$20 million (75 percent receive funds)	

First, to evaluate the effect of institutional constraints on credibility, the conjoint varies whether the policy is reversible by lawmakers, the President/Governor, or not reversible at all.²⁷ The last level is an intentional abstraction that allows us to capture the counterfactual of no reversal concerns. The AMCE should be positive and largest for the reversion-proof investment, followed by Congress and then the president (Congress requires a majority to act whereas the president has fewer institutional constraints).

Second, the bipartisanship attribute probes the consequences of second-order beliefs by varying the extent to which both Democrats and Republicans support the investment package. Credibility should be increasing in bipartisanship. When both parties back legislation, the median lawmaker is less likely to pursue rollback since the bipartisan consensus reflects strong national support for the policy. Below we offer suggestive evidence for this reversibil-

²⁷. We randomize whether the actor is the state or federal government.

ity interpretation.

Third, to investigate the effect of investment structure, we vary the value and duration of the tax credits. Since we randomize these attributes, we can evaluate their independent and interactive effects. In general, we expect respondents to favor large, long-term investments. However, when forced to choose between large short-term proposals and small- or medium long-term packages, time discounting should lead subjects to select the former. Also note that the size of the tax credit may also serve as a costly signal that demonstrates the government’s commitment to creating jobs. This reinforces how the theorized mechanisms are not mutually exclusive.

Fourth, to test whether sinking costs increase credibility, an attribute presents a choice between a *guaranteed* small grant from the federal government for local schools and the *ability* to apply for a similar but larger grant with a 75 percent chance of success. The expected value of the large but uncertain grant is equal to that of the smaller but guaranteed funding. We hypothesize that the attribute signals the actor’s type; the guaranteed small grant is a costly action that only a credible government would take.²⁸

Given the nuances of these attributes, we take five steps to ensure respondent comprehension. First, we provide extensive and clear instructions to explain the attributes and tasks (see Appendix E.2). Second, we employ both content and metadata-based attention checks, described in Appendix E.4, to ensure that subjects understood the instructions and read with care. Third, we limit the number of attributes and tasks to five each, well within the guidance of Bansak et al. (2018) who find designs with up to 30 tasks are robust to satisficing. Fourth, we optimized the conjoint table to fit mobile screens so that respondents could view much of the table and answer options simultaneously. Lastly, we include a battery of interpretation checks which we discuss when presenting results.²⁹

28. A possible limitation is a ceiling effect among Democrats who may believe, despite our specification of the acceptance probability, that the Democratic-controlled executive branch at the time of the survey might be more likely to approve a grant to their community.

29. These interpretation checks come after the respondent completes all conjoint tasks.

4.1.2 Results

Figure 6 plots the AMCEs based on regression estimates with standard errors clustered by respondent. The bars denote 95 percent confidence intervals. The points lacking horizontal bars denote the reference category for each attribute.

Beginning with institutional constraints, for both the choice and ratings outcomes, respondents are sensitive to reversibility; when the policy is *de facto* not reversible, support increases. When comparing the effect of an actor who can reverse the law, people are more averse to policies that can be overturned by the president or governor. This supports our hypothesis that the lesser constraints on the executive's ability to reverse policy translate into reduced commitment; legislative action, by contrast, is viewed as more durable. As an interpretation check, we ask how long people think tax credits will last and randomize whether the credits are reversible by the actors identified in the conjoint. The results suggest that if there are no institutional constraints, the respondent believes the tax credit will end three years early (figure E4).

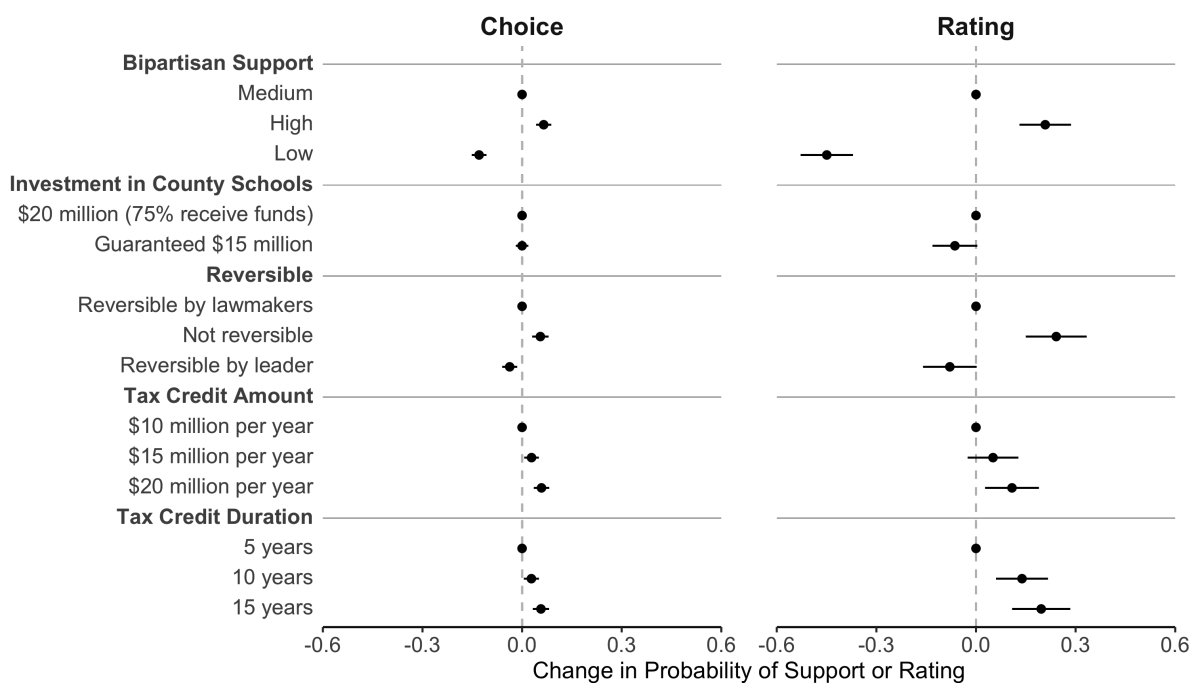


Figure 6: Effects of policy attributes on overall policy support

Turning to second-order beliefs, figure 6 reveals that bipartisan backing for transition assistance translates into overall support for the policy. Across all attributes, low bipartisanship has the largest negative effect on support. A possible concern with this interpretation is that bipartisanship also signals other dimensions of the policy such as quality. The design of the conjoint counterbalances the potential for information equivalence, since the other attributes specify relevant policy components. To further investigate this alternative explanation, we implement an interpretation check that finds the effect of bipartisanship transmits through assessments of reversibility (figure E5).

Next, the structure of investment influences support, although the relative magnitude of these effects is smaller than that of other attributes. Tax credits of lesser and greater value increase and decrease support, respectively, for the choice but not rating outcome. A symmetric finding obtains for the duration attribute.³⁰ Taken together, these results suggest that while the *content* of investment matters, equally if not more important are the *incentives* of, and *constraints* on, actors charged with implementing the policy.

Proceeding to the school funding attribute designed to capture costly signals, in the aggregate there is no effect of guaranteed funding on policy support. However, this masks important partisan differences. In Appendix E.6 we show that Republicans and Independents are slightly more likely to select a policy if the government sends a costly signal.³¹ We find a similar partisan pattern in the interpretation check for this attribute. This heterogeneity by party identification aligns with our earlier finding that Republicans are more skeptical of clean energy. The results here indicate that partisan jobs and investment beliefs are not simply a reflection of dislike for clean sector jobs, but represent a deeper concern about credibility. For Republicans, costly signals may lessen these credibility concerns.

In sum, the findings from the multi-attribute experiment are as follows: First, institu-

30. To explore time discounting, we estimate the interactive effect of tax credit duration and amount; that is, the effect of tax credit duration conditional on the tax credit amount, and vice versa. Consistent with our theory, the results from these tests indicate that people discount the future (Appendix E.5). We also perform an interpretation check to verify that discounting, rather than differential perceptions of efficacy, drive this result.

31. However, they are not likely to increase their rating evaluation of the policy.

tional constraints increase policy support since they reduce the reversal risk from electoral swings. Second, bipartisanship enhances support due to the information co-sponsorship provides regarding the preferences of lawmakers and in turn their motivation to overturn or defend the legislation. Third, investment structure influences policy approval; people generally endorse larger and longer tax credits when evaluated independently, but their interactive effect on support declines as the time horizon widens since credibility concerns lead people to discount the future. Fourth, sending costly signals through community-wide investment may ameliorate commitment problems, especially among Republicans.

4.2 Retraining Experiment

Beyond support for assistance programs, effective transition programs must convince individuals to retrain for jobs in new industries. To this end, governments often invest in workforce development programs. The canonical case is Trade Adjustment Assistance, which included funds to re-skill workers adversely affected by foreign trade. Likewise, the POWER initiative distributed grants to train out-of-work coal miners for new careers. However, our theory suggests that training programs are often met with skepticism from would-be recipients. If the industry for which people are being retrained depends on government support, people may doubt whether jobs will exist in the future. A new leader may assume power and axe the program. Budget constraints might force subsidy cuts. Opposition groups could lobby to curtail the rent. Given this fraught context, are there ways governments might structure retraining to alleviate the commitment problem?

4.2.1 Design

We construct a survey experiment to explore this question. The vignette presents the respondent with a potential government investment to expand renewable energy along with a program to train workers for the new jobs. The treatments manipulate the government's incentives to follow through on its investment in green jobs. The logic of these treatments

mirror the insights from Alesina and Tabellini (1990), who show how political parties use government debt to strategically influence the policy choices of successors. The experiment focuses on states as the actor, since this level of government is often responsible for administering workforce development programs.

The first commitment device manipulates the conditionality of the loans the government extends to help workers cover education expenses incurred during retraining for renewable energy jobs. In the low credibility baseline, repayment of the loan is unconditional; whether an individual finds work in solar or wind energy is irrelevant to their obligation to pay back the government. In the *conditional loans* treatment, loan repayment is conditional on the participant finding a renewable energy job within five years. If not enough green jobs are available, the individual has no obligation to pay back the government. Unlike the low credibility treatment, the government has an incentive to continue supporting the renewable energy industry to recoup its lending costs. This allows the current government to tie the hands of future administrations, which might face budget shortfalls if it repeals support for green energy.

The second commitment device manipulates the cost the government incurs if it reneges on its support for renewable energy. A future anti-renewables administration might be willing to incur the price of not having loans repaid if they are inconsequential relative to the overall budget, but the new administration might balk as the valuation increases and forces trade-offs with other priorities. Capturing this logic, we randomize whether the loans constitute a large percent of the state’s budget in the *high budget* treatment. We select budget amounts of one and five percent, which are based on estimates of the cost to train coal workers for solar jobs in West Virginia (Louie and Pearce 2016).³² The experiment holds constant private costs for retraining by stipulating that retrainees receive a monthly stipend covering the cost of living. This echoes transition assistance proposals, such as Colorado’s.³³

32. The worst-case cost of retraining coal miners is \$475 million (4.1% of West Virginia’s budget) whereas the best case scenario is \$45.9 million (0.4%).

33. Colorado Department of Labor and Employment, “Draft Colorado Just Transition Plan – Preliminary Outline,” July 1, 2020.

The vignette reads as follows:

Consider a 10 year investment by a state government to expand wind and solar energy. As part of this plan, the state government creates a program to train workers for new wind and solar energy jobs.

The training program provides:

- A monthly stipend for the cost of living.
- No interest loans for tuition.
- {If people cannot find wind and solar energy jobs after 5 years because there are not enough available, they do not need to pay back the loan.}

In all, the loans are estimated to be worth $\{1 / 5\}$ percent of the state budget.

This is a two-by-two factorial design. The *high credibility* contrast compares the joint-occurrence of the conditional loan repayment and high budget conditions with the joint-occurrence of the unconditional loan repayment and low budget conditions; this is a juxtaposition of the best- and worst-case scenarios in terms of credibility. We also present a *pooled* contrast that compares the joint-occurrence of the conditional loan repayment and high budget conditions with all other conditions. Lastly, the *high budget* and *conditional loan* contrasts compare the high budget and conditional loan conditions, respectively, with the remaining treatments. These latter two contrasts probe the independent effects of the commitment devices.

The first outcome measure asks whether a respondent would consider entering the training program. The question is phrased in terms of if one were to pick a new career, since many respondents likely already have professions. We expect more people to be willing to participate in the training program when the government ties its hands via conditional loan repayment and high budget expenditures. As secondary outcomes, we ask how likely the respondent would be to recommend the program to friends and family. Credibility should matter most for the self-enrollment and recommendation outcomes since a respondent considers personal and social costs.³⁴

34. We also explore whether commitment dynamics translate into program support. We registered mixed expectations for the high budget treatment condition and a positive directional effect for the high credibility and unconditional loan treatments. We found no effect of any of treatment on program support, suggesting that support entails distinct considerations from credibility.

4.2.2 Results

Turning to the overall results, 83 percent indicate they would be likely to recommend the program to family or friends and 72 percent would be likely to enroll themselves. Figure 7 plots the ATE estimated with OLS regression using controls and two-sided 95 percent confidence intervals. In the high credibility contrast, conditional loan repayment and high budget share increase the probability of recommending the program and enrolling oneself. Decomposing the joint effect of loan conditionality and budget share reveals that conditional loan repayment drives much of the willingness to recommend or enroll in the program. There is no effect for the budget treatment on enrollment, when marginalizing over the loan conditions, although there is a weak effect on propensity to recommend the program.³⁵

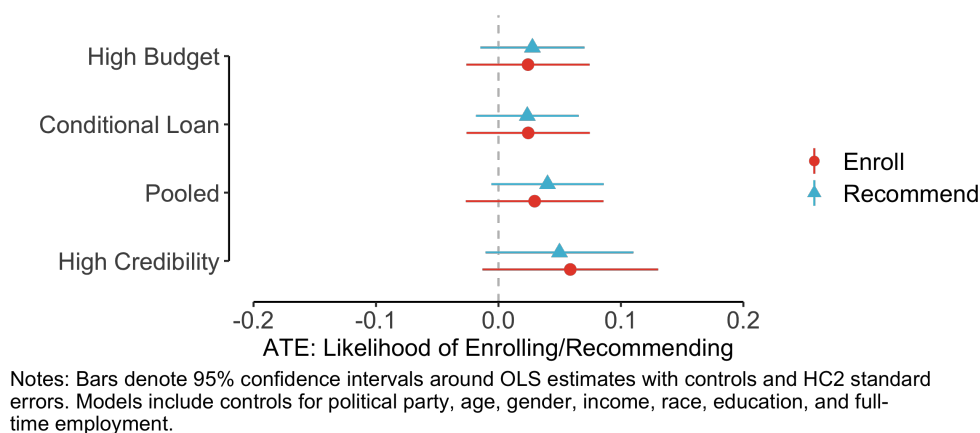


Figure 7: Effects of retraining program commitment devices on probability of recommending the program and willingness to self-enroll

To evaluate whether the theorized commitment devices influence a respondent’s expectations of policy rollback, we ask: “How likely or unlikely do you think it is that the investment to expand solar and wind energy would be eliminated or reduced over the next 10 years?” The possible answers run along a four-point scale from “very unlikely” to “very likely.” As an indication of the salience of credibility, 58 percent of respondents think the government

35. To rule out the possible information equivalence between budget size and loan conditionality and investment efficacy, we devise an interpretation check that estimates the effect of these attributes on perceived investment’s efficacy. There is no effect on efficacy assessments, which suggests credible commitments drive the results (figure F1).

would reverse its investment.³⁶

A further implication is that if the respondent believes the government would carry out the retraining program, people should think that more re-trainees should succeed in finding jobs. To probe this program efficacy hypothesis, we ask: “What percentage of people who participate in the training program do you think would find solar or wind energy jobs in the next 5 years? Response values range from 0 to 100.” Examining the raw data, answers run from 0 to 100 percent, with a median of 52. Results contained in Figure 8 show that the high credibility treatment leads respondents to believe that 5.1 percent more program participants would find careers in renewable energy. This effect holds for the pooled and conditional loan treatments as well. Budget size has a positive point estimate, but is imprecisely estimated. These results underscore that people believe the government has the capacity to assist their communities, but the public lacks faith in the government’s incentives to carryout investment policies absent commitment devices.

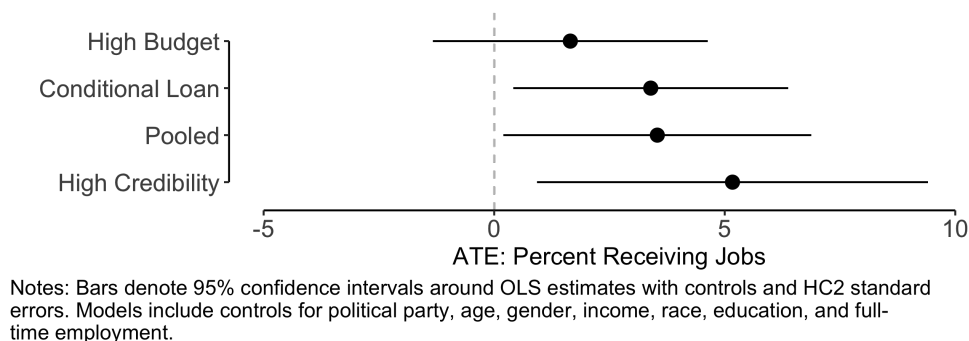


Figure 8: Effect of commitment devices on percent receiving jobs

In all, retraining programs are central to economic transition plans, such as decarbonization. However, trust in the government’s incentives to follow through with its promises to retrain workers varies, but can be enhanced with commitment devices that make it incentive

36. Figure F2 presents the results, which show Republicans respond to the commitment devices as theorized in the high credibility, conditional loan, and pooled contrasts. In contrast, Democrats view the workforce program that occupies a high share of the state’s budget as more likely to be reversed, which may reflect a concern that the Republican party’s historical preference for small government increases the odds that expensive policies might be reversed. We anticipated this in our pre-registered hypotheses, noting that greater budgetary cost may lead some to think the policy would have a higher chance of reversal. The average effects are null, which we attribute to partisan heterogeneity.

compatible for the government to sustain its investment.

4.3 Regulation Experiment

Now we explore the effect of transition assistance credibility on support for policies that cause regional job losses. Unlike the conjoint and regulation experiments, the regulation experiment stipulates guaranteed job losses in the respondent's community, which should heighten the salience of commitment concerns. In particular, the regulation experiment captures the trade-off between providing public goods like environmental protection and the costs for concentrated interests like workers in polluting industries. More broadly, the strategic situation mirrors that of policy-led economic transitions such as decarbonization or trade liberalization, which impose concentrated economic costs on energy-producing and trade-exposed communities.

4.3.1 Design

The experiment instructs the respondent to envision a government regulation that will lead to layoffs at the main job-provider in the area where the subject works. The government will establish an assistance program to retrain impacted workers and provide local economic development grants. We randomize whether the assistance program is bipartisan or reversible, hypothesizing that people are more willing to accept a costly regulation if the government is committed to the assistance program; bipartisanship and non-reversibility provide a signal of second-order beliefs and institutional constraints, respectively, which should increase credibility. The vignette reads as follows:

Think about the main job-provider in the area where you work. Imagine that the federal government is considering a regulation that will cause layoffs in that industry. The regulation is needed to prevent pollution that will harm human health.

To protect workers and communities, the federal government will create an assistance program. The assistance program will include free retraining for workers and grants for local economic development.

There is {low / high} bipartisan support for the assistance program.

The assistance program is {reversible / not reversible} by a future Congress.

The main outcome measure asks how likely or unlikely the subject would be to support the costly regulation.

4.3.2 Results

Overall, 69 percent of respondents said they would support the regulation, although this drops to 51 percent among Republicans. Figure 9 plots the average treatment effects, which show how support increases for all credibility treatments as expected. There is no heterogeneity by party, save for a positive effect of bipartisanship on Republican policy support (figure G1). The lack of partisan heterogeneity may reflect the costliness of the regulation, which could dampen ceiling effects among Democrats. This common response across parties here suggests that when private costs are high, as is the case in economic transitions, credibility concerns can transcend the perceptual screen of partisanship.

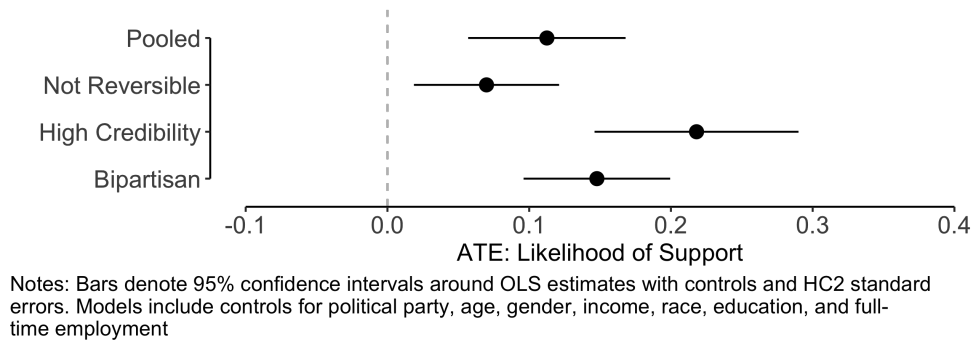


Figure 9: Effects of bipartisanship and reversibility on support for costly transition

As an interpretation check for the role of credibility, we ask whether the participant thinks it is likely that the program would be cut. Unlike responses to the support question, respondents are quite pessimistic regarding the durability of assistance; 60 percent believe the program will be reversed. This distribution of responses is remarkable, demonstrating how the government's promise to carry out economic development programs, such as aid to coal communities, is not taken for granted.

Figure 10 shows that the credibility treatments reduce concern about reversibility. The combined impact of bipartisanship and institutional constraints is considerable, suggesting that commitment devices can have additive effects on the public’s trust in government.

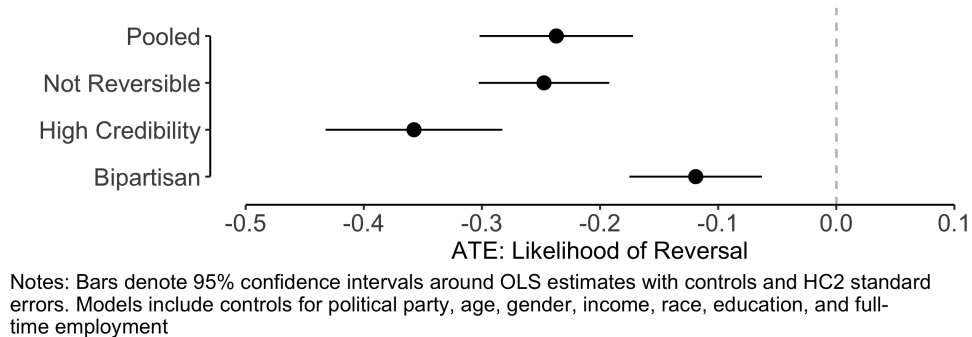


Figure 10: Effects of bipartisanship and reversibility on perceived durability of assistance

4.4 Summary

In all, these findings suggest that the public is more willing to incur transition costs when the government provides assistance. However, it is essential that the government take steps to bolster the credibility of its commitment. We explore complementary mechanisms for doing so that highlight distinct dimensions of credibility problems and voter concerns. Taken together these findings suggest the importance of developing and studying institutional mechanisms to enhance the credibility of transitional investments to reduce carbon emissions while sustaining economic livelihoods.

5 Conclusion

This paper demonstrates that credible commitment problems present a barrier to local development that might otherwise help communities. In particular, credibility concerns are acute when it comes to accelerating a transition away from fossil fuels. In doing so, we develop a “ground up” micro-founded approach to thinking about place-based transition assistance such as local investments, compensation, and retraining. Our focus on credibility

considerations contributes to a literature on embedded liberalism-style compromises that are typically top down in nature (Ruggie 1982).

In the climate context, demands for decarbonization will only continue to grow as global warming accelerates and generates new political cleavages within and between nations (e.g., Gazmararian and Milner 2022). Our findings speak to how policymakers might respond to those demands. To enhance credibility and garner support for climate transitions, advocates should employ commitment devices like conditional loan repayment for retraining, build bipartisan consensus and legislative rather than executive action when possible, invest in community-wide public goods like schools, and emphasize the creation of jobs outside of green industries. Such jobs, while not tied to the green economy, can nonetheless be compatible with the goals of climate policy or local development.

Though such actions might currently appear politically infeasible or challenging, such perceptions are a product of the view that backlash creates an obstacle to decarbonization; contrary to these expectations, we find that people are willing to incur transition costs if provided credible assistance. Further, we note that some conservative legislators in the United States flag similar concerns from a business perspective — the uncertain durability climate policy undermines business interests that otherwise would want to invest in decarbonization opportunities (Graves 2022).

In terms of climate politics, we refocus public opinion research from consumers (e.g., Ansolabehere and Konisky 2014) to communities (e.g., Gaikwad, Genovese, and Tingley 2022). We also deepen an emerging and exciting stream of scholarship on the clean energy transition. For instance, Meckling and Nahm (2021) identify strategic state capacity as an explanation for how some governments but not others succeed in demobilizing fossil fuel interest groups; the commitment dynamics we explicate nuance the ways that states might recruit allies and align interests. In related work, Gaikwad, Genovese, and Tingley (2022) introduce a theory of preferences over the allocation of compensation; we add the credibility of the government’s commitments as a strategic extension to their model. Lastly, Colgan,

Green, and Hale (2021) theorize the dynamics of bargaining between climate-forcing and climate-vulnerable asset holders; applying their framework, we can show that if the balance of political power tips in favor of assets vulnerable to global warming, then governments may be more able to credibly commit to providing assistance to transitioning communities. These applications show the value in theorizing climate politics through the lens of bargaining and credibility concerns.

There are at least four additional avenues of inquiry for future research. First, scholars should explore whether credibility considerations apply to other aspects of the climate transition such as direct compensation and carbon tax dividend programs.³⁷ Similarly, the challenge of meeting climate finance goals under the Paris agreement could create commitment problem concerns in recipient countries (Gaikwad, Genovese, and Tingley 2021). Second, credibility dynamics should be explored through a comparative lens. Other countries have varied histories with redistribution, which could amplify or attenuate commitment concerns. For example, lack of faith in the apolitical execution of redistribution in India (e.g., Gaikwad, Genovese, and Tingley 2022) might exacerbate worries about local benefits from investment. Third, building on our results that point to the significance of relative comparisons between industries, scholars should explore to what extent these comparisons are malleable. People may become more amenable to accepting what they perceive as sub-optimal transition assistance if they are persuaded their existing industry is in inevitable decline (Gazmararian 2021). Fourth, the rich literature on “place versus people” based development policies should consider the role of investment credibility. Unintended consequences of place-based investment are important to consider (Kline and Moretti 2014). However, much research highlights the importance of such approaches, especially in areas with high labor elasticity which includes some of the energy transition communities discussed in this paper (e.g., Austin, Glaeser, and Summers 2018). Applying these and other insights (e.g., Shambaugh

37. Along with the topics examined this paper, policy sequencing (Meckling, Sterner, and Wagner 2017) may be essential for decarbonization because political constraints can lead governments to pursue piecemeal and incremental measures with unknown efficacy (Meckling, Sterner, and Wagner 2017).

and Nunn 2018) to the climate transition context is sorely needed. Failure to do so will lead to the self-reinforcing decay of distressed regions that is unwise politically and normatively (Anderson 2017). We argue that the investment credibility concerns raised in this paper should be further explored vis-à-vis the place-based literature.

In the context of economic transitions more broadly, since the work of Polanyi (1944), scholars have explored the interplay of economic dislocation and redistributive politics. Whether transitions are the consequence of technological transformations like automation or policy-induced shifts like emissions regulations, assisting the losers of these changes has been a central task of governments. From a normative perspective, the state has an obligation to not leave members of society behind, especially when government cause is the cause of their dislocation. From the political perspective, providing assistance to these communities can build a coalition for socially desirable ends, such as climate policy. Our research suggests that the success of embedded liberalism-style bargains is not simply a top down technical task of supplying and targeting assistance, but requires fostering trust and establishing durable investments via institutional constraints so promises of transition assistance appear credible from the ground up perspective of communities.

References

- Alden, Edward. 2017. *Failure to Adjust*. Rowman & Littlefield.
- Alesina, Alberto, and Guido Tabellini. 1990. “A Positive Theory of Fiscal Deficits and Government Debt.” *The Review of Economic Studies* 57 (3): 403.
- Anderson, Michelle. 2017. “Losing the War of Attrition: Mobility, Chronic Decline, and Infrastructure.” *Yale Law Journal* 127:522.
- Ansolabehere, Stephen, and David M Konisky. 2014. *Cheap and Clean*. The MIT Press.

- Arellano, Cristina, Aleš Bulř, Timothy Lane, and Leslie Lipschitz. 2009. “The dynamic implications of foreign aid and its variability.” *Journal of Development Economics* 88 (1): 87–102.
- Austin, Benjamin, Edward Glaeser, and Lawrence Summers. 2018. *Jobs for the Heartland: Place-Based Policies in 21st Century America*. w24548. Cambridge, MA: NBER.
- Axelrod, Robert, and Robert O. Keohane. 1985. “Achieving Cooperation under Anarchy.” *World Politics* 38 (1): 226–254.
- Babcock, Linda, William J Congdon, Lawrence F Katz, and Sendhil Mullainathan. 2012. “Notes on Behavioral Economics and Labor Market Policy.” *IZA Journal of Labor Policy* 1 (1): 2.
- Bansak, Kirk, Jens Hainmueller, Daniel J. Hopkins, and Teppei Yamamoto. 2018. “The Number of Choice Tasks and Survey Satisficing in Conjoint Experiments.” *Political Analysis* 26 (1): 112–119.
- Barradale, Merrill Jones. 2010. “Impact of Public Policy Uncertainty on Renewable Energy Investment.” *Energy Policy* 38 (12): 7698–7709.
- Bartik, Timothy. 2003. *Local Economic Development Policies*. Upjohn Institute. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=400820.
- Bergquist, Parrish, Matto Mildenerger, and Leah Stokes. 2020. “Combining Climate, Economic, and Social Policy Builds Public Support for Climate Action in the US.” *Environmental Research Letters* 15 (5): 054019.
- Bleizeffer, Dustin. 2016. “Uncertain Future for Wyoming’s Laid off Coal Miners.” *High Country News*. <https://bit.ly/3qGANO6>.
- Bowen, T. Renee, J. Lawrence Broz, and B. Peter Rosendorff. 2022. “Trade Policy Transitions: Three Eras of U.S. Trade Policy.”

- Brady, Jeff. 2017. "Solar Firms Plan To Return To Nevada After New Law Restores Incentives." *National Public Radio*, June 7, 2017. <https://tinyurl.com/4mzxadh4>.
- Breetz, Hanna, Matto Mildenberger, and Leah Stokes. 2018. "The Political Logics of Clean Energy Transitions." *Business and Politics* 20 (4): 492–522.
- Broz, J. Lawrence, Jeffry Frieden, and Stephen Weymouth. 2021. "Populism in Place." *International Organization*, 1–31.
- Buckley, Cara. 2022. "Coming Soon to This Coal County: Solar, in a Big Way." *The New York Times*, January 2, 2022. <https://tinyurl.com/2p8j7w2p>.
- Cardwell, Diane. 2017. "What's Up in Coal Country: Alternative-Energy Jobs." *New York Times*. <https://nyti.ms/3ilccnP>.
- Citrin, Jack, and Laura Stoker. 2018. "Political Trust in a Cynical Age." *Annual Review of Political Science* 21 (1): 49–70.
- Colgan, Jeff D., Jessica F. Green, and Thomas N. Hale. 2021. "Asset Revaluation and the Existential Politics of Climate Change." *International Organization* 75 (2): 586–610.
- Cramer, Katherine J. 2016. *The Politics of Resentment*. Chicago, IL: The University of Chicago Press.
- Cusack, Thomas, Torben Iversen, and Philipp Rehm. 2006. "Risks at Work." *Oxford Review of Economic Policy* 22 (3): 365–389.
- De la Cuesta, Brandon, Naoki Egami, and Kosuke Imai. 2022. "Improving the External Validity of Conjoint Analysis." *Political Analysis* 30 (1): 19–45.
- Dixit, Avinash, and John Londregan. 1995. "Redistributive Politics and Economic Efficiency." *American Political Science Review* 89, no. 4 (December): 856–866.
- Domonoske, Camila. 2021. "Boom Or Bubble? Skeptics Take Aim At Buzzy Electric Vehicle Market." *National Public Radio*, March 24, 2021. <https://tinyurl.com/jt4fuphu>.

- Economist, The. 2009. “Greening the Rustbelt.” *The Economist*, August 13, 2009. <https://tinyurl.com/4xmbu5xu>.
- Egan, Patrick J., and Megan Mullin. 2017. “Climate Change: US Public Opinion.” *Annual Review of Political Science* 20 (1): 209–227.
- Erickson, Camielle. 2021. “A Look Ahead: It Was a Bruising Year for Wyoming Coal. What Could the New Year Bring?” *Casper Star Tribune*. <https://bit.ly/3uAxaKN>.
- Fearon, James D. 1997. “Signaling Foreign Policy Interests.” *Journal of Conflict Resolution* 41 (1): 68–90.
- Fernandez, Raquel, and Dani Rodrik. 1991. “Resistance to reform: Status quo bias in the presence of individual-specific uncertainty.” *The American economic review*, 1146–1155.
- Franco, Lucas. 2019. *Catching the Wind 3.0*. Local Jobs North Dakota & Minnesota. <https://bit.ly/3iIoixo>.
- Gaikwad, Nikhar, Federica Genovese, and Dustin Tingley. 2021. “Climate Action from Abroad: Assessing Mass Support for Cross-Border Climate Compensation.” *working paper*.
- . 2022. “Creating Climate Coalitions: Mass Preferences for Compensating Vulnerability in the World’s Two Largest Democracies.” *American Political Science Review*.
- Gazmararian, Alexander F. 2021. “Coal Country Supports Climate Policy in Exchange for Transition Assistance.” Working Paper.
- Gazmararian, Alexander F., and Helen V. Milner. 2022. “Political Cleavages and Changing Exposure to Global Warming.”
- Goldstein, Judith, and Robert Gulotty. 2021. “America and the Trade Regime: What Went Wrong?” *International Organization* 75 (2): 524–557.

- Graves, Garret. 2022. “U.S. Climate Change Policy in an Era of Political Polarization.” March.
- Hainmueller, Jens, Daniel J. Hopkins, and Teppei Yamamoto. 2014. “Causal Inference in Conjoint Analysis.” *Political Analysis* 22 (1): 1–30.
- Hazlett, Chad, and Matto Mildenberger. 2020. “Wildfire Exposure Increases Pro-Environment Voting within Democratic but Not Republican Areas.” *American Political Science Review* 114 (4): 1359–1365.
- Hernandez, Dan. 2016. “Nevada Solar Industry Collapses after State Lets Power Company Raise Fees.” *The Guardian*, January 13, 2016. <https://tinyurl.com/2u627tva>.
- Hu, Jane. 2021. “New Wind Projects Power Local Budgets in Wyoming.” *High Country News*, January 11, 2021. <https://tinyurl.com/2p8mcsfm>.
- Iversen, Torben, and David Soskice. 2001. “An Asset Theory of Social Policy Preferences.” *American Political Science Review* 95 (4): 875–893.
- Jenkins, Jesse, Mark Muro, Ted Nordhaus, Michael Shellenberger, Letha Tawney, and Alex Trembath. 2012. *Beyond Boom and Bust*. Brookings. <https://tinyurl.com/2p9ebe5e>.
- Kline, Patrick, and Enrico Moretti. 2014. “People, places, and public policy: Some simple welfare economics of local economic development programs.” *Annual Review of Economics* 6 (1): 629–662.
- Kluve, Jochen. 2010. “The Effectiveness of European Active Labor Market Programs.” *Labour Economics* 17 (6): 904–918.
- Kono, Daniel Yuichi. 2020. “Compensating for the Climate.” *Political Studies* 68 (1): 167–186.
- Louie, Edward P., and Joshua M. Pearce. 2016. “Retraining Investment for U.S. Transition from Coal to Solar Photovoltaic Employment.” *Energy Economics* 57:295–302.

- Mansfield, Edward D., and Nita Rudra. 2021. "Embedded Liberalism in the Digital Era." *International Organization*, 1–28.
- Martin, John P., and David Grubb. 2001. "What Works and for Whom: A Review of OECD Countries' Experiences with Active Labour Market Policies." *Swedish Economic Policy Review* 8 (2): 9–56.
- Meckling, Jonas, and Jonas Nahm. 2021. "Strategic State Capacity." *Comparative Political Studies*.
- Meckling, Jonas, Thomas Sterner, and Gernot Wagner. 2017. "Policy Sequencing toward Decarbonization." *Nature Energy* 2 (12): 918–922.
- Mildenberger, Matto. 2020. *Carbon Captured*. MIT Press.
- Mildenberger, Matto, and Dustin Tingley. 2019. "Beliefs about Climate Beliefs." *British Journal of Political Science* 49 (4): 1279–307.
- Miller, Gary J., and Andrew B Whitford. 2016. *Above Politics*. Cambridge University Press.
- Milner, Helen V. 2021. "Is Global Capitalism Compatible with Democracy?" *International Studies Quarterly*, sqab056.
- North, Douglass C., and Barry R. Weingast. 1989. "Constitutions and Commitment: The Evolution of Institutions Governing Public Choice in Seventeenth-Century England." *The Journal of Economic History* 49 (4): 803–832.
- OECD. 2020. *Making the Green Recovery Work for Jobs, Income and Growth*. <https://bit.ly/3I6hiEz>.
- Olson, Mancur. 1965. *The Logic of Collective Action*. Harvard University Press.
- Orenstein, Walker. 2019. "Clean Energy Jobs Are Big in Minnesota. But They Often Go to People from out of State." *MinnPost*. <https://bit.ly/3LHuORB>.

- Polanyi, Karl. 1944. *The Great Transformation*. Farrar & Rinehart.
- Popp, David, Francesco Vona, Giovanni Marin, and Ziqiao Chen. 2020. *The Employment Impact of Green Fiscal Push*. w27321. NBER.
- Rehm, Philipp. 2009. “Risks and Redistribution.” *Comparative Political Studies* 42 (7): 855–881.
- Rickard, Stephanie J. 2020. “Globalization, Compensation, and the Rise of the Far Right.” APSA Annual Meeting.
- Rodrik, Dani. 2014. “Green Industrial Policy.” *Oxford Review of Economic Policy* 30 (3): 469–491.
- Rogoff, Kenneth. 1985. “The Optimal Degree of Commitment to an Intermediate Monetary Target.” *The Quarterly Journal of Economics* 100 (4): 1169.
- Ruggie, John Gerard. 1982. “International Regimes, Transactions, and Change.” *International Organization* 36 (2): 379–415.
- Ryssdal, Kai. 2017. “Imagining the Future of Coal in Gillette, Wyoming.” *NPR*. <https://bit.ly/3iJILSg>.
- Scheiber, Noam. 2021a. “Building Solar Farms May Not Build the Middle Class.” *The New York Times*, July 16, 2021. <https://tinyurl.com/2p8atxvd>.
- . 2021b. “Can a Green-Economy Boom Town Be Built to Last?” *The New York Times*, September 13, 2021. <https://tinyurl.com/22hzk3mp>.
- Schelling, Thomas C. 1956. “An Essay on Bargaining.” *American Economic Review* 46 (3): 281–306.
- Scheve, Kenneth F., and Theo Serlin. 2021. “The German Trade Shock and The Rise of the Neo-Welfare State in Early 20th Century Britain.” <https://tinyurl.com/yn4z5f4c>.

- Searcey, Dionne. 2021. “Wyoming Coal Country Pivots, Reluctantly, to Wind Farms.” *New York Times*. <https://nyti.ms/3Nuikhw>.
- SEIA. 2020. “Illinois Clean Energy Boom Goes Bust as State Program Runs Out of Funding, Forcing Layoffs at Solar and Wind Businesses.” Solar Energy Industries Association, December 16, 2020. <https://tinyurl.com/yckr738f>.
- Shambaugh, Jay, and Ryan Nunn, eds. 2018. *Place-Based Policies for Shared Economic Growth*. Brookings Institution.
- Shepsle, Kenneth A. 1991. “Discretion, Institutions, and the Problem of Government Commitment.” In *Social Theory for a Changing Society*, edited by Pierre Bourdieu and James S. Coleman. Westview Press.
- Shuler, Liz. 2021. *Shuler at COP26: We Cannot Leave Workers Behind*. <https://bit.ly/3tPnzAR>.
- Stefek, Jeremy, Anna Kaelin, Suzanne Tegen, Owen Roberts, and David Keyser. 2019. *Economic Impacts from Wind Energy in Colorado Case Study: Rush Creek Wind Farm*. National Renewable Energy Laboratory. <https://bit.ly/3tRgWha>.
- Stokes, Leah. 2020. *Short Circuiting Policy*. Oxford University Press.
- Stokes, Leah, and Christopher Warshaw. 2017. “Renewable Energy Policy Design and Framing Influence Public Support in the United States.” *Nature Energy* 2 (8): 17107.
- Thuermer, Angus. 2019. “PacifiCorp: Early Closure of Wyo Coal Plants Saves \$599 Million.” *WyoFile*. <https://bit.ly/36Syj8D>.
- Tomer, Adie, Joseph W. Kane, and Caroline George. 2021. *How Renewable Energy Jobs Can Uplift Fossil Fuel Communities and Remake Climate Politics*. Brookings. <https://tinyurl.com/bdcnztrm>.

- Victor, David, and Kassia Yanosek. 2011. "The Crisis in Clean Energy: Stark Realities of the Renewables Craze." *Foreign Affairs* July/August.
- Walter, Stefanie. 2010. "Globalization and the Welfare State." *International Studies Quarterly* 54 (2): 403–426.
- . 2021. "The Backlash Against Globalization." *Annual Review of Political Science* 24 (1).
- Walton, Robert. 2018. "Advocates Warn New Jersey Solar Market Could Collapse Again." *Utility Dive*, October 22, 2018. <https://tinyurl.com/mry2ydxk>.
- Willson, Miranda. 2021. "Va. Governor-Elect Vows to Exit Cap-and-Trade Program." <https://bit.ly/3IOsFBB>.
- Willson, Miranda, and ti Swartz. 2022. "How Governors Races May Change Energy, from EVs to Renewables." *E&E News*, February 8, 2022. <https://bit.ly/3w0V0Sx>.

Online Appendix

Embedded Liberalism from the Ground Up: Credibility and Climate Transitions

A	Pre-Analysis Plan	1
B	Sample Descriptions	2
C	Variable Construction	5
D	Jobs and Investment Beliefs	6
	D.1 Renewable Industry Salaries	6
	D.2 Industry Selection	6
	D.3 Matrix Question Quality Checks	7
	D.4 Ordered Logistic Regressions	7
	D.5 Multinomial Regression Models	11
	D.6 Renewable Energy versus Coal and Healthcare Investment Beliefs	13
	D.7 County Fair Results	15
E	Multi-Attribute Policy Experiment	17
	E.1 Perspective Taking	17
	E.2 Conjoint Instructions	17
	E.3 Conjoint Task	18
	E.4 Conjoint Attention Check	18
	E.5 Time Discounting	19
	E.6 Costly Signals Partisan Effects	20
	E.7 Reversibility Interpretation Check	22
	E.8 Bipartisanship Interpretation Check	23
	E.9 Conditional AMCEs	24
F	Retraining Experiment	25
	F.1 Interpretation Check	25
	F.2 Partisan Heterogeneity	25
G	Regulation Experiment	27

A Pre-Analysis Plan

We registered a pre-analysis plan (PAP) for the survey experiments with the EGAP Registry. We made one minor modification to the baseline model specification: we used party identification rather than ideology due to the former's fewer missing observations. We also deviated from the PAP by presenting results using multivariate regression and two-sided confidence intervals, which is more conservative than the one-sided tests we pre-registered.

B Sample Descriptions

<i>General Population 1:</i>					
<i>N</i> = 2049	Mean	Std.Dev.	Min	Max	Missing
Age	48.18	17.47	18	99	0
Female	0.51	0.5	0	1	0
College Degree	0.63	0.48	0	1	0
Income Category	6.59	3.4	1	16	61
Full-Time Employed	0.46	0.5	0	1	0
Fossil Fuel Industry	0.07	0.25	0	1	0
Democrat	0.4	0.49	0	1	0
Republican	0.29	0.45	0	1	0
Independent	0.14	0.34	0	1	0
White	0.74	0.44	0	1	0
Black	0.13	0.34	0	1	0
Hispanic	0.11	0.32	0	1	0
Rural	0.17	0.37	0	1	0
Climate Concern	0.78	0.42	0	1	0
<i>General Population 2:</i>					
<i>N</i> = 1203					
Age	48.53	17.26	19	95	0
Female	0.53	0.5	0	1	0
College Degree	0.36	0.48	0	1	0
Income Category	5.88	3.46	1	16	48
Full-Time Employed	0.38	0.48	0	1	0
Fossil Fuel Industry	0.03	0.17	0	1	0
Democrat	0.41	0.49	0	1	0
Republican	0.24	0.43	0	1	0
Independent	0.15	0.36	0	1	0
White	0.76	0.43	0	1	0
Black	0.12	0.32	0	1	0
Hispanic	0.18	0.38	0	1	0
Rural	0.19	0.39	0	1	0
Climate Concern	0.78	0.42	0	1	0
<i>Gulf Coast:</i>					
<i>N</i> = 999					
Age	44.99	16.79	18	92	0
Female	0.52	0.5	0	1	0
College Degree	0.19	0.39	0	1	0
Income Category	5.28	3.35	1	16	44
Full-Time Employed	0.38	0.49	0	1	0
Fossil Fuel Industry	0.17	0.38	0	1	0
Democrat	0.25	0.43	0	1	0
Republican	0.39	0.49	0	1	0
Independent	0.17	0.37	0	1	0
White	0.8	0.4	0	1	0
Black	0.13	0.34	0	1	0
Hispanic	0.14	0.34	0	1	0
Rural	0.19	0.39	0	1	0
Climate Concern	0.7	0.46	0	1	0

<i>Industrial Heartland:</i>					
<i>N</i> = 941	Mean	Std.Dev.	Min	Max	Missing
Age	47.11	17.28	18	90	0
Female	0.53	0.5	0	1	0
College Degree	0.28	0.45	0	1	0
Income Category	5.42	3.16	1	16	34
Full-Time Employed	0.36	0.48	0	1	0
Fossil Fuel Industry	0.04	0.19	0	1	0
Democrat	0.3	0.46	0	1	0
Republican	0.31	0.46	0	1	0
Independent	0.14	0.35	0	1	0
White	0.85	0.36	0	1	0
Black	0.09	0.29	0	1	0
Hispanic	0.11	0.32	0	1	0
Rural	0.46	0.5	0	1	0
Climate Concern	0.73	0.44	0	1	0
<i>New Mexico:</i>					
<i>N</i> = 305					
Age	51.1	17.87	18	89	0
Female	0.52	0.5	0	1	0
College Degree	0.38	0.49	0	1	0
Income Category	5.2	3.38	1	14	10
Full-Time Employed	0.29	0.45	0	1	0
Fossil Fuel Industry	0.07	0.25	0	1	0
Democrat	0.37	0.48	0	1	0
Republican	0.27	0.44	0	1	0
Independent	0.18	0.38	0	1	0
White	0.83	0.38	0	1	0
Black	0.02	0.14	0	1	0
Hispanic	0.44	0.5	0	1	0
Rural	0.35	0.48	0	1	0
Climate Concern	0.74	0.44	0	1	0
<i>SWPA Region:</i>					
<i>N</i> = 1049					
Age	47.77	16.64	18	96	0
Female	0.56	0.5	0	1	0
College Degree	0.29	0.45	0	1	0
Income Category	5.31	3.22	1	16	40
Full-Time Employed	0.36	0.48	0	1	0
Fossil Fuel Industry	0.06	0.24	0	1	0
Democrat	0.34	0.47	0	1	0
Republican	0.3	0.46	0	1	0
Independent	0.17	0.38	0	1	0
White	0.88	0.33	0	1	0
Black	0.1	0.31	0	1	0
Hispanic	0.07	0.26	0	1	0
Rural	0.3	0.46	0	1	0
Climate Concern	0.75	0.43	0	1	0

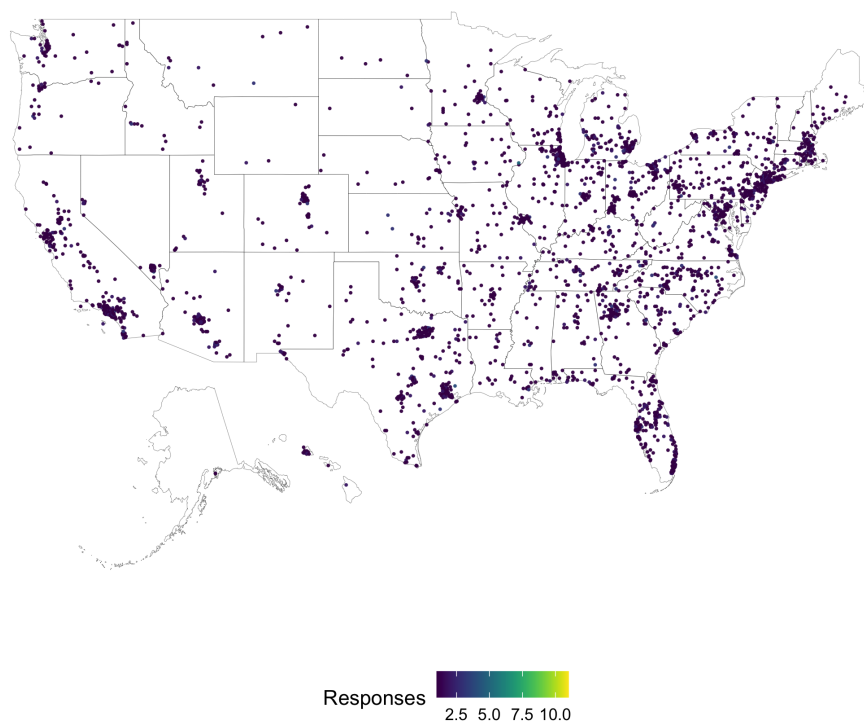


Figure B1: Spatial distribution of national samples

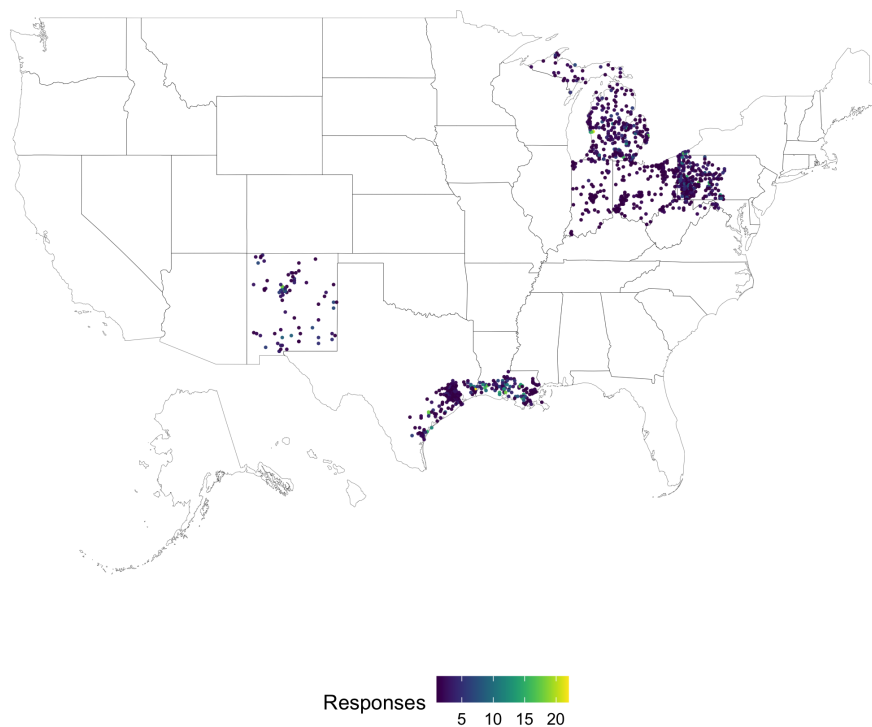


Figure B2: Spatial distribution of regional samples

C Variable Construction

- Political Party: Factor with categories for “Democrat,” “Republican,” or “Independent” if a respondent identifies as a Democrat or as leaning towards the Democratic Party, as a Republican or as leaning towards the Republican party, or as an independent.
- Age: Numeric measure of the number of years a respondent has been alive.
- Income: Sixteen income categories, including a level for respondents who prefer not to answer.
- Black: Indicator for respondent identification as “Black or African American.”
- Hispanic: Indicator for respondent identification as “Spanish, Hispanic, or Latino.”
- Education: Indicator variable for if a respondent has a four-year college degree or higher.
- Full-time Employment: Indicator for if a respondent is “employed full-time.”
- Fossil Fuel Industry Employment: Indicator for if a respondent says they work in coal, oil, or natural gas.³⁸
- Sampling Frame: Factor with categories for whether the sample is regional, and if so urban or rural, or if the sample is national. This variable takes ten values: Gulf Coast (non-urban), Gulf Coast (urban), Industrial Midwest (non-urban), Industrial Midwest (urban), New Mexico (non-urban), New Mexico (urban), Southwest Pennsylvania (urban), Southwest Pennsylvania (non-urban), National 1, and National 2. For the regional model specification that compares each region to the nation, we collapse the national samples into a single category, in addition to combining urban and non-urban into a single category for each region. We tend to differences between urban and non-urban samples in this specification using the rural indicator. This coding allows for comparisons between regions as a whole.
- Climate Concern: The item measuring climate concern asks the respondent, “Which of the following do you think best describes your view about global warming?” Responses increase in level of concern, running from “This is not a serious problem,” to “More research is needed before action is taken,” to “We should take some action now,” ending at “Immediate and drastic action is needed.” We dichotomize this scale, with higher values indicating greater concern.
- Rural: We construct an indicator for if a respondent reports living in a ZIP code classified as rural by the Federal Office of Rural Health Policy.³⁹ Model specifications for the experiments fielded in the second national sample do not include this indicator.

38. Model specifications for the experiments fielded in the second national sample do not include this indicator since there are few respondents employed in fossil fuels.

39. <https://www.hrsa.gov/rural-health/about-us/definition/datafiles.html>

D Jobs and Investment Beliefs

D.1 Renewable Industry Salaries

According to the Bureau of Labor Statistics, solar photo-voltaic installers earn a mean hourly wage of \$23.08 compared to \$28.66 among coal miners and \$29.41 in oil and gas extraction. Wind turbine service technicians, a relatively specialized job that is not representative of the entire industry, earn on average \$28.53 per hour, slightly less than coal miners. People working as construction laborers on renewable energy projects can expect to make \$20.67 on average.⁴⁰

D.2 Industry Selection

The first three industries — solar energy, wind energy, and energy efficiency — represent some of the fastest growing clean economy jobs in the United States. We separate these industries, rather than ask a blanket question about green jobs, as people may hold different beliefs regarding particular subsets of the emerging clean economy. Since energy efficiency might be vague in the mind of respondents, we give examples, such as “building insulation” and “electrical equipment.”

Next is automobile manufacturing, a more traditional industry. In contrast to green sector jobs, automobile factories tend to provide large sources of stable, well-paying, and often unionized employment. Of course, the auto industry is not immune to economic and technological changes, such as the 2007-08 financial crisis. Automotives will also play a role in decarbonization via electric vehicles.

Turning to environmental cleanup, this refers to environmental remediation and brownfield development jobs. Environmental cleanup is proposed as a mechanism to help fossil fuel communities transition to new industries (Raimi 2020). The reasoning is that these jobs will be located in the same areas as the fossil fuel workers displaced by climate policy. The potential downside of these jobs is that people might view them as temporary, although there is a dearth of public opinion data on this question.

Now are the carbon-intensive industries: coal mining, and oil and gas. These provide the natural benchmark against which to judge perceptions of green jobs, since it is workers in polluting industries who must transition to new lines of work if the country decarbonizes. These three fossil fuels are some of the greatest contributors to carbon pollution. We group oil and gas together, as the two are often extracted in tandem.

The remaining industries — trucking, health care, and computer programming — fall outside the energy sector. Trucking is a growing profession with a shortage of drivers. The job is transitory in that it requires movement from place to place, similar to solar and wind energy installation. Trucking also is an accessible career for people without a college education, although some further accreditation is required. In interviews related to this project, county officials in Southwest Pennsylvania tasked with economic development identified trucking as a potential source of new jobs.

We include health care because it is an industry with a shortage of workers, especially nurses, and it is also in high demand in Coal Country which has an aging population. This combination should make it a ripe source of employment. Although, there might be some barriers to transitioning fossil fuel workers to these industries because the skill set for coal mining differs considerably from that of nursing, which may influence perceptions of health care as a viable career, in addition to gendered beliefs about the “care economy.”

Last is computer programming, a high tech job that is well-paid, in high demand, and requires specialized training. Though computer programmers may have a stable job, we expect to find different perceptions about this industry in the General Population and regional samples. While the national population may be optimistic about the prospect of growth in the industry, rising wages, the longevity of jobs, and share of local employment, we expect individuals in fossil fuel-producing areas to be more pessimistic. This is due

40. See: “May 2020 Occupation Profiles,” https://www.bls.gov/oes/current/oes_stru.htm

to a history of failed initiatives to transition coal miners to coding jobs. For example, the Mined Mines program made job guarantees to residents that failed to materialize.⁴¹

D.3 Matrix Question Quality Checks

A concern with matrix-style questions like the ones our battery employs is that respondents may engage in a satisficing behavior called “straight-lining.” This is where the subject provides the same answer for all items in the matrix. The questions ask respondents to consider 10 industries, making it highly improbable that a straight-line response reflects a genuine belief that the future of jobs and consequences of investment are identical across all 10 industries. In addition to satisficing, straight-lining may reflect the non-existence of beliefs regarding the future of jobs or consequences of government investment.

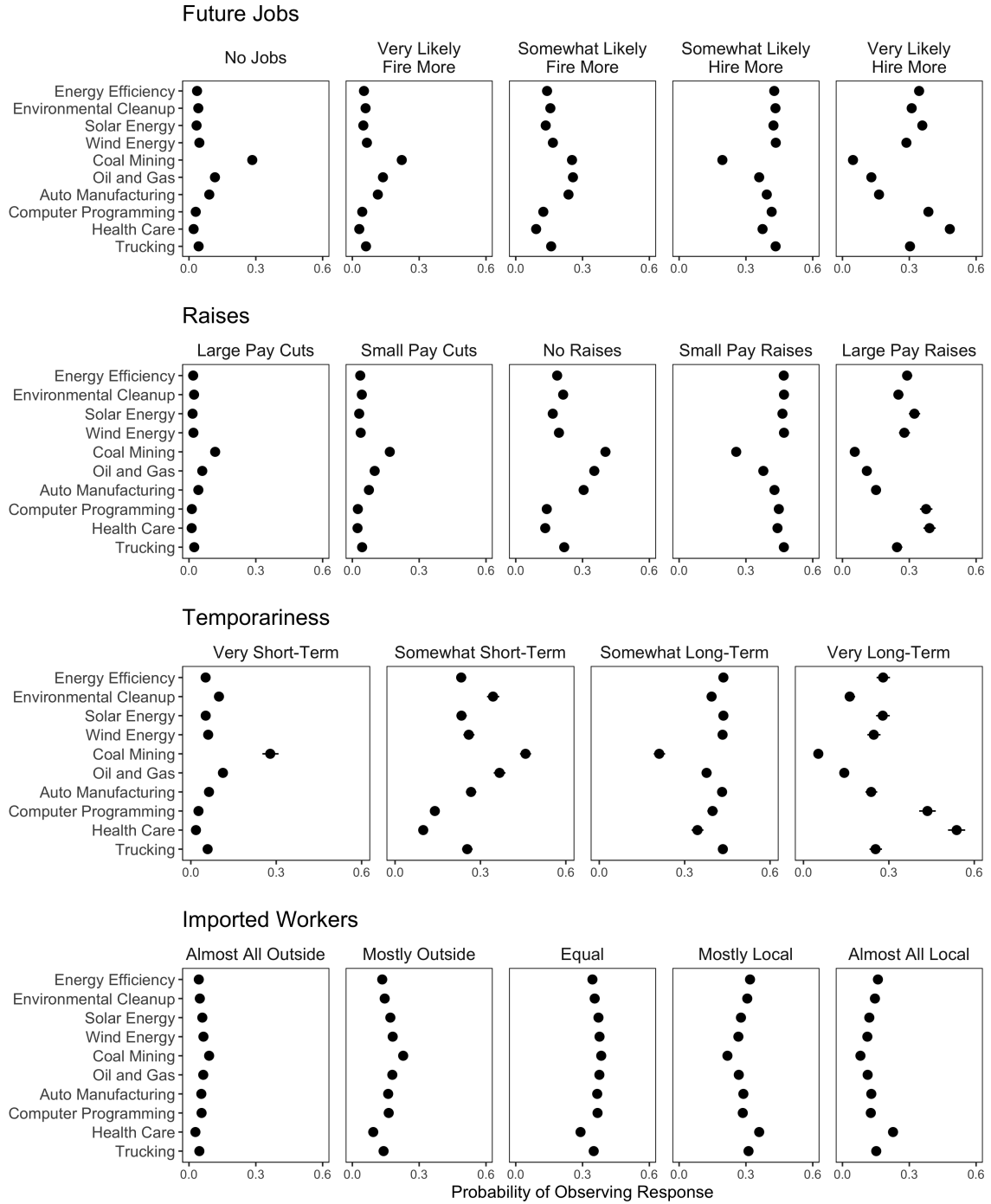
Across the samples, the vast majority never straight-line (80%). However, 13% do so once, 6% twice, and 1% three or more times. As evidence that straight-lining reflects satisficing rather than genuine answers, note that respondents who never engage in the practice spend a median time of 16.1 minutes on the survey whereas those who straight-line spend only 15.5 minutes while those who straight-line all four times spend 13.1 minutes. Further, a regression of an indicator for straight-lining on sample demographics reveals low income correlates with straight-lining; wealthier respondents may be more intrinsically motivated by the content of the survey, rather than compensation for completion, another indication of satisficing. Straight-lining is also uncorrelated with race/ethnicity.

In theory, straight-lining, if at random, should only introduce noise that lowers the precision of estimates. However, if features of the survey item make it more likely that respondents select answers at one end of the scale, this could introduce systemic bias. The main results include all respondents. To investigate whether the minimal number of straight-liners introduces bias, here we trim respondents who straight-line two or more times and the results are unchanged (figure D1). This is likely because the results are robust to the inclusion of controls, which would also account to any correlation between demographic characteristics and propensity to straight-line.

D.4 Ordered Logistic Regressions

Figure D2 presents ordered logistic regression coefficients for wind and energy. Figure D3 presents ordered logistic regression coefficients for oil/gas and coal. Covariate specifications remain the same as in previous regressions. Multinomial regression estimates provide similar substantive conclusions.

41. “They Were Promised Coding Jobs in Appalachia. Now They Say It Was a Fraud.” The New York Times, May 12, 2019, <https://nyti.ms/3uQ8SfY> (Accessed January 5, 2022).



Notes: Bars denote 95% confidence intervals around fitted probabilities estimated from ordered logistic regressions with covariates held at their means. Model includes controls for political party, age, gender, income, Black, Hispanic, education, full-time employment, fossil fuel employment, and sampling frame.

Figure D1: Jobs and investment beliefs excluding respondents who straight-line two or more times

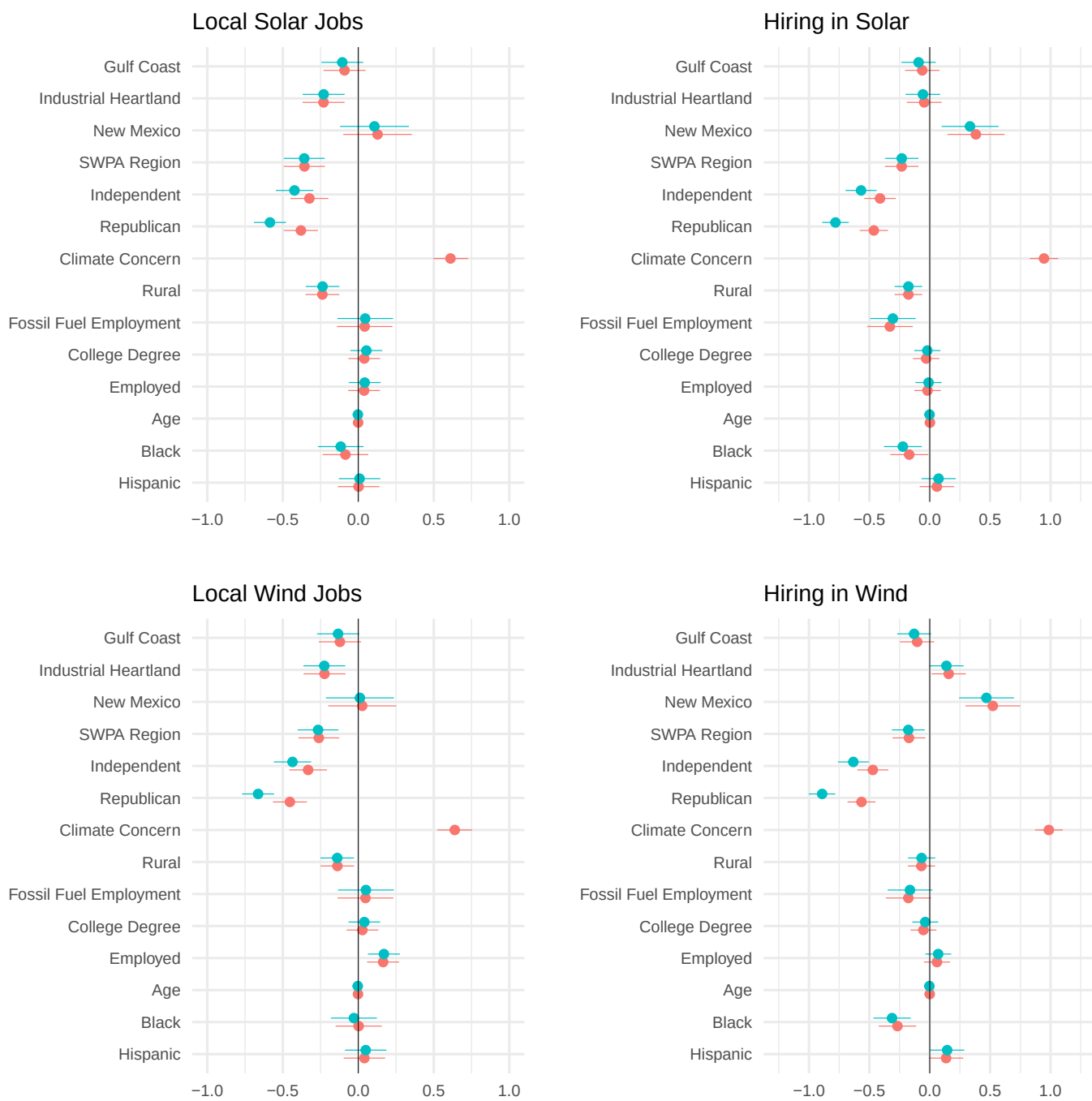


Figure D2: Jobs and investment beliefs estimated using ordered logistic regression

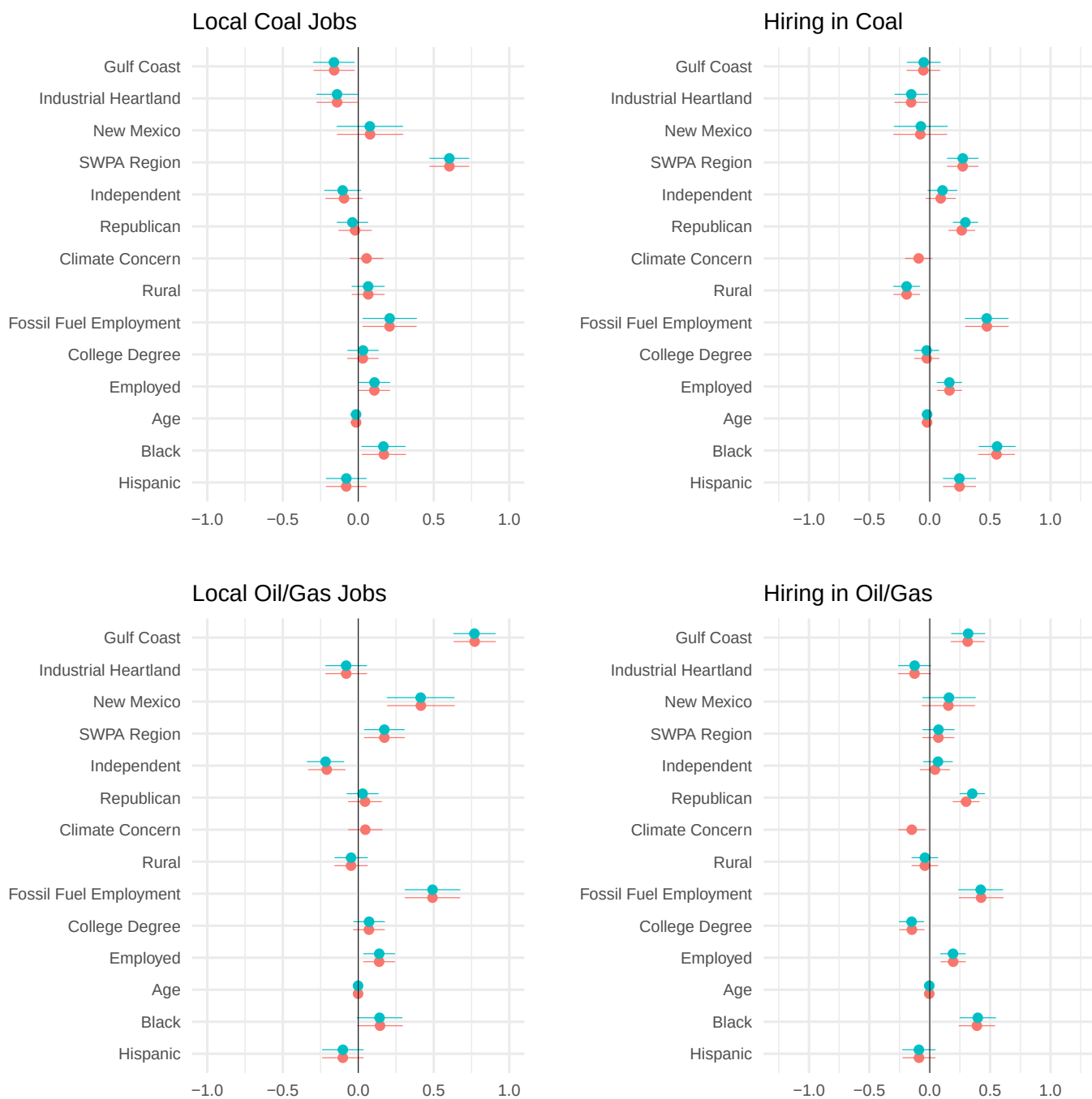
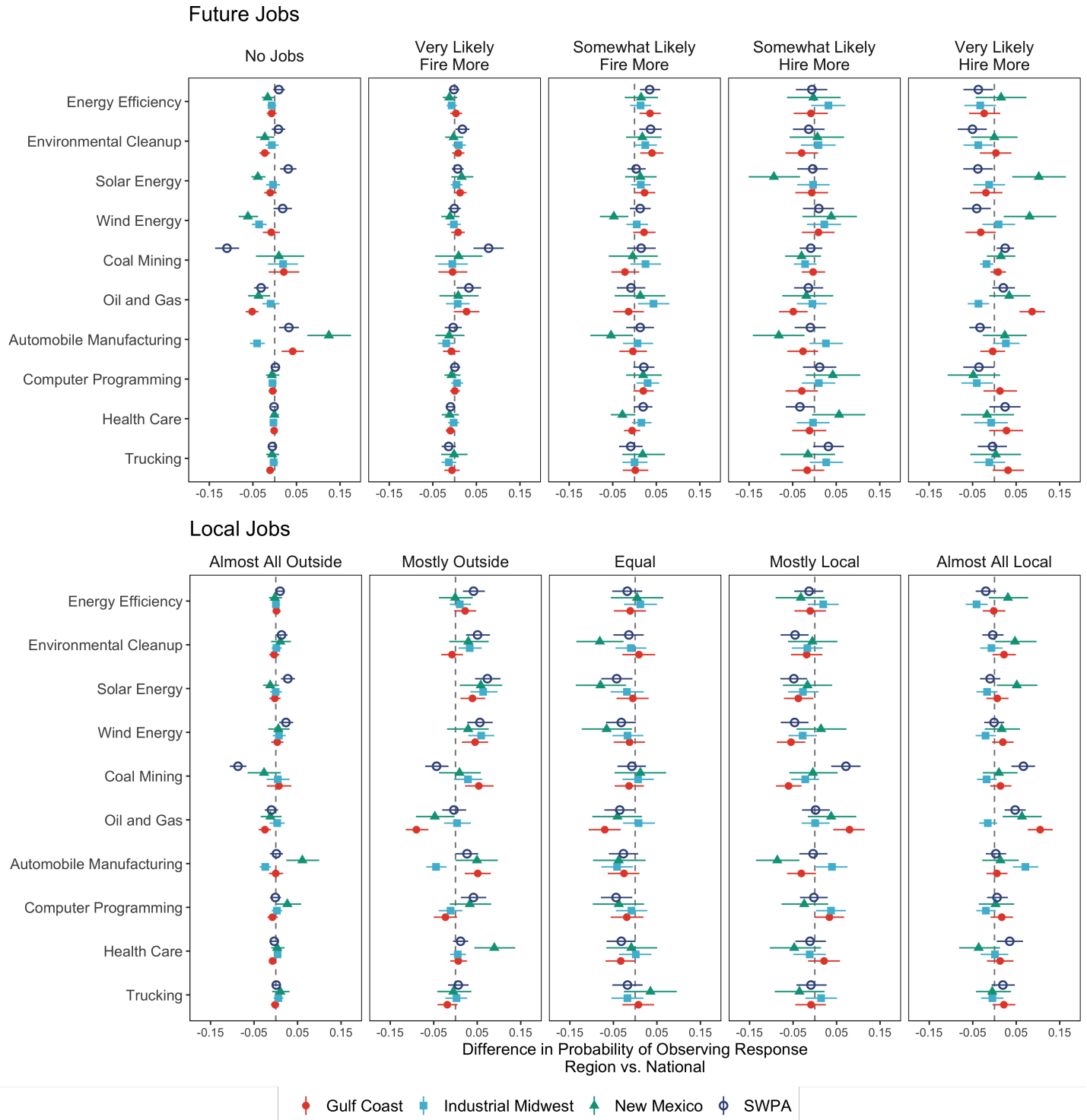


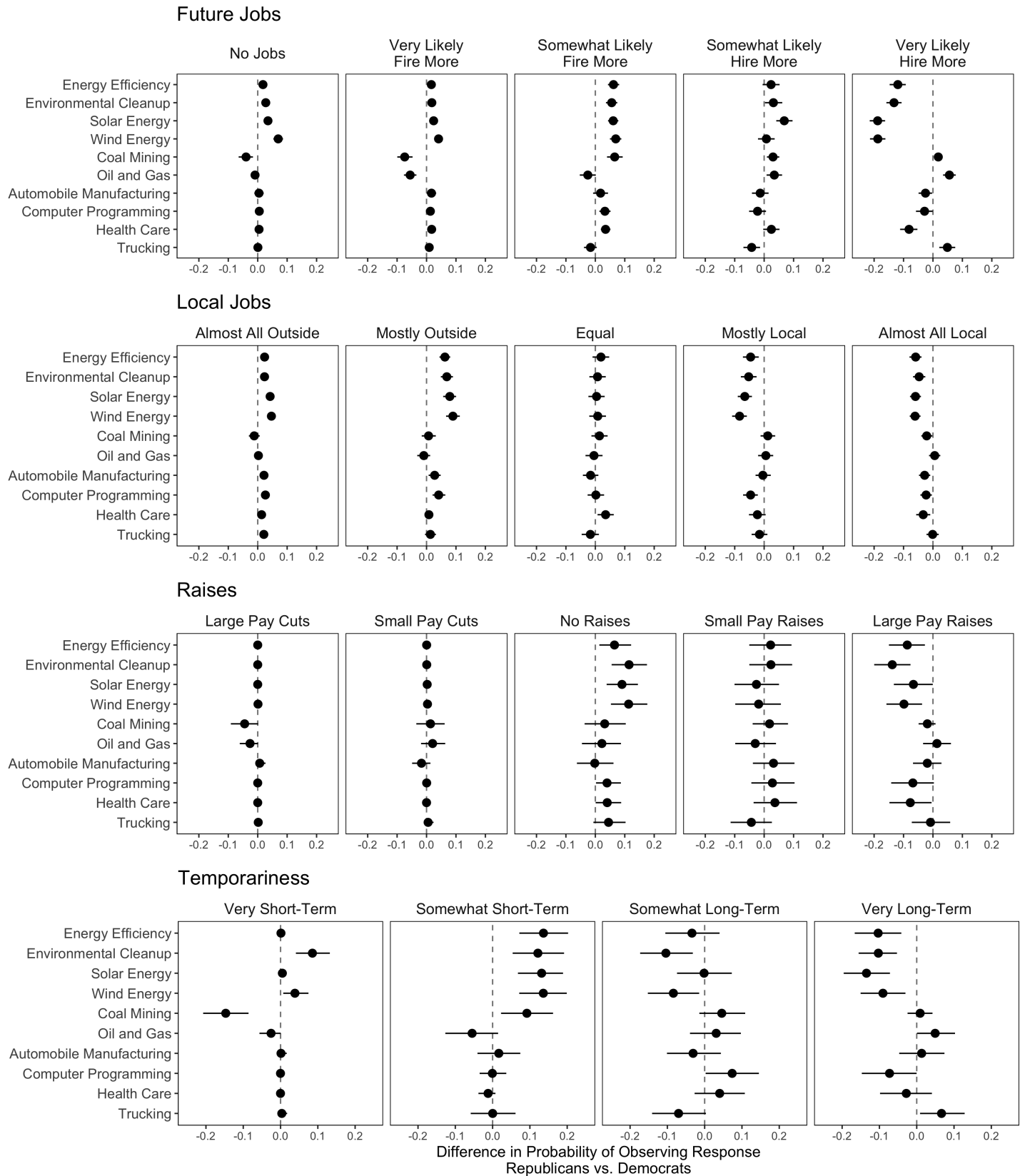
Figure D3: Jobs and investment beliefs estimated using ordered logistic regression

D.5 Multinomial Regression Models



Notes: 95% bootstrapped confidence intervals

Figure D4: Multinomial regression models of the effect of region on jobs and investment beliefs. Plot shows the first difference of fitted probabilities of observing an answer category for a region and the nation. Positive values indicate that people in the region are more likely to select the corresponding category. Model covariates set at representative mean values. Total of 40 models specified, one for each question and industry. Confidence intervals obtained using 2000 bootstrap samples with replacement.



Notes: 95% bootstrapped confidence intervals

Figure D5: Multinomial regression models of the effect of partisan identification on jobs and investment beliefs. Plot shows the first difference of fitted probabilities of observing an answer category for Republicans and Democrats. Positive values indicate that Republicans are more likely to select the corresponding category. Model covariates set at representative mean values. Total of 40 models specified, one for each question and industry. Confidence intervals obtained using 2000 bootstrap samples with replacement.

D.6 Renewable Energy versus Coal and Healthcare Investment Beliefs

Figure D6 reports regression results using the within subject difference in responses to the coal investment questions and both wind energy and solar energy investment questions.

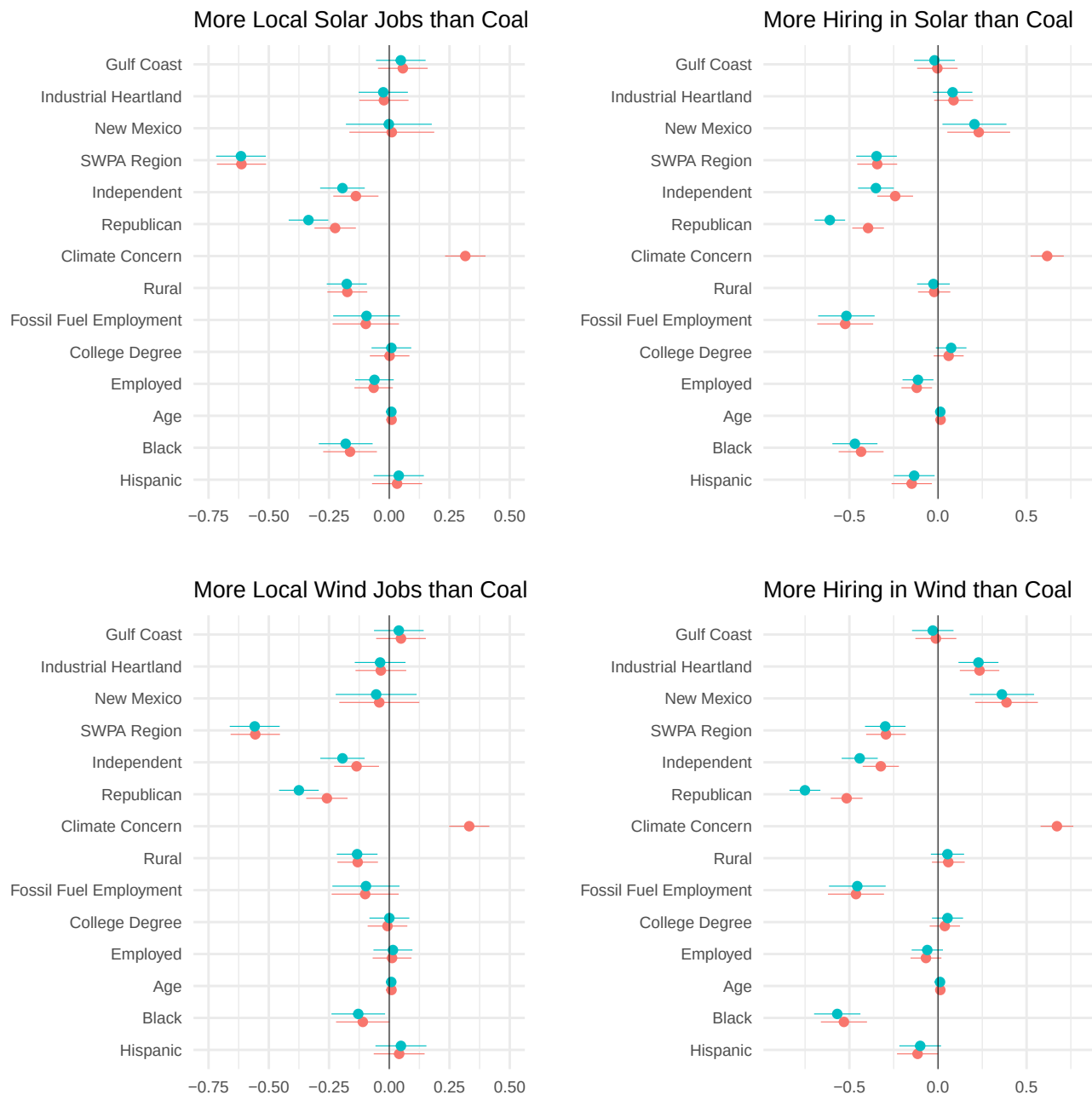


Figure D6: Individual and regional determinants of within respondent perceptions of renewable energy investment outcomes versus coal investment. Robust standard errors used and 95% confidence intervals reported.

Figure D7 reports regression results using the within subject difference in responses to the coal investment questions and both wind energy and solar energy investment questions.

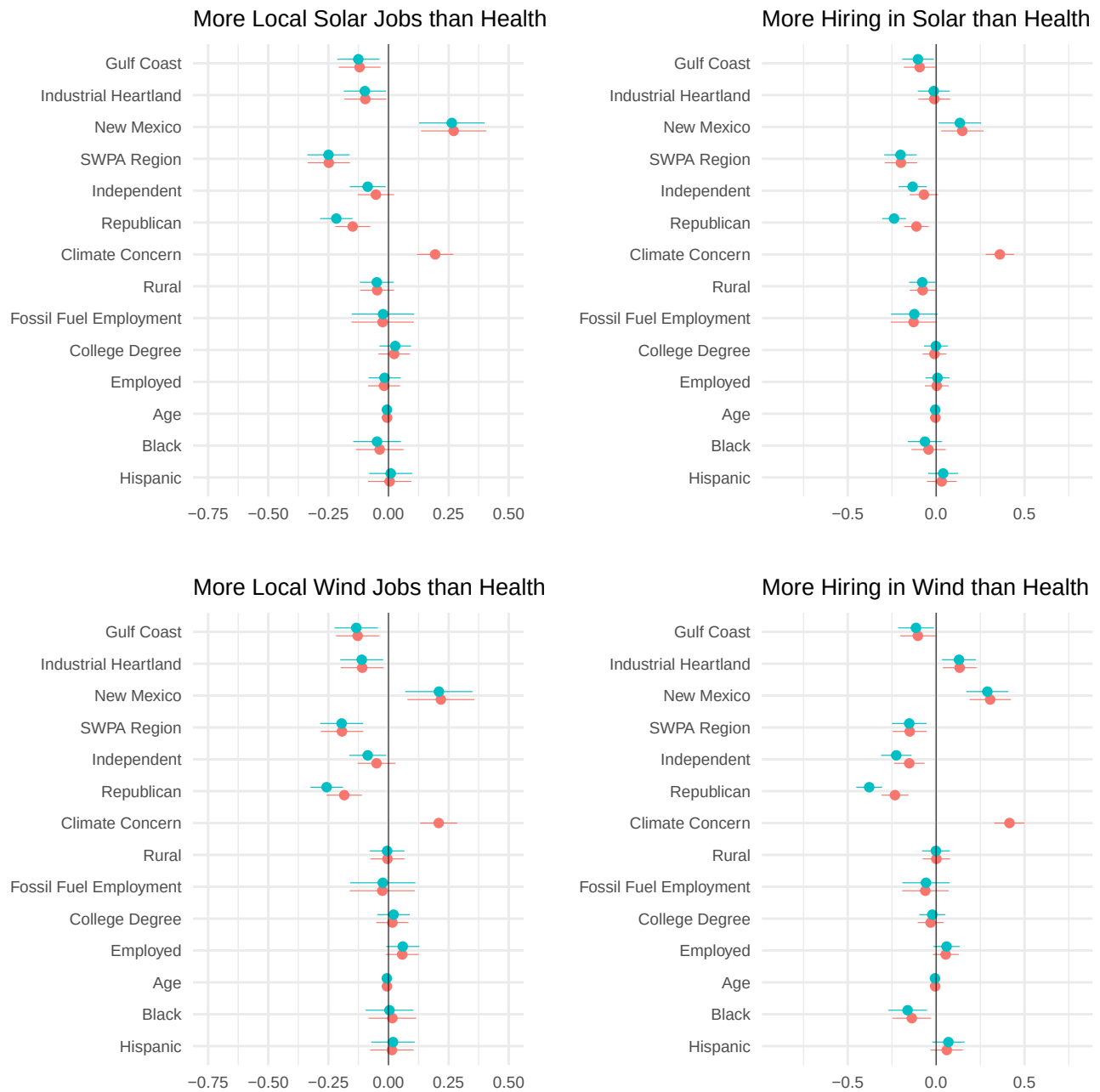


Figure D7: Individual and regional determinants of within respondent perceptions of renewable energy investment outcomes versus healthcare investment. Robust standard errors used and 95% confidence intervals reported.

D.7 County Fair Results

The County Fair survey contained an item to measure beliefs about the pay of green jobs. The item asks: “Compared to existing jobs in your community, how much better or worse do you think new renewable energy jobs would pay?” Possible responses included “Much worse,” “Somewhat worse,” “Somewhat better,” and “Much better.” The baseline for comparison here is the community where the survey was fielded, which is home to considerable poverty; using the federal definition, the percentage of impoverished in the area ranges from 13 to 22 percent.

Figure D8 displays the results. Across party and sector, a majority believes green jobs pay “somewhat” or “much better” than typical sources of employment in their community. However, this may be due to the lack of employment opportunities in the area, but is a meaningful finding as it suggests an openness to investment. Since the question only asks about green sector jobs, it does not resolve whether these are the optimal industries to invest in to mobilize the largest pro-climate coalition.

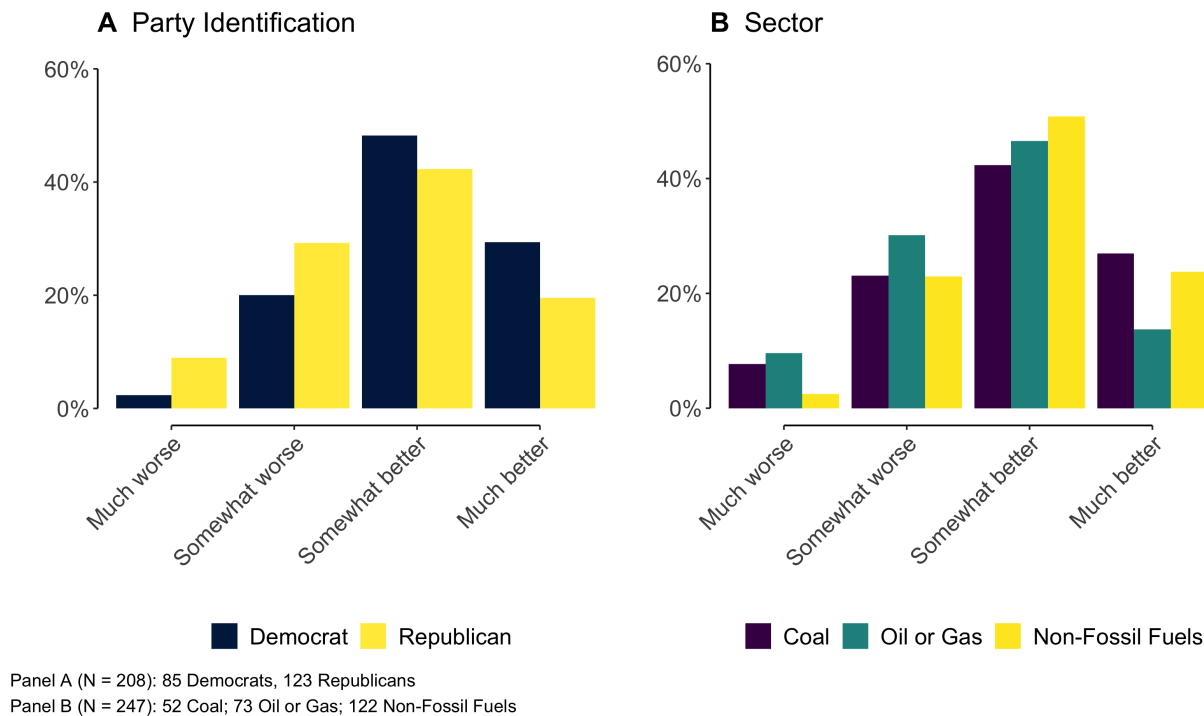


Figure D8: Beliefs about pay of green jobs compared to existing community jobs

Table D1 presents ordered logistic regressions of the survey items on demographic characteristics. Republican party identification, relative to Democratic identification, has a negative association with durability and pay beliefs.

Table D1: County fair sample ordered logistic regression of green jobs durability pay and beliefs

	Durability	Pay
Politician Treatment	-0.401 (0.269)	-0.624 (0.276)*
Party: Independent	-0.915 (0.417)*	-1.369 (0.437)**
Party: Republican	-1.326 (0.301)***	-0.849 (0.304)**
Age: 35-54	-0.102 (0.287)	-0.045 (0.297)
Age: 55 or older	-0.400 (0.360)	-1.001 (0.383)**
Female	0.106 (0.261)	0.097 (0.268)
Race: Black/AA	-0.761 (2.082)	-12.446 (0.896)***
Race: Hispanic/Latino	-1.259 (2.160)	-12.668 (0.930)***
Race: Native American/Pacific Islander	0.715 (2.426)	-11.807 (1.505)***
Race: Other	-0.009 (1.897)	-11.820 (0.736)***
Race: White	-0.758 (1.775)	-12.351 (0.413)***
College	0.658 (0.340)	0.296 (0.347)
Prefer Not Say	0.498 (0.857)	-1.555 (0.831)
Less than \$20,000	-0.557 (0.818)	-0.178 (0.786)
\$20,000 to 39,999	1.613 (0.742)*	0.903 (0.717)
\$40,000 to 59,999	-0.057 (0.641)	0.386 (0.629)
\$60,000 to 79,999	0.858 (0.538)	0.412 (0.531)
\$80,000 to 99,999	0.521 (0.479)	-0.423 (0.489)
\$100,000 to 119,999	0.321 (0.445)	-0.453 (0.466)
\$120,000 to 139,999	-0.371 (0.391)	-0.234 (0.405)
\$140,000 to 159,999	-0.229 (0.327)	0.099 (0.344)
Employed	-0.203 (0.280)	-0.823 (0.297)**
Fossil Fuel Employment	0.033 (0.270)	-0.299 (0.278)
Survey Wave	0.119 (0.356)	0.377 (0.362)
Not long at all—Not very long	-3.534 (1.797)*	
Not very long—Somewhat long	-1.636 (1.783)	
Somewhat long—Very long	0.135 (1.781)	
Much worse—Somewhat worse		-16.611 (0.679)***
Somewhat worse—Somewhat better		-14.429 (0.637)***
Somewhat better—Much better		-11.934 (0.629)***
Log Likelihood	-300.508	-264.871
N	244	244

Notes: *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$

E Multi-Attribute Policy Experiment

E.1 Perspective Taking

This appendix discusses the rationale for asking the respondent to take the perspective of a county resident receiving assistance. The main reason is that non-residents might have different preferences over investment because they incur the fiscal cost through taxes while enjoying none of the private benefits. Unlike previous perspective-taking work, the goal of this instruction is not to probe the effect of empathy, but to encourage the respondent to think of the investment from the viewpoint of a benefactor. One potential alternative to perspective taking would be to tell the respondent that the investment is for her county. This is a sub-optimal remedy because counties may vary in their need for investment, which introduces an unobserved dimension that confounds preferences.

E.2 Conjoint Instructions

Some counties in the United States that have depended on a single industry now face economic decline. On the next pages, you will see investment policies by the {ACTOR} government to create renewable energy jobs (e.g., solar and wind) in these counties. It is important to read the details about these policies.

— *new page* —

We will first provide background on how the policies differ. As an overview, there are five ways the policies differ:

- Tax credit amount: how large the tax credit is
- Tax credit duration: how long the tax credit lasts
- Bipartisan support: if both Democrats and Republicans support the overall policy
- Reversible: who has the power to rollback the policy, if the policy is reversible (for example: lawmakers, {LEADER})
- Additional funding for county schools: if the government includes additional funds for county schools

— *new page* —

Tax credit amount: The investment policies will attract renewable energy jobs (e.g., solar and wind) to the counties by providing tax credits that lower the cost of doing business. Some policies will provide larger tax credits than others.

— *new page* —

Tax credit duration: Some tax credits will last for a short period of time while others last longer.

— *new page* —

Bipartisan support: Investment policies will differ in whether they have low, medium, or high bipartisan support, that is, the extent to which they are supported by both Democratic and Republican lawmakers.

— *new page* —

Reversible: Investment policies will differ in whether or how they could be reversed. That a policy can be reversed means that it could end early. The policies you will see can either be reversed by the {LEADER} alone, reversed by lawmakers, or are not reversible.

— *new page* —

Additional investment in county schools: In addition to the tax credits, the policies will include an investment in county schools by the {ACTOR} government. For some policies, the county receives the school funding no matter what. For other policies the county must apply for the funds; 75 percent of counties receive funds.

— *new page* —

On the next pages, you will be asked to pick the investment policy that you would prefer the {ACTOR} government to implement. When answering, imagine that you live in a county receiving an investment.

E.3 Conjoint Task

Please read {ACTOR} government investment policies A and B. These policies aim to create renewable energy jobs (e.g., solar and wind) in counties facing economic decline.

— *policy profiles here* —

On a scale from 1 to 7, where 1 indicates that the {ACTOR} government should absolutely not implement the policy and 7 indicates that the {ACTOR} government should definitely implement the policy, how would you rate policies A and B?

E.4 Conjoint Attention Check

There are two attention checks for the conjoint: (i) content, and (ii) metadata. The content-based check is a simple question that comes after the last conjoint task, when respondents should have maximum understanding and should thus be able to answer it with ease. The meta-data check occurs in the introductory phase, filtering out survey-takers who speed through without reading. The check works as follows: We delay the display of the “next” button for three seconds. We then use survey metadata to record if the subject clicks “next” in the three seconds after the button appears. If so, they are excluded, as it is impossible to have read the 81 words in under six seconds.⁴²

Which of the following categories was NOT included on the previous screens?

- Tax credit duration
- Bipartisan support
- Additional investment in county schools
- Bridge and road investment

42. Based on an average reading speed of American adults of 200 to 250 words per minute, it should take 19 to 24 seconds to read the introduction.

E.5 Time Discounting

This appendix explores the interactive effect of tax credit amount and duration. If people discount the future due to factors like electoral turnover, support should be less sensitive to the size of tax credits for inherently uncertain long-term investments. Indeed, exploring the average component interaction effects (ACIE) for credit amount and duration reveals no effect for the interaction of both amount values and the longest policy duration of 15 years (figure E2).

To probe whether discounting drives these results, rather than perceptions of efficacy, we ask: “How effective or ineffective do you think tax credits valued at \$15 million per year for {5, 10, 15} years would be in creating jobs?” Responses run from “very” and “somewhat effective” to “very” and “somewhat ineffective,” which we dichotomize in the middle with 1 indicating perceptions of efficacy. A result inconsistent with our theory would be a significant finding that longer tax credits are perceived as less effective, which would supply an alternative explanation for why support does not increase for the long duration tax credits. Instead, figure E1 shows that respondents generally view longer investments as more effective. This is further evidence that credibility dynamics of time discounting, not perceptions of efficacy, explain the findings. To reiterate, despite people believing extended tax credits are a more effective tool, this design element when interacted with tax credit size has little no to no effect on overall policy support in terms of the ratings outcome due to commitment problems.

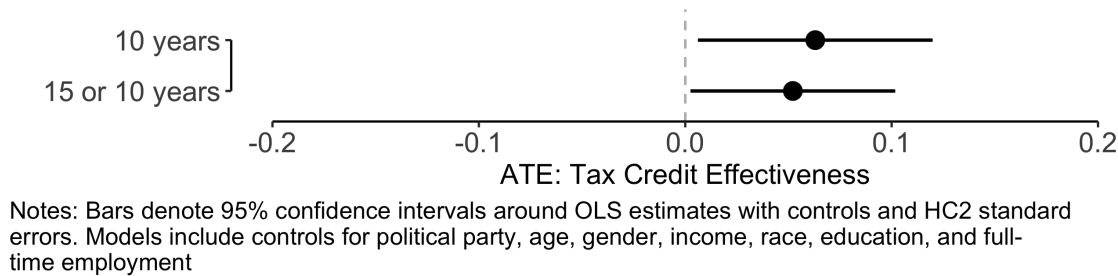


Figure E1: Effect of tax credit duration on perceived efficacy

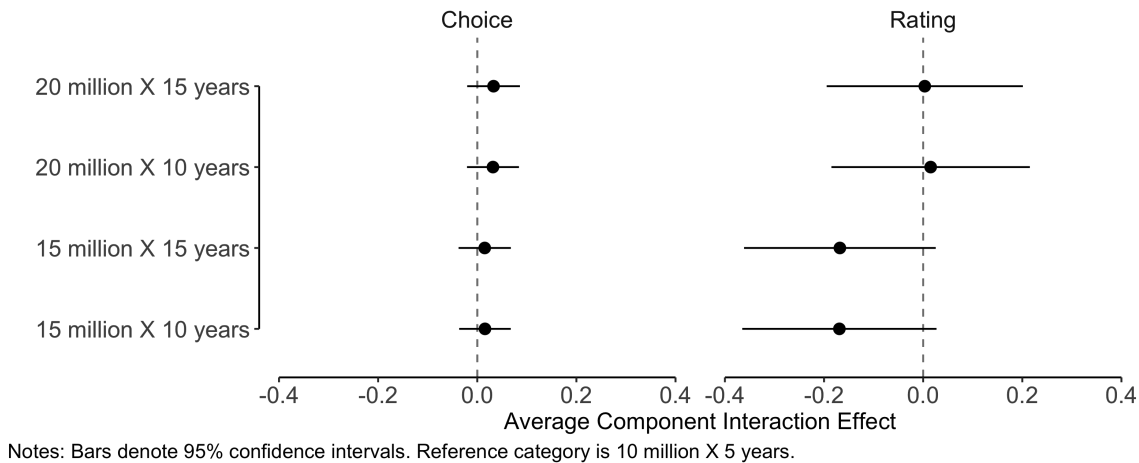


Figure E2: Interactive effect of tax credit duration and amount on policy support

E.6 Costly Signals Partisan Effects

This appendix explores partisan heterogeneity in responses to costly signaling. Democrats are 14 percent more likely than Republicans and Independents to consider the government as “very committed” to the investment (table E1). The converse is true, with 24 percent of Republicans and 27 percent of Independents believing that the government is somewhat or very uncommitted. Only 11 percent of Democrats hold such a pessimistic belief.

Table E1: Belief in government’s commitment by party identification

	Democrat	Neither	Republican
Very uncommitted	0.02	0.06	0.05
Somewhat uncommitted	0.09	0.21	0.19
Somewhat committed	0.62	0.59	0.63
Very committed	0.28	0.14	0.13

To ensure this heterogeneity is not due to inadvertent correlation with treatment assignment, we validate the randomization process. First, a two-sided t -test of the proportion of Democrats in the treatment and control groups fails to reject the null hypothesis of no difference ($t = 0.88, p = 0.38$). Second, the correlation between Democratic identification and assignment to the control group is 0.025.

Table E2 presents the AMCE for the guaranteed school funding conjoint attribute conditional on Democratic identification. For the choice outcome, there is a weak substantive effect of costly signaling among Republicans. This does not extend to how these respondents rate the policy packages.

Table E2: AMCE for guaranteed school funding conditional on Democratic identification

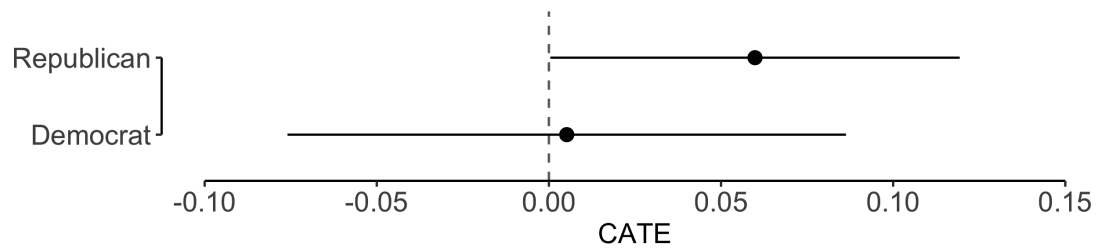
group	cate	lb	ub	alpha	t	p
Democrat	-0.029	-0.058	-0.000	0.050	-1.967	0.049
Republican/Independent	0.020	-0.005	0.045	0.050	1.571	0.116
Democrat	-0.108	-0.210	-0.006	0.050	-2.071	0.038
Republican/Independent	-0.030	-0.119	0.058	0.050	-0.671	0.502

Notes: CAMCE estimated using OLS with errors clustered by respondent.
Two-sided t -tests reported.

Turning to the interpretation check for costly signaling, we ask the respondent the following:

If in addition to the tax credits, the government also {guaranteed \$15 million for county schools / gave counties the ability to apply for \$20 million for county schools (75 percent receive funds). How committed or uncommitted would you say the government is to creating jobs in the county?

We dichotomize the answers, coding respondents answering very committed as 1 and those either somewhat committed or uncommitted as 0. We pre-registered this coding procedure to ensure sufficient variation where necessary, which is the case here, as 80 percent of subjects answer “very” or “somewhat committed.” There is no effect of the treatment in the aggregate. However, as before, the CATE shows how Republicans are responsive to credibility concerns (figure E3).



Notes: Bars denote 95% confidence intervals around OLS estimates with controls and HC2 standard errors. Models include controls for political party, age, gender, income, race, education, and full-time employment

Figure E3: Average treatment effect of costly signaling via school funding guarantee conditional on Democratic identification

E.7 Reversibility Interpretation Check

To verify that institutional reversibility translates into perceptions of government credibility, we devise an interpretation check to quantify the effect of institutional constraints on the perceived duration of tax credits. We ask this question after the respondent completes all conjoint tasks. If institutional constraints influence credibility, then the lack of checks should lead people to expect that the government would renege on its commitment. The item reads as follows with the text in braces randomized:

Suppose the government establishes tax credits that are supposed to last for 15 years. By law, the tax credits are {not reversible / reversible by the {President / Governor} / reversible by lawmakers}. How many years do you think the tax credits will last? Responses range from 0 to 15.

Figure E4 presents the results of this mechanism check, which shows how, compared to the baseline control of a policy being not reversible, if respondents believe actors have the institutional power to reverse the policy, the average respondent expects tax credits to end approximately three years before intended.

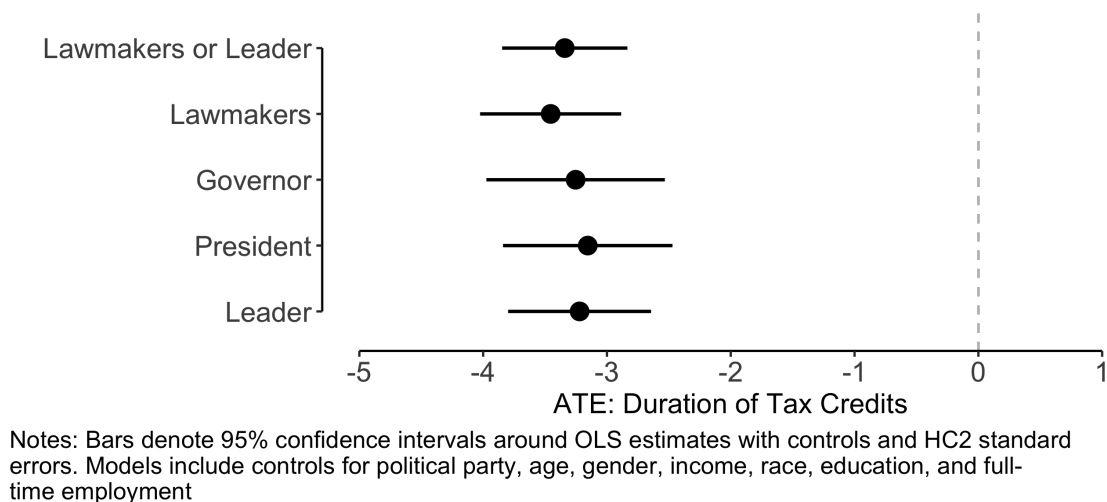


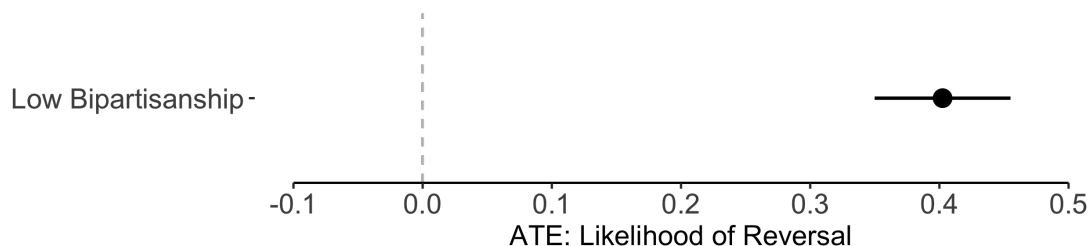
Figure E4: Effect of reversibility on perceived duration of tax credits

E.8 Bipartisanship Interpretation Check

To validate that the effect of bipartisanship transmits through its influence on second-order beliefs, we ask:

If a government investment policy has {low / high} bipartisan support, how likely or unlikely do you think it is that the policy will be reversed in the future?

Answers range from “very” and “somewhat likely” to “somewhat” and “very unlikely,” which we dichotomize at the midpoint. Before presenting the results, it is notable that people held especially pessimistic views of the likelihood of policy reversal; 60 percent said it is likely that the investment policy would be reversed. Nevertheless, bipartisan sponsorship has a meaningful effect. Table E5 shows how if the policy has low bipartisanship, respondents are 41 percent more likely to believe it will be overturned.



Notes: Bars denote 95% confidence intervals around OLS estimates with controls and HC2 standard errors. Models include controls for political party, age, gender, income, race, education, and full-time employment

Figure E5: Effect of bipartisanship on perceived reversibility of tax credits

E.9 Conditional AMCEs

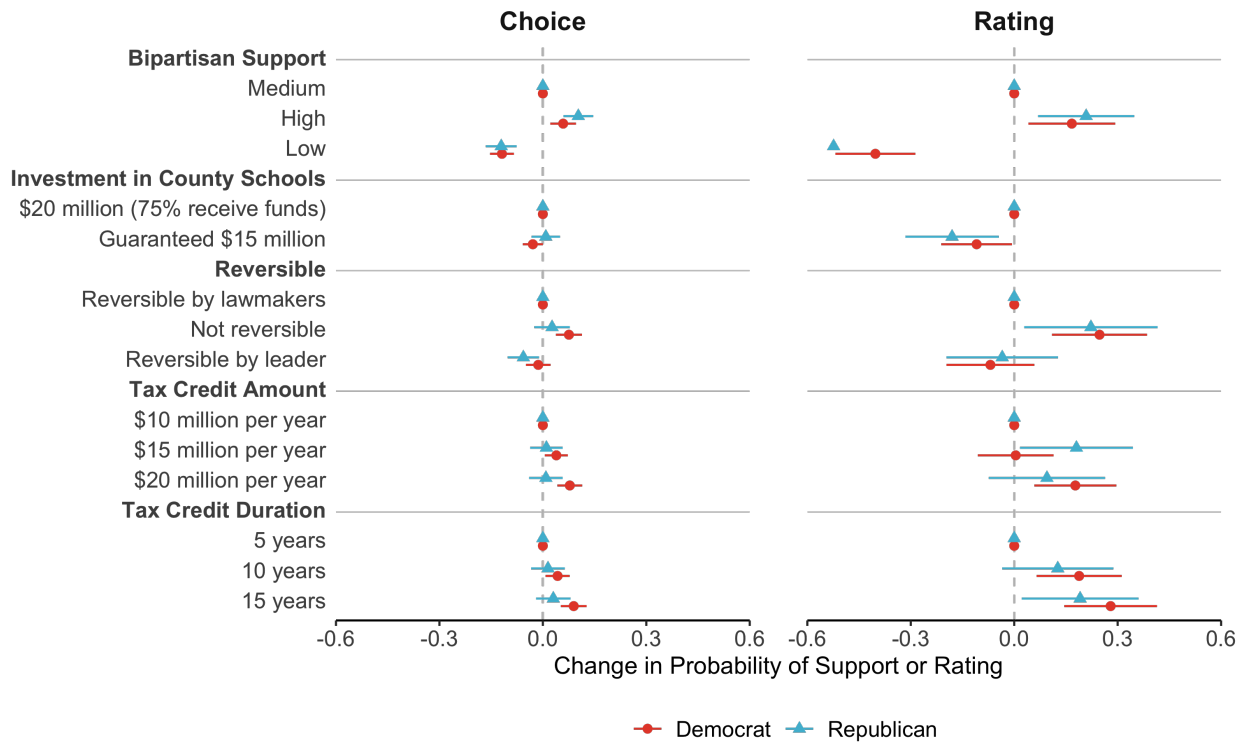


Figure E6: Effect of policy attributes on overall support conditional on Democratic identification

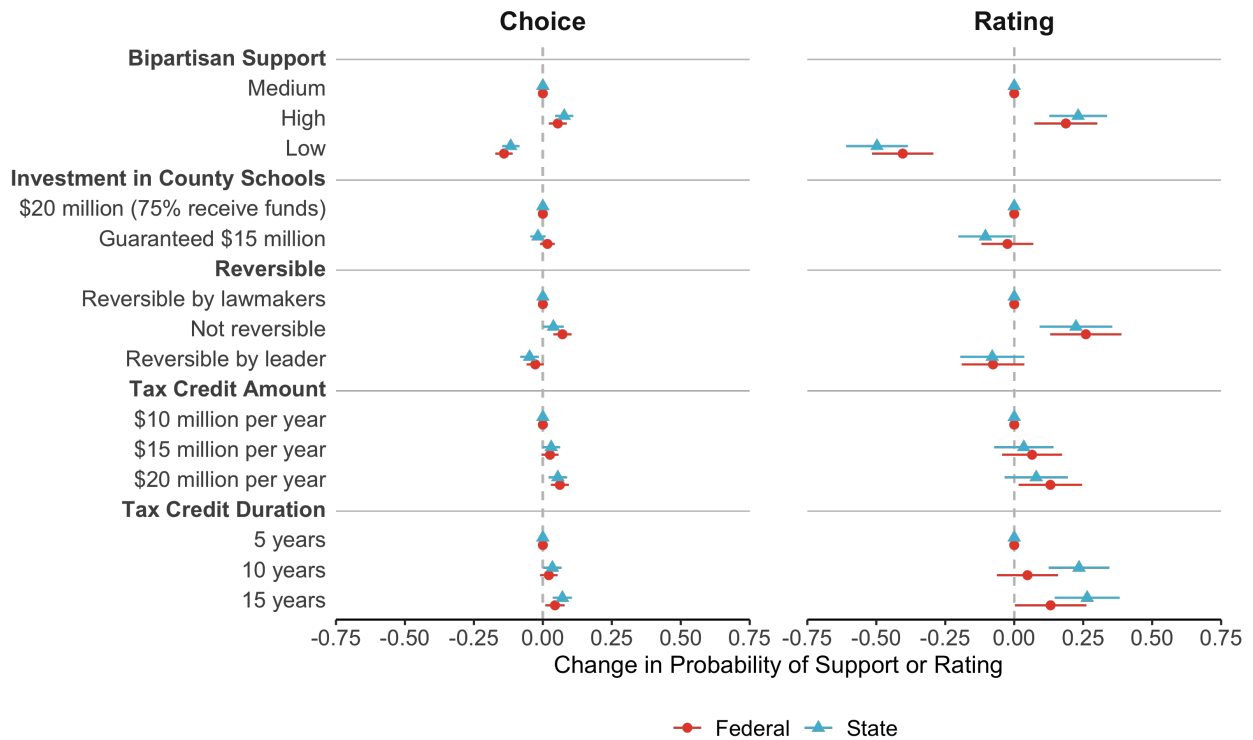


Figure E7: Effects of policy attributes conditional on level of government providing investment

F Retraining Experiment

F.1 Interpretation Check

To rule out the possibility that perceived differences in investment efficacy drive the result, a question asks: “How effective or ineffective do you think the 10 year investment to expand solar and wind energy would be in creating new jobs.” Investment efficacy is distinct from program efficacy; the former pertains to the effect of tax credits in stimulating new industries, whereas the latter refers to the effect of the retraining program. For example, some may hesitate to enroll in the retraining program because they believe tax credits are an ineffectual job-creating instrument, not because of credibility concerns regarding reversal. An overwhelming 82 percent of respondents think the program would be somewhat or very effective, so we dichotomize the outcome measure with “very effective” as 1 and all else as 0 to ensure meaningful variation. Figure F1 displays the results conditional on party. Republicans and Democrats in the treatment group are no more or less likely than their counterparts in the control group to perceive the tax credits as efficacious. This increases confidence in the interpretation that a commitment problem explains the patterns uncovered in the data.

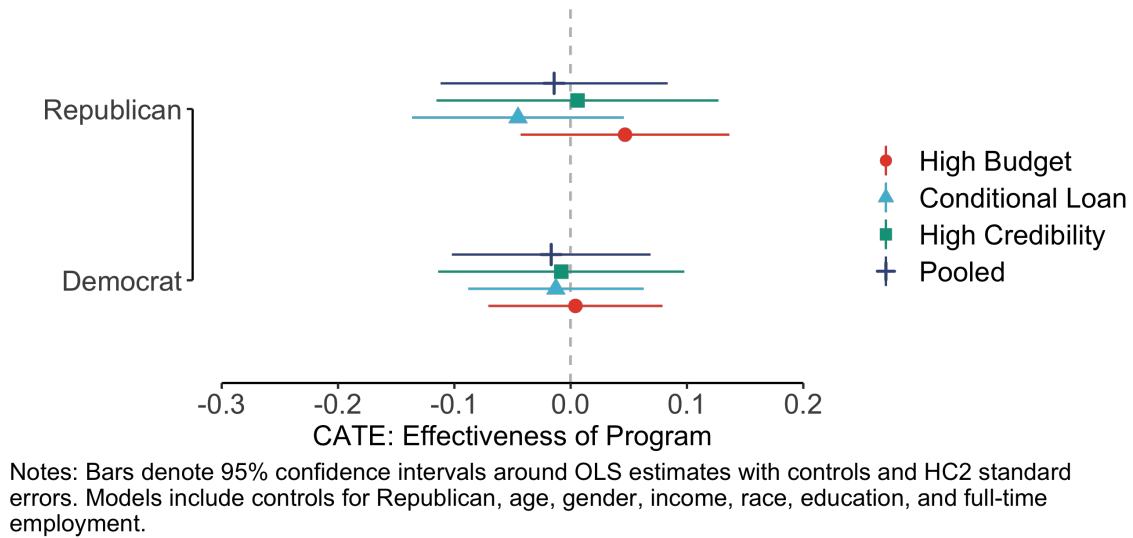
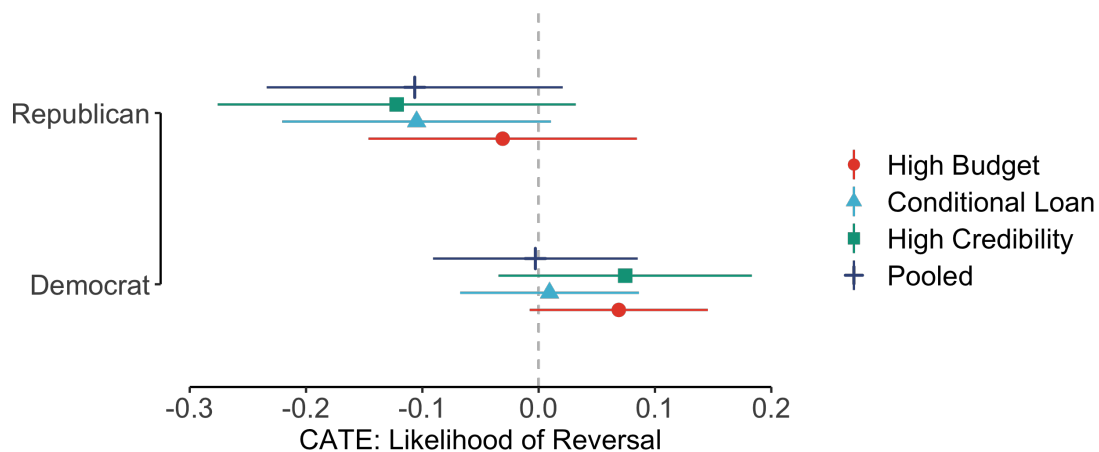


Figure F1: Effects of retraining program commitment devices on perception of renewable investment efficacy

F.2 Partisan Heterogeneity



Notes: Bars denote 95% confidence intervals around OLS estimates with controls and HC2 standard errors. Models include controls for Republican, age, gender, income, race, education, and full-time employment.

Figure F2: Conditional effect of commitment devices on perception of program reversal

G Regulation Experiment

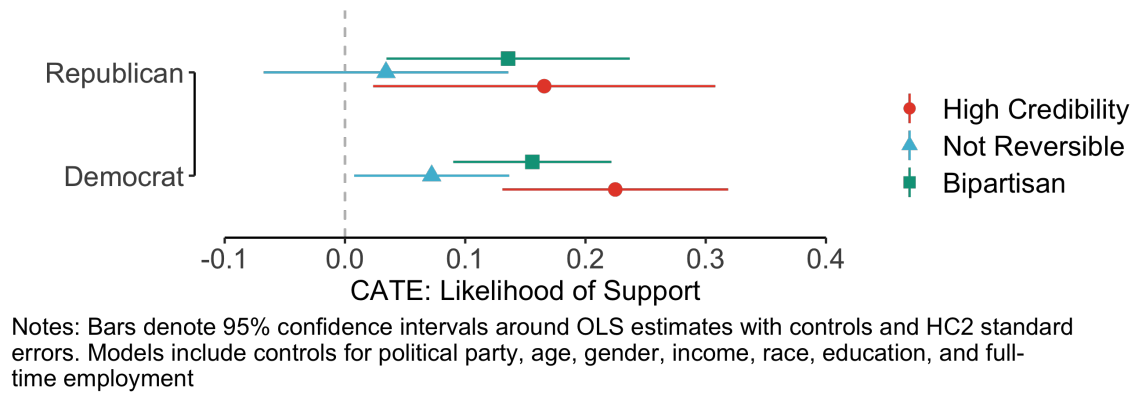


Figure G1: Conditional average treatment effect by party identification on policy support

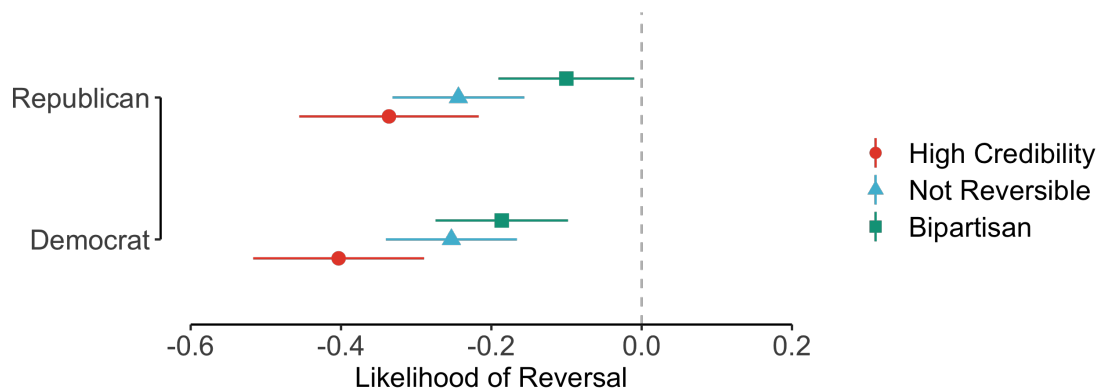


Figure G2: Conditional average treatment effect of commitment devices by party identification on perceived reversibility

References

Raimi, Daniel. 2020. *Environmental Remediation and Infrastructure Policies Supporting Workers and Communities in Transition*. 20-11. RFF and EDF. <https://tinyurl.com/yck6smhv>.