The Dual Economy, Climate Change, and the Polarization of American Politics

Thomas Oatley

Tulane University

June 18, 2023

Abstract

The intersection between the climate crisis and America's dual economy contributes powerfully to contemporary political polarization. The dual economy features carbon-intensive industries in the interior and knowledge-intensive industries along the coasts. This new economic geography intersects with exposure to climate-related severe weather; carbon economy communities are insulated from the climate crisis, while knowledge economy communities are directly exposed. This interaction between the dual economy and the climate crisis has generated a new axis of political conflict centered upon the role fossil fuels will play in America's future. Climate change policy has become a focal point of this conflict. Using data on economic geography, political attitudes on climate change policy, and support for Trump in the 2016 and 2020 presidential elections, I describe the dual economy and climate crisis intersection and its association with attitudes towards climate change policy and support for Trump in 2016 and 2020. The analysis indicates that residents of carbon economy communities oppose climate change policy and support Trump, while knowledge economy residents support climate change policy and oppose Trump.

1 Introduction

The US Congress passed the most significant response to the climate crisis in U.S. history, the Inflation Reduction Act (IRA), in August of 2022. Rather than indicating a new broad consensus in American climate change policy, however, the IRA illustrates the extent to which climate change remains a contentious and polarizing issue. While the IRA allocates $369 billion to subsidies and tax breaks that encourage green energy, it simultaneously "paves the way for a massive expansion of oil and gas drilling on federal lands and in federal waters" (Hemel 2022). Moreover, the Act's promised emissions reductions, 40 percent below their 2005 peak by 2030, tend toward moderate rather than ambitious reductions. Emissions would likely have been 30 percent below 2005 levels even without the IRA, and America is obligated under the Paris Agreement to reduce emissions by 50 percent by 2030. Thus, while the IRA is a major improvement over the status quo, it is insufficient to meet global targets. And yet this bill could barely muster a Senate majority, as Vice President Kamala Harris had to cast the deciding vote. Moreover, the Republican party is now trying to weaken key elements of the IRA and will likely reverse the policy if they capture the White House and Congress in the 2024 election. America remains deeply divided over climate change policy.

The partisan struggle over climate change legislation highlights two important and much broader questions about U.S. politics that I address in this paper. First, what is the underlying reason for the political division over climate change policy? Is it a partisan divide reinforced by interest group politics and industry lobbying as most coverage suggests, or does the congressional divide represent a deeper socioeconomic cleavage in the American electorate? Second, how is the division over climate change policy related to the broader polarization of contemporary American politics? Are they two entirely separate phenomena, does one cause the other, or do they stem from a common root? I answer these questions by examining how the intersection of the dual economy and varying exposures to climate change shapes the polarization of American politics.

Over the last thirty years the U.S. has developed into a dual economy. Throughout most of the twentieth century, the U.S. had a unitary industrial structure organized around fossil fuel-intensive manufacturing such as motor vehicles, steel, petrochemicals, and the machines and equipment needed to produce them. It is hard to over-estimate the extent to which these industries dominated the American economy. Auto production alone accounted, directly and indirectly, for one of every six jobs (Lanzilotti 1971, 256; US Department of Transportation 1981). This carbon economy emerged in the first decades of the 20th century and reached full bloom in the mid-1970s. Over the ensuing decades, however, it has gradually but steadily given way to a dual economy in which the remnants of the carbon economy constitute one sector and a knowledge economy organized around information technology, pharmaceuticals, financial services, and other creative and intellectual property intensive industries makes up the other. This dual economy sharply divides American society. Residents of the two spheres have different skill sets, work in different industries, live in different regions of the country, and have different experiences. Residents of knowledge economy communities are generally prosperous and highly educated. Palo Alto, California is a typical example. Median household income is $158,000, 83 percent of residents have a four-year college degree, and only 6.1 percent of the population falls below the poverty line. Residents of carbon economy communities, in contrast, usually have less formal education and lower incomes. Peoria, Illinois, a relatively successful carbon economy community, has a median household income one-third of Palo Alto's ($52,000). Only one-third of Peoria's residents hold a four-year college degree and the poverty rate is three times higher (20 percent) than it is in Palo Alto. These spheres constitute the two worlds of contemporary American capitalism.

American communities also have different exposures to climate change. It is well known that the specific impacts of climate change vary across space. Some communities are vulnerable to rising sea levels, severe storms, droughts, and wildfires that destroy property and reduce local asset values (what Colgan et al (2021) call climate vulnerable assets). Residents in other communities are exposed to different climate impacts, such as heatwaves and increased rainfall, that are less likely to manifest as catastrophic and economically devastating events. In the contemporary U.S., different exposures to the climate crisis map on to the dual economy divide. America's knowledge economy communities are located in regions vulnerable to potentially devastating climate change impacts, while carbon economy communities are located in regions that face lower and more readily managed risks.

Knowledge economy and carbon economy communities thus have diametrically opposed interests over climate change policy and the development of the American economy over the next half century. Climate change constitutes an existential threat for most knowledge economy communities. In northern California, for instance, San Francisco Bay poses an "increasingly serious threat to millions of residents and hundreds of billions of dollars of bay front property — from neighborhoods to freeways to airports — as seas continue their slow but relentless rise" (Rogers 2022). Other climate-related threats are present. The Camp Wildfire of 2018 killed 85 people, displaced fifty thousand, and burned 11,000 structures in Paradise, California. The 2020 wildfire season consumed 7.3 million acres along the Pacific coast (Siegler 2019; National Interagency Fire Center 2022). Along the Atlantic seaboard, Hurricane Sandy damaged 69,000 residential units, killed 43 people, and caused more than $19 billion in damage in the greater New York City area in 2012 (New York City 2022). Knowledge economy communities thus want effective climate change policy and a rapid phasing out of carbon-intensive industries. For most carbon economy communities, in contrast, decarbonization constitutes a greater threat than climate change. Key carbon-intensive industries, especially steel, cement, ammonia (and thus fertilizer), and transportation, depend on carbon-intensive processes for which commercially viable green alternatives do not yet exist. Many also remain dependent on coal and other fossil fuels for energy and for jobs. As West Virginia Treasurer Riley Moore recently noted about his state "we're an energy state and energy accounts for hundreds of millions of dollars of tax revenue...All our jobs come from coal and gas. I mean, this is who we are. This is part of our way of life here in the state. And they're telling us that these industries are bad. We have an existential threat here. We must fight back" (Gelles and Tabuchi 2022). Carbon economy communities thus resist comprehensive climate change policy that encourages decarbonization (Gaikwad et al 2022; Bechtel et al 2019; Arndt et al 2022). The intersection of the dual economy and varying exposures to climate change has created a carbon-climate cleavage that contributes to the polarization of American politics.

This polarization is more typically attributed to macroeconomic conditions and sociocultural factors. Existing scholarship treats America's right-wing populism to changes to the economy wrought by trade, globalization, and austerity (Autor et al. 2017; Autor, Dorn, and Hanson 2016; Broz, Frieden, and Weymouth 2021; Colantone and Stanig 2018; Jensen, Quinn, and Weymouth 2017; Baccini and Weymouth 2021). An even larger body of work posits that sociocultural factors, and a rising status threat stemming "most notably[from] rising immigration, the decline of traditional values, and the mobilization of women and minority groups" (Berman 2021, 75), are the key factors in the rise of populism (see e.g., Abramowitz and McCoy 2019; Abramowitz and Saunders 2008; Bartels 2020; Mutz 2018; Newman, Shah, and Collingwood 2018; Nivola and Brady 2008; Reny, Collingwood, and Valenzuela 2019; Sides, Tesler, and Vavreck 2019). a broader context into which these alternatives can be incorporated. Rather than replace these alternatives, however, the carbon-climate cleavage hypothesis offers a broader structural framework within which to embed them.

This paper develops the carbon-climate cleavage argument. I first articulate how the combination of the dual economy and regional variation in climate change exposure creates the possibility of a carbon-climate cleavage and establishes the conditions under which the cleavage will develop. I then use data on economic composition and estimates of climate change exposures to demonstrate that these conditions are satisfied in the contemporary U.S. I then highlight the political significance of this carbon-climate cleavage with statistical models that show that support for climate change policy and support for Trump varies systematically across this cleavage. The final section summarizes the results and highlights possible avenues for additional research.

2 Theory: the Carbon-Climate Cleavage

Though we most typically think about climate change as an environmental issue, it enters national politics as an issue of economic policy as well. In formulating their perspectives toward climate change policy, individuals must balance two potential direct economic costs: the costs they incur when they suffer an economic loss from a climate-related event and the cost they face when they suffer a loss cause by the transition away from the carbon economy. Because people have different exposures to these two costs, they hold different preferences about climate change policy. These differences form the basis for the carbon-climate cleavage.

2.0.1 The Dual Economy

The American economy has been transitioning from an economic structure dominated by carbon-intensive industrial economy to one dominated by human capital and intellectual property. A large body of scholarship points attention to the fact that this transition has spatially polarizing consequences (see e.g., Moisio 2018; Bachman and Moisio 2021). Bachman and Moisio (2021, 6) note that "the growth potentials of capital accumulation are today located in the urban hubs of the knowledge economy... [while] the "losers" of the process of knowledge-based economization are places and regions that are not capable of connecting themselves with the "high value" parts of the global value chains and become hosts of waning service sectors and manual labor." Hudson (2015, 34) argues similarly that spatial polarization is inherent to capitalist development. A sense of place-specific identity, when linked to spatially uneven development, encourages political mobilization as groups organize to defend their shared territorial interests (see also Iversen and Soskice 2015).

I theorize this transition and the associated spatial polarization by building on the dual economy model as modified recently by economic historian Peter Temin. Sir W. Arthur Lewis (1954) developed the dual economy in the 1950s as a model of a typical developing country. Developing economies have two sectors, a large traditional low productivity sector, usually agriculture, and a small modern high productivity sector, usually labor-intensive manufacturing. Economic growth is driven by increased demand for the manufactured goods produced by the high productivity sector. Lewis argued that agriculture held a substantial pool of surplus labor which moved into manufacturing, and that this movement caused productivity (output per worker) and wages to rise in both sectors. Fewer workers in agriculture meant rising output per capita in that sector, and higher productivity of manufacturing supported higher incomes there as well. Thus, over time a low-income agrarian society transitions to a high-income manufacturing economy that supports high incomes in farming as well.

Temin (2017) modified the standard Lewis model and applied it to the contemporary U.S. Temin defined the modern high productivity sector as finance, technology, and electronics (FTE), or what I call the knowledge economy. The carbon economy constitutes the traditional sector, though Temin defined it somewhat more broadly as all low-wage activities outside of the knowledge economy. Temin argues, in contrast to Lewis, that labor is immobile between the carbon economy and the knowledge economy (see also Gabe et al. 2018). Limits on labor mobility reflect two considerations. First, movement from the carbon economy to the knowledge economy requires a significant investment in formal education. When only a small percentage of the carbon economy workforce holds a college degree, carbon economy workers do not move into the knowledge economy. Second, labor mobility is limited by local real estate markets. Housing prices in knowledge economy communities are high and rising, while home prices in carbon economy communities are relatively low and falling (see Ganong and Shoag 2017). This housing price gap means that even a skilled worker in a carbon economy community will find it difficult to move from Peoria to Palo Alto. Instead, workers displaced from carbon-intensive industries are pushed into their local low-wage service sector. Rather than incomes rising everywhere, the transition instead widens income inequality: incomes rise for knowledge economy workers and fall for labor displaced from the carbon economy. Temin argues, and it is difficult to disagree, that this dynamic characterizes the trajectory of the American economy.

Residents of carbon economy and knowledge economy communities have very different economic interests over economic and environmental policies. Residents of communities embedded in the carbon economy have compelling reasons to support policies that directly sustain fossil fuels, such as Federal regulations that enable oil and gas exploration and drilling on public land. These communities also oppose policies that raise fossil fuel prices, such as a carbon tax or an emissions trading scheme, and support policies that encourage investment in carbon-intensive industries. In contrast, knowledge economy communities, for which fossil fuels and carbon-intensive industries are of small and decreasing significance as a source of income, and for which renewables can satisfy their demand for electricity, have little economic rationale to support policies that sustain fossil fuels or the carbon economy. The dual economy thus gives rise to very distinct orientations toward the fossil fueled economy. One set of communities staunchly defends the carbon economy, while the other is, at best, indifferent to its fate.

2.1 Climate Change Exposure

Independent of their economic composition, communities are exposed in different ways and in varying degrees to the climate crisis. Climate change, which effects natural and built environments, will increase the frequency and severity of extreme weather events. More frequent droughts, heat waves, excessive rainfalls, hurricanes, and wildfires are a few of the likely consequences. These events will damage property and other assets located in the communities they strike. Sometimes this damage might manifest as partial or total loss, such as when wildfires consume residential communities. In other instances, asset values might fall because the risk of catastrophic loss is high. The value of beachfront property located on Grand Isle, Louisiana, for instance, might be expected to decline significantly over the next decade. The value of farmland might fall sharply in regions expected to experience prolonged drought.

Although climate change is a global threat, direct exposure to climate impacts varies across space. To take an obvious example, the risk of coastal flooding is highest along coastlines and lowest in the interior. Hurricanes threaten the Gulf and south Atlantic coasts more than the Northeast or the Pacific Northwest. Forest fires pose severe risks to California but not to the interior. And the severity of coastal flooding among coastal communities may be greater in some coastal communities than in others. Even within as small an area as New Orleans, for example, vulnerability to flooding varies between the city's center districts, built below sea level, and its uptown area, which stands slightly above sea level. Thus, although climate change is a global phenomenon, its specific impact on society varies significantly across space. Some communities are highly exposed to impacts, while others considerably less exposed.

Community attitudes about climate change policy reflect these different exposures. Communities that face a high risk of climate-related extreme weather events will support policies that mitigate the crisis. In contrast, communities that face a low risk of climate-related events will not prioritize climate change as a concern and will be reluctant to support costly measures intended to mitigate the crisis. We should observe a high exposure vs. low exposure division on climate change and emissions reduction policies.

2.2 The Carbon-Climate Cleavage

Where communities sit in a two-dimensional space defined by the dual economy and climate change exposure is the structural context within which people develop positions over climate change policy (see figure 1). The horizontal dimension in figure 1 captures communities' location in the dual economy. Communities fully dependent on the carbon economy sit at the far left while communities dependent on the knowledge economy sit at the far right. The vertical axis captures communities' exposures to climate change. High exposure communities lie at the very top while low exposure communities lie at the very bottom. The two dimensions define four quadrants, each of which categorizes communities in terms of distinct combinations of economic composition and climate change exposure. A community's location in this space in turn shapes its residents' orientation toward climate change policy and decarbonization.

I assume that individual preferences over climate change policy reflect their economic or material interests. People support or oppose climate change policy based on how they expect climate change itself and decarbonization induced by climate change policy to affect their personal income and wealth (see, e.g. Colgan et al 2021; Aklin and Mildenberger 2020). Moreover, I assume that as people contemplate this issue, they wish to minimize their exposure to economic losses, and they attempt to do so by calculating whether they stand to lose more from negative climate change impacts or from climate change policies that accelerate decarbonization. If they anticipate significantly larger losses from climate change than from decarbonization, they support climate change policy. If they anticipate significantly larger losses from decarbonization they oppose climate change policy. The issue of climate change thus enters national electoral politics as an economic policy issue (including energy policy) as well as an environmental issue per se. The Biden administration's green industrial policy and the IRA illustrate climate change policy as economic policy (see Allen et al 2021).

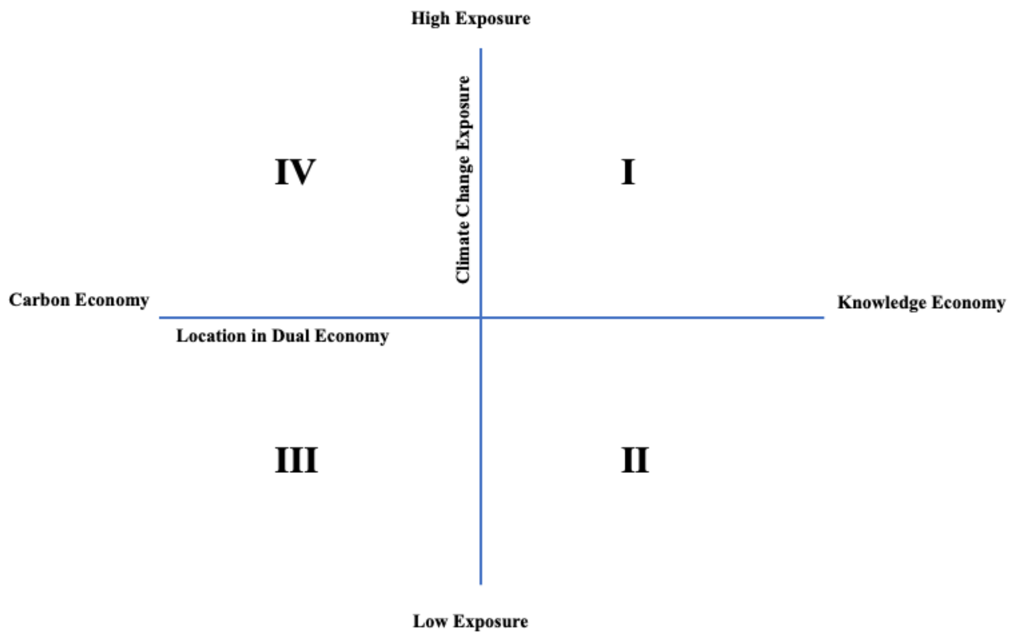

Figure 1: The Carbon-Climate Cleavage

The communities located in the four quadrants of figure 1 thus have different preferences over climate change policy. The nowledge economy communities with high exposure to climate change that lie in Quadrant I are strong advocates for climate change policy. On the one hand, these knowledge economy communities expect few direct costs from climate change policies that encourage decarbonization. And as high exposure communities, climate change policy promises significant benefits in the form of fewer losses from negative climate events. Knowledge economy communities suffer few costs from climate policy because they no longer need to depend on fossil fuels as a source of electricity or as a core input to the industrial processes that dominate local economic activity. At the same time, these communities realize significant benefits from climate change mitigation because they are highly vulnerable to severe weather events generated by climate change and from the rising costs associated with being exposed to the risk of such events.

Communities in Quadrant II are ambivalent about climate change policy. Because these communities are part of the knowledge economy, local economic activity will not decline in scale and community-based assets will not fall in value as a consequence of decarbonization. Yet, because these communities have low exposure to the climate crisis, they do not expect to realize significant direct benefits from climate change policy. Such communities have little incentive to pay significant costs, in form of high energy prices or rising taxes to subsidize green industrial policy, to mitigate the climate crisis. At the same time, they have no reason based on local industry to oppose decarbonization.

Quadrant III contains communities characterized by low exposure to climate change and high dependence on carbon-intensive industries. These communities offer little support for climate change policy and they often actively oppose it. They do so because climate change policies that encourage decarbonization eliminates jobs in carbon-intensive firms within each community, while also threatening the retail outlets, the real estate markets, and the government services that these jobs support. As employers close and jobs disappear, tax revenues fall, and public services decline in quality. Housing values fall as people leave the community, further depressing tax revenues and forcing additional cuts to public services. Climate change mitigation, in contrast, offers few direct benefits to these communities because assets here are less exposed to catastrophic weather-related events. Such apparent insulation from the most catastrophic climate change events may be reinforced at the individual level by motivated reasoning (Hart and Nisbet 2012; Kahan 2015) in conjunction with the "invisibility of climate change and the uncertainty in attributing specific events and weather patterns to the broader phenomenon" (Egan and Mullin 2017, 211).

Finally, communities in Quadrant IV have a high exposure to climate change and rely on carbon-intensive industries. Like the communities in Quadrant III, these communities have an aversion to a dramatic shift away from the carbon economy. Yet, in contrast to contrast to communities in the Quadrant III, this group is highly exposed to climate change. Gulf Coast communities' dependence on the oil and gas industry alongside their exposure to hurricanes is a good example. This combination creates a somewhat challenging position that calls for a reduction of GHG emissions to minimize losses arising from direct exposure to climate impacts while at the same time resisting decarbonization to minimize losses for core industries. Such communities might be strong supporters of government policies that invest in carbon capture and sequestration technologies.

A carbon-climate cleavage exists when communities are distributed between Quadrant I and Quadrant III. Quadrant I communities support rapid decarbonization to mitigate climate change while Quadrant III communities want to protect the carbon-intensive industries that sustain their communities and oppose stringent climate change policy. Policies advocated by Quadrant I communities thus threaten the current standard of living Quadrant III communities, and vice versa. Little room for compromise exists. No cleavage exists if communities cluster in a single Quadrant. In 1968, for example, most American communities were located in Quadrant III, relying heavily on the carbon economy and having low exposure to climate change. Nor will a cleavage emerge when communities are distributed between Quadrant II and Quadrant IV. Quadrant IV communities support the carbon economy but also want to reduce GHG emissions, while Quadrant II communities are most concerned about the cost of mitigation. A cleavage will not emerge if communities are distributed between Quadrant I and Quadrant IV. Both Quadrants support climate change policy and might also share an interest in developing carbon capture and sequestration technology, one because of its specialization in intellectual property, the other because carbon capture allows them to remain carbon-intensive producers while also mitigating climate change.

A carbon-climate cleavage develops, therefore, when communities are distributed between high exposure knowledge economy communities and low exposure carbon economy communities. This suggests two propositions about contemporary American polarization. First, American communities are distributed between high exposure knowledge economy communities and low exposure carbon economy communities. Second, this carbon-climate cleavage contributes to the polarization of American politics.

3 Data and Analysis

To evaluate these two propositions, I first examine the intersection between location in the dual economy and exposure to climate change to demonstrate the existence of a carbon-climate cleavage. I then show that this cleavage holds political significance by regressing support for climate change policy and the vote for Trump against economic characteristics and climate change exposure.

I employ county as the unit of analysis rather than the individual. I expect residents in every county to have similar preferences over climate change policy irrespective of individual differences in occupation or industry of employment. For instance, a retail clerk's income is tied closely to the fortunes of the county's dominant industries and, as a consequence, their orientation towards climate change policy will reflect their county's location in the Carbon-Climate space. In other words, average support for climate change policy and for Trump will vary across counties as a function of county location in the Carbon-Climate space. Individual attitudes within each county will vary around the mean; people with more formal education in a carbon economy community, for instance, might offer more support for climate policy than their neighbors with no education beyond high school. Low-skill workers in knowledge economy communities will offer less support for climate change than their college educated neighbors.

3.1 Measuring the Carbon-Climate Cleavage

We turn first to the intersection of the dual economy and climate exposure. I use three indicators to measure a community's location in the dual economy: carbon economy jobs, GHG emissions, and skill level. Carbon economy jobs is the sum of employment in oil and gas extraction, coal mining, motor vehicle manufacturing (including agricultural and construction machinery), primary metals manufacturing, and petrochemical manufacturing, divided by total employment in the county. GHG emissions per capita is the sum of enterprise level GHG emissions for each county, divided by county population. Skill level is the county-level ratio of college graduates to high school graduates.

Maps of these measures reveal the geographic organization of the dual economy. Figure 2 shows that carbon economy jobs cluster in counties in the nation's interior (figure 2). Carbon-intensive manufacturing and coal mining are concentrated in the Great Lakes region while oil and gas extraction and petrochemical manufacturing are most important along the Gulf Coast and through the Great Plains. And while jobs in these carbon-intensive industries are not absent entirely from counties along the Atlantic and Pacific coastlines, they constitute a much smaller share of employment in these coastal communities than they do in the interior. The GHG emissions map (figure 3) reveals a similar geography, as industrial emissions are highest in the nation's interior and along the Gulf coast and significantly lower along the East and West coasts. Finally, the skill level map (figure 4) is a mirror image of the first two. The share of the labor force that holds at least a four-year college degree is higher in the Northeast and along the West coast than in the interior counties in which the population is dominated by workers with a high school education or less.

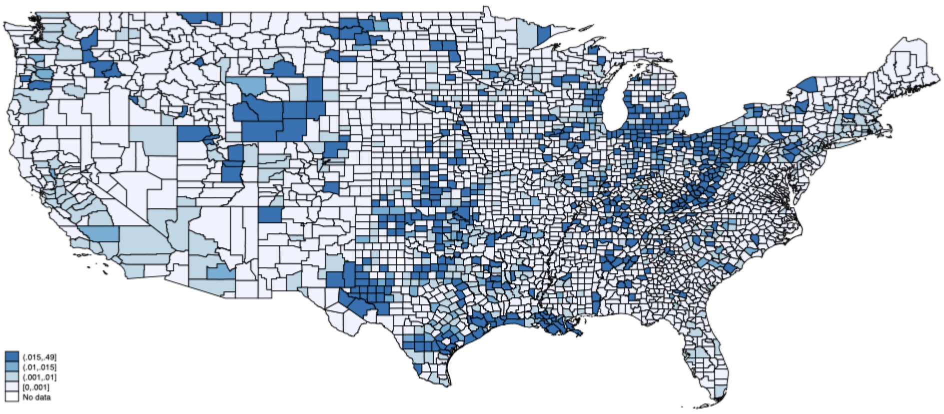

Figure 2: Carbon Intensive Job Share

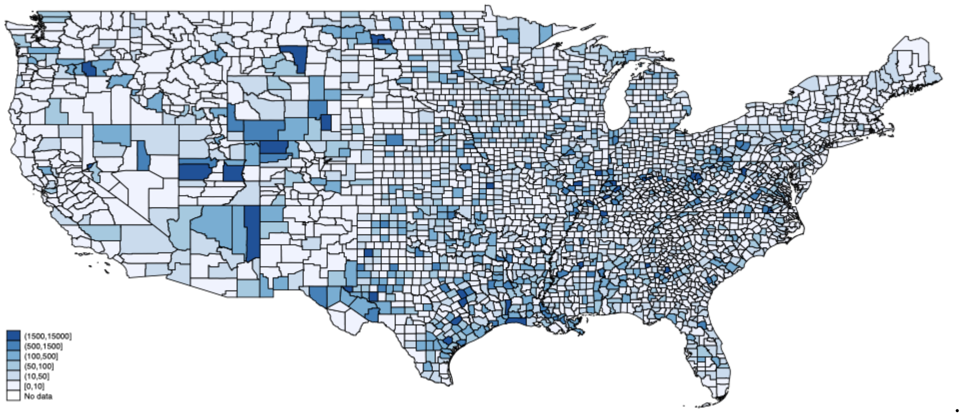

Figure 3: Industrial GHG Emissions

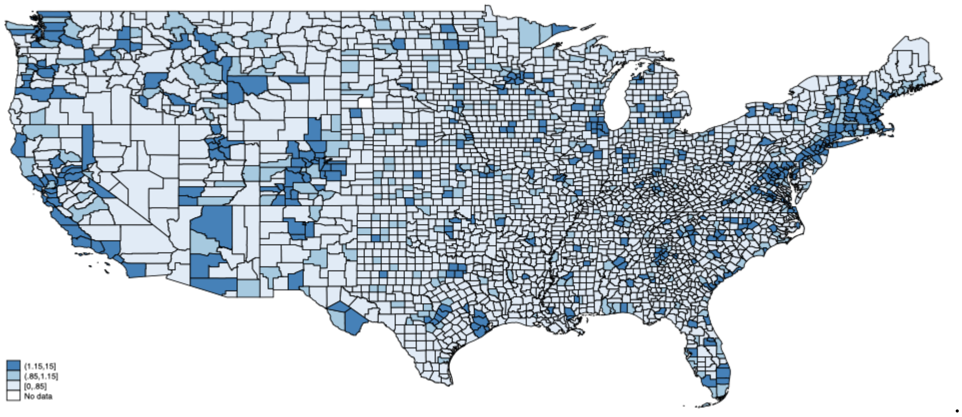

Figure 4: Skill Level

The maps suggest that the geography of the dual economy has two central characteristics. First, county economies are specialized rather than diversified; that is, livelihoods in each county are derived from either carbon-intensive industries or from knowledge-intensive industries and rarely from both. Second, rather than being uniformly distributed across the nation, carbon economy communities and knowledge economy communities cluster together in separate regions. The knowledge economy has taken root in the Northeast and along the West Coast, while the carbon economy dominates the interior counties. To the extent that economic factors shape electoral politics, this particular economic geography generates a strong divide between a coastal knowledge economy and the interior carbon economy.

Climate change exposure displays a strikingly similar geographic divide. I measure climate change exposure with the U.S. Federal Emergency Management Agency (FEMA)

National Risk Index (NRI) (FEMA 2022). The NRI evaluates vulnerability to eighteen natural disasters at the county level. Risk is estimated as the expected property loss from natural disasters multiplied by social vulnerability and divided by community resilience. FEMA defines social vulnerability as the "susceptibility of social groups to the adverse impacts of natural hazards, including disproportionate death, injury, loss, or disruption of livelihood." Community resilience in contrast "is the ability of a community to prepare for anticipated natural hazards, adapt to changing conditions, and withstand and recover rapidly from disruptions." The index varies from 0 (extremely low risk) to 100 (very high risk). The NRI map highlights the extent to which climate change exposure varies across the US (figure 5). Areas of very high and relatively high risk are concentrated along the Pacific Coast, in Florida, and along portions of the Atlantic Coast south of New York City. In contrast, FEMA estimates that communities in the nations' interior face relatively low risk, with a few exceptions in large urban centers with high concentrations of vulnerable populations. Moreover, the regions face different types of impacts. The interior counties face risks arising from variability in precipitation (flooding and droughts) and high temperatures as well as a greater threat of extreme events such as tornadoes. In contrast, the coasts face drought and high temperatures, but also face forest fires, hurricanes, coastal erosion, and rising sea levels.

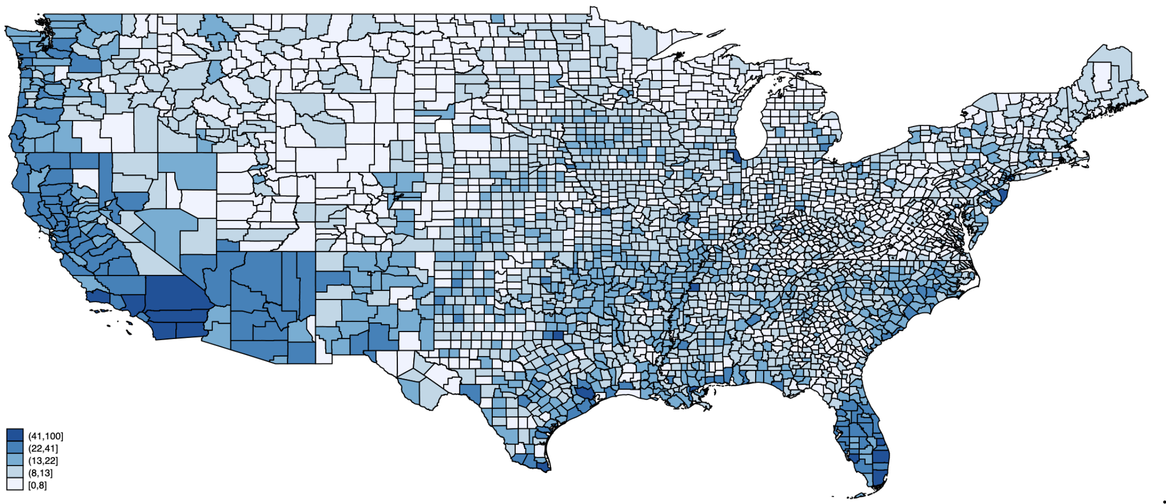

Figure 5: FEMA Climate Risk

When we put the dual economy maps next to the climate exposure map it appears that knowledge economy communities have a greater exposure to climate change than carbon economy counties. To determine whether this division is meaningful I assigned

	Carbon Economy	Knowledge Economy	
	Quadrant IV	Quadrant I	
Carbon Economy Jobs	0.02***	0.008**	
Skill Level	0.57***	1.57***	High
GHG Emissions	56.5*	13.2**	Exposure
Climate Risk	18.4***	22.6***	
Counties	518	196	
	Quadrant III	Quadrant II	
Carbon Economy Jobs	0.02***	0.009***	
Skill Level	0.5***	1.8***	Low
GHG Emissions	121.6***	18***	Exposure
Climate Risk	0.08***	7.3***	
Counties	2075	318	

Table 1: Carbon-Climate Cleavage

each county to one of the four quadrants from figure 1 based on their NRI rating and skill level. I then calculated means for the dual economy characteristics and climate change exposure for the counties in each quadrant (see table 1). The 196 counties that fall in Quadrant I are characterized by a highly skilled workforce, few carbon economy jobs, and low GHG emissions. In addition, these communities have a high exposure to climate change. The 318 counties in Quadrant II have an economic profile similar to the Quadrant I counties, but have one-third the average exposure to climate change. In contrast, the 2,075 counties located in Quadrant III have a low skill workforce, a large share of carbon economy jobs, and very high GHG emissions. Moreover, these counties have a very low average climate change exposure. Finally, the 318 counties in Quadrant IV have economic characteristics similar to Quadrant III counties, but have an average climate change exposure that is more than twice as large. Difference of means tests, in which I compared the means in each quadrant to the means for all counties in the three remaining quadrants, reveal that Quadrant means are (almost) always significantly different (statistically) from the rest of the sample. The only exceptions arise in Quadrant IV, and these indicate that the economic characteristics of Quadrant IV counties are not significantly different from the economic characteristics of counties in Quadrant III.

Finally, I estimate how the American population is distributed across the Carbon-Climate space. The 196 counties in Quadrant I have a combined adult population of 105 million, while the 2,075 counties in Quadrant III have a combined population of

Table 2: The Carbon-Climate Cleavage and Climate Change Policy

	Limit CO_2	Drill Offshore	Prioritize Climate	Government Effort
Mean Carbon Economy Jobs	0.02***	0.008**		
	(1.68)	(2.14)	(1.79)	(1.24)
Mean Skill Level	-363.23***	82.67	-399.50***	-168.54***
	(45.48)	(58.10)	(48.49)	(33.51)
Mean GHG Emissions	-0.004***	0.001***	-0.001***	0.000***
	(0.00)	(0.00)	(0.00)	(0.00)
Mean Climate Risk Index	0.80***	-1.98***	0.62***	-0.12
	(0.13)	(0.16)	(0.14)	(0.09)
Patents	-0.000	-0.000	0.000	0.000
	(0.00)	(0.00)	(0.00)	(0.00)
Vulnerability	0.04***	-0.09***	0.15***	0.03***
	(0.01)	(0.01)	(0.01)	(0.01)
Unemployment	-0.24***	0.57***	0.18***	0.07
	(0.05)	(0.06)	(0.05)	(0.04)
Trump Vote 2016	-33.33***	25.29***	-31.70***	-30.62***
	(0.52)	(0.67)	(0.56)	(0.39)
Constant	82.55***	42.61***	61.62***	73.31***
	(0.52)	(0.66)	(0.55)	(0.38)
R-squared	0.77	0.59	0.73	0.80
N	2921	2921	2921	2921

$^{***}p < 0.001$, $^{**}p < 0.01$, $^{*}p < 0.05$

50.6 million. Quadrant IV counties have 51 million, and Quadrant II counties have 41 million. Thus, 42.4 percent of the adult population has an unambiguous economic incentive to support climate change policy, and 20.4 percent have an unambiguous economic incentive to oppose it. An additional 20.7 percent of the population has an economic incentive to sustain the carbon economy and hope for a technological solution to climate change. The remaining 16.4 percent have no economic incentive to either support or oppose climate change policy. Overall, therefore, 42.4 percent of the population has an economic rationale to support climate change policy, and 41.1 percent has an economic rationale to either oppose climate policy outright or to resist rapid decarbonization. This points to the emergence of two relatively equally-sized, geographically separate constituencies that is likely to become - if it hasn't already – an important source of division in American politics. This is the carbon-climate cleavage.

3.2 The Political Significance of the Carbon-Climate Cleavage

To evaluate whether this carbon-climate cleavage has political significance I regress county-level support for climate change policy and Donald J. Trump's vote share in the 2016 and 2020 presidential elections against economic characteristics and climate change exposure.

3.2.1 Climate Change Policy Attitudes

I first demonstrate the extent to which county-level attitudes toward climate change policy correlate with the carbon-climate cleavage identified above. I use county-level climate change policy attitudes derived from a statistical model of a survey data set containing 25,000 observations (Howe et al. 2015). I analyze public support for two statements about specific climate policy measures and two statements about government effort.

- We should regulate carbon dioxide (the primary greenhouse gas) as a pollutant."
- We should "expand offshore drilling for oil and natural gas off the U.S. coast."
- "The President should do more to address global warming."
- "Global warming should be a high priority for the next president and Congress."

Each response is the percentage of the county population that supports the statement.

The multivariate analysis employs five measures of the dual economy: carbon economy jobs, GHG emissions per capita, skill level, patents, and coal-fired electricity generation. The first three should be familiar to the reader by now. I also include the number of patents acquired by county residents and businesses between 2000 and 2015. Coal-fired electricity is megawatts per capita generated by coal-fired plants, measured at the state level. The NRI captures exposure to climate change. I use county unemployment rate to control for economic anxiety. Finally, to control for the sociocultural perspective, the status threat hypothesis, and other unobserved attributes I include Trump's vote share in the 2016 presidential election. Vote share controls for ideology/partisanship (conservatives are less likely to support climate change policy) and cue taking (i.e., I support Trump because he will "Make America Great Again," and Trump calls climate change a hoax. I thus oppose climate change policy). I estimated all models using Stata's ordinary least squares procedure. The results are presented in table 2.

The models return consistent results. They account for between fifty-nine and eighty percent of the total variance, and only one of the estimated coefficients on the variables

Table 3: The Carbon-Climate Cleavage and Climate Change Policy

	Limit CO_2	Drill Offshore	Prioritize Climate	Government Effort
Carbon-intensive Jobs	-7.43***	10.70***	-8.17***	-4.37***
	(1.68)	(2.14)	(1.79)	(1.24)
Coal-fired plants	-363.23***	82.67	-399.50***	-168.54***
	(45.48)	(58.10)	(48.49)	(33.51)
GHG Emissions	-0.004***	0.001***	-0.001***	0.000***
	(0.00)	(0.00)	(0.00)	(0.00)
Skill Level	0.80***	-1.98***	0.62***	-0.12
	(0.13)	(0.16)	(0.14)	(0.09)
Patents	-0.000	-0.000	0.000	0.000
	(0.00)	(0.00)	(0.00)	(0.00)
Vulnerability	0.04***	-0.09***	0.15***	0.03***
	(0.01)	(0.01)	(0.01)	(0.01)
Unemployment	-0.24***	0.57***	0.18***	0.07
	(0.05)	(0.06)	(0.05)	(0.04)
Trump Vote 2016	-33.33***	25.29***	-31.70***	-30.62***
	(0.52)	(0.67)	(0.56)	(0.39)
Constant	82.55***	42.61***	61.62***	73.31***
	(0.52)	(0.66)	(0.55)	(0.38)
R-squared	0.77	0.59	0.73	0.80
N	2921	2921	2921	2921

$^{***}p < 0.001$, $^{**}p < 0.01$, $^{*}p < 0.05$

of interest fails to return a statistically significant coefficient. Moreover, each model supports the idea that a carbon-climate cleavage shapes American polarization. The measures of economic structure yield significant and correctly signed coefficients. The larger the share of carbon-intensive jobs, the less support there is for policies intended to encourage decarbonization and mitigate climate change. The substantive magnitude is large, ranging from a 4-point to a 10-point change in support for the four questions as we move from minimum exposure (zero jobs) to maximum dependence. GHG Emissions is also significant and carries the expected sign. We see greater opposition to limiting GHG emissions and to making climate change a priority in high emitting counties than in low-emitting counties, while support for offshore drilling is higher in the high emitting counties than in low emitting counties. The effect of coal-fired plants is also significant. As megawatts per capita generated by coal-fired plants increase, support for climate change policy falls. Again, the magnitude of the estimated relationship is substantively large. As we move from counties in states with zero coal fired plants to counties that are the most dependent on coal-fired plants, the estimated support for limits on coal plants'

CO2 emissions falls by about one percentage point.

Counties with a highly skilled work force exhibit a higher level of support for climate change policy than do counties with a less skilled work force, although this relationship does not pertain to Presidential Effort on climate change. One might be tempted to interpret this as an education effect rather than a skill level effect, as in people with college degrees better understand climate change and are thus more likely to support climate change policy than people with a high school education. However, the education variable here tells us only that counties with a high proportion of college graduates to high school graduates exhibit more support for climate change policy than counties with few college graduates. It is likely that part of the relationship reflects education, and part reflects job-based economic self-interest.

Patents yields mixed results. The measure is significant and carries a negative sign in two models. This indicates that counties with an economic structure that acquires a lot of patents oppose the idea that the next government should prioritize climate change and are less supportive of the efforts of the current government. These two positions are a bit inconsistent and thus difficult to interpret. The measure is not statistically significant in the other models.

Our measure of climate change exposure returns a significant and correctly signed coefficient in all models. Support for strict limits on coal-fired plants' emissions is stronger in high exposure counties than in low exposure countries, while support for offshore drilling is stronger in low exposure counties than it is in high exposure counties. In addition, residents of high exposure counties exhibit greater support for having the next government prioritize climate change and are more inclined to agree with the statement that the president should make a greater effort to address climate change. We thus find a positive relationship between a community's direct exposure to climate change and its support for climate change policy.

Unemployment is significant and carries the expected sign in two of the four models. Support for limits on CO2 weakens while support for Offshore Drilling increases as the unemployment rate increases. Support for making climate change policy a priority increases in line with unemployment. The estimated relationship between unemployment and Presidential effort is small and uncertain, offering some indication that the macroeconomic environment shapes climate change policy support. Trump 2016 is statistically significant, the estimated effect is quite large, and the coefficients carry the expected sign. Independent of economic structure and climate exposure, support for climate change policy falls as support for Trump rises. I note, however, that the results across all models are robust to omitting Trump 2016 from the specification.

I then estimated a set of models with categorical variables created to correspond to county location in the four quadrants of the Carbon-Climate space. The rationale for this specification is twofold. First, the carbon-climate cleavage arises from the co-occurrence of two characteristics in each county rather than from the marginal impact of one independent variable while controlling for others. Second, the strongest evidence that the cleavage has political significance arises when Quadrant I and Quadrant III counties constitute the two poles—the most and least supportive of climate change policy. The categorical specification allows me to estimate this ranking. I used skill level to assign counties to their location in the dual economy (ratios above and below 1). I used the same rule as above to assign climate exposure. Quadrant I (high exposure knowledge economy counties), which I expect to be the most supportive of climate change policy, is the omitted category. The coefficients for the included quadrants indicate support relative to support in Quadrant I. Results are in table 3.

Low exposure knowledge economy communities are less enthusiastic about climate

Table 4: The Carbon-Climate Cleavage and Climate Change Policy

	Limit CO_2	Drill Offshore	Prioritize Climate	Government Effort
Low Vulnerability	-0.517	1.549***	-3.059***	-0.974***
Knowledge Economy	(0.35)	(0.41)	(0.34)	(0.23)
Low Vulnerability	-1.909***	3.688***	-3.292***	-0.656**
Carbon Economy	(0.32)	(0.37)	(0.31)	(0.21)
High Vulnerability	-0.932**	2.694***	-1.193***	-0.472*
Carbon Economy	(0.34)	(0.40)	(0.33)	(0.22)
Rate	-0.402***	0.759***	0.059	0.063
	(0.05)	(0.06)	(0.05)	(0.03)
Trump Vote 2016	-34.621***	27.268***	-33.666***	-30.485***
	(0.52)	(0.61)	(0.51)	(0.35)
Constant	85.638***	35.408***	67.530***	73.931***
	(0.43)	(0.50)	(0.42)	(0.28)
R-squared	0.693	0.546	0.701	0.787
N	3106.000	3106.000	3106.000	3106.000

$^{***}p < 0.001$, $^{**}p < 0.01$, $^{*}p < 0.05$

policy than their high exposure peers, exhibiting a one-point increase in support for offshore drilling, a three-point reduction of support for making climate change a priority. Low exposure carbon economy communities (Quadrant III) are least supportive of climate policy, with an almost two-point reduction in support for limiting CO2 emissions, an almost four-point increase in support for offshore drilling, and a three-point reduction in support for making climate change a priority compared to the Quadrant I communities. The high exposure carbon economy communities provide more support for climate policy than their low exposure carbon economy peers, but less support than knowledge economy communities with high and low exposures. These results are robust to the inclusion and exclusion of the unemployment rate and Trump's 2016 vote share.

The carbon-climate cleavage structures political division over climate change policy. High exposure knowledge economy communities offer much more support for climate change policy than low exposure carbon economy communities.

3.2.2 Presidential Elections

Community location on the Carbon-Climate space correlates with Trump's vote share in the 2016 and 2020 elections. Consider first average support for Trump in the four Quadrants (table 4). Support for Trump was strongest in Quadrant III and weakest in Quadrant I. Indeed, the gap is more than 25 points in both elections. Moreover, Trump had considerably more support in Quadrant IV counties than in Quadrant III counties. This is consistent with an underlying carbon-climate cleavage.

I then estimated multivariate models of Trump vote shares in 2016 and 2020. The dependent variable is the share of the popular vote captured by Trump in each election. Model specifications are identical to the climate change models reported above with one change. I control for each county's Republican-ness with the residuals generated by a statistical model of the prior presidential election in which I regress vote share against the dual economy and climate exposure measures. In the model of the 2020 election, Trump 2016 is the portion of Trump's 2016 vote share that is not explained by dual economy and climate exposure variables. In the 2016 election model, Romney 2012 is the portion of Romney's 2012 vote share that is not explained by the county's location in the Carbon-Climate space. This residual is intended to capture many of the unobserved factors in the electorate, such as partisanship, gender, race, and a bundle of identity-based attitudes toward minorities, that shape voters' support for Trump. The results are presented in table 5.

The models show the same results across the two elections. Trump's vote share increased in line with the importance of carbon-intensive jobs, of coal-fired electricity and of per capita industrial GHG emissions, and fell as a function of skill level and patents. In addition, support for Trump was significantly lower in high exposure counties than it was in low exposure counties. Notice also that Unemployment is always significant and negative; support for Trump was lower in high unemployment counties than in low unemployment counties. Romney's 2012 vote share and Trump's 2016 vote share are significant and carry positive signs. Higher support for Romney in 2012 correlates with higher support for Trump in 2016 and higher support for Trump in 2016 correlates

Table 5: The Carbon-Climate Cleavage and Presidential Elections

	2016	2020
Carbon Job Share	0.13***	0.14***
	(0.02)	(0.02)
Coal-fired Plants	0.11***	0.12***
	(0.004)	(0.00)
GHG Emissions	0.01***	0.02***
	(0.002)	(0.001)
Skill Level	-0.13***	-0.14***
	(0.001)	(0.00)
Patents	-0.00***	-0.00***
	(0.00)	(0.00)
Vulnerability.	-0.003***	-0.001***
	(0.00)	(0.00)
Unemployment	-0.03***	-0.03***
	(0.00)	(0.00)
Republican Share in Prior Election	0.87***	0.96***
	(0.01)	(0.00)
Constant	0.76***	0.77***
	(0.01)	(0.00)
R-squared	0.91	0.96
N	2921	2921

$^{***}p < 0.001$, $^{**}p < 0.01$, $^{*}p < 0.05$

with higher support in 2020. More importantly, economic characteristics and climate exposure remain statistically significant when we include these measures of support for Trump.

I estimated two additional models using the Quadrant categorical variables (see table 6). The high exposure knowledge economy communities are the excluded category. The models conform to our expectations. The low exposure knowledge economy communities (Quadrant II) offer no more support for Trump than their high exposure peers. Carbon economy communities, in contrast, offer significantly more support for Trump—as much as 20 points more—than the knowledge economy communities in both elections. Moreover, Trump support is stronger in low exposure carbon economy communities (Quadrant III) than in high exposure carbon economy communities (Quadrant IV). Both control variables return significant coefficients. Support for Trump in 2016 is a positive function of support for Romney in 2012 and support for Trump in 2020 is a positive function of support in 2016. Unemployment is significant, and the negative coefficient indicates that support for Trump declines as unemployment rises.

Table 6: The Carbon-Climate Cleavage and Support for Trump

	2016	2020
Low Vulnerabilty	0.01	-0.004
Knowledge Economy	(0.01)	(0.01)
High Vulnerability	0.16***	0.18***
Carbon Economy	(0.01)	(0.01)
Low Vulnerability	0.21***	0.20***
Carbon Economy	(0.01)	(0.01)
Unemployment	-0.02***	-0.02***
	(0.00)	(0.00)
Republican Share in Prior Election	0.85***	0.89***
	(0.01)	(0.01)
Constant	0.56***	0.58***
	(0.01)	(0.01)
R-squared	0.78	0.79
N	2921	2921

$^{***}p < 0.001$, $^{**}p < 0.01$, $^{*}p < 0.05$

4 Conclusion

Contemporary polarization of American politics results, in part, from the intersection of the dual economy and the climate crisis. The dual economy divides America into knowledge economy communities and carbon economy communities, with limited labor flows between them. American communities also have different exposures to climate change risk. Some communities are much more exposed to negative climate impacts than others. These two dimensions overlap to a considerable extent. Knowledge economy communities are often highly exposed to climate change impacts, and many carbon economy communities have low exposure to these impacts. This overlap gives rise to the carbon-climate cleavage.

The carbon-climate divide pits the two communities against each other over climate policy. Policy measures required to safeguard knowledge economy communities from climate change impacts, almost all of which encourage a reduction of fossil fuel consumption, necessarily pose a threat to the carbon-intensive industries upon which carbon economy communities depend. At the same time, failing to implement policies to address climate change to sustain the carbon economy allows the climate crisis to worsen and thereby imperils knowledge economy communities. We thus expect high vulnerability knowledge economy communities and low vulnerability carbon economy communities to hold sharply opposed preferences on climate change policy and to vote for pro and anti-climate change candidates in presidential elections.

The empirical analysis presented here is consistent with these expectations. High vulnerability knowledge economy communities tended to exhibit the strongest support for climate policy, both in the individual policy measures and in the general importance to be attached to the issue. And these communities provided the weakest support for Trump, a staunchly anti-climate candidate, in the 2016 and 2020 elections. In contrast, low vulnerability carbon economy communities provided the weakest support for climate policy. Moreover, these communities provided the strongest support for the climate change skeptic Trump in both elections. In addition, we saw that these opposing positions were moderated a bit in the low vulnerability knowledge economy communities, who were a bit less supportive of climate policy and a bit more supportive of Trump, and in the high vulnerability carbon economy communities, who were slightly more supportive of climate policy and slightly less supportive of Trump.

This theoretical argument and the empirical evidence stand in contrast to the prevailing narrative on American political polarization. This narrative holds that sociocultural concerns rather than concerns about economic transition or climate change drive polarization. Yet, recognizing that the intersection of the dual economy and the climate crisis is contributing to political division does not diminish the relevance of a sociocultural explanation. It does suggest, however, that we must begin to explore how these sociocultural and material concerns intersect and interact to shape political behavior. This is in line with Melcher (2021, 19), who finds that "economic self-interest has a systematic and important effect on the formation of redistributive, class, and racial attitudes of Americans," one that "rivals and occasionally supersedes the effect of...racial resentment, and party identification and political ideology."

The need for additional work along these lines is strengthened by the recognition that the demographic group most directly threatened by decarbonization is the very same group most likely to perceive a status threat from immigration and other social changes: adult white males with relatively little formal education. In the fossil fuel energy industry, for instance, white males dominate the labor force. "As of 2019, non-Hispanic whites were 88 percent of oil and gas drilling workers, 91 percent of coal miners, 78 percent of petroleum refinery workers, 88 percent of construction workers, and 85 percent of electrical power generation and transmission workers" (Sicotte 2021). A similar lack of diversity characterizes carbon-intensive manufacturing industries. White males account for close to seventy-five percent of the labor force in the auto industry, for instance (Coffin and Lawrence 2020). And the auto industry is unusually diverse compared to the other durable goods manufacturing industries that dominate the carbon economy.

Thus, shifting away from the carbon-intensive growth model removes the economic foundation that allowed white males with relatively little formal education to attain middle class status. The status threat that white males face, therefore, has an economic as well as a sociocultural component. This makes it challenging to determine the underlying concerns that motivate individual political behavior.

To be clear, I am not concluding that individuals are solely motivated by their economic interests as defined by their location in the carbon-climate space when they vote for a presidential candidate. Nor am I suggesting that individual attitudes about climate change an exclusive result of this location. Drawing any conclusions about individuals is invalidated by the ecological fallacy. Moreover, it has proven difficult to find robust evidence that individuals support candidates or take policy positions based solely on their narrow economic interest (see Mansfield and Mutz 2009; Rho and Tomz 2017). We have even less evidence that climate change has been a salient issue in presidential elections. For that reason, additional research on the carbon-climate cleavage must test at the individual level the causal hypothesis that varying locations in the dual economy and exposures climate change motivate political activity. Teasing out such causal relationships, and trying to untangle the connections between sociocultural and socioeconomic concerns in individual behavior will require a combination of survey experiments and community level case studies.

Yet, even recognizing this important limitation, the county-level evidence points strongly to a carbon-climate cleavage in American politics. The divide in American politics is similar to the spatial divide Arndt et al (2022) describe in their study of a center-periphery cleavage in climate change attitudes in the European Union. "On the one hand, the progressive, egalitarian, metropolitan wealthy middle classes concerned about climate change and the environment are likely to abandon traditional left parties and opt green. On the other hand, the 'left behind' low-income individuals residing in poorer regions have no incentive to support policies that hurt them financially. Thus, they may opt for radical alternatives such as populist right-wing parties or far left parties concerned with equity, fairness and distribution" (Arndt et al 2022, 22). Hence, traditional left-right divisions organized around class that have structured politics throughout the postwar period are being disrupted by the emergence of climate change and the associated policy remedies.

In the American context, this division, as well as the factors that are creating it, are reminiscent of previous episodes of polarization that emerged during periods of rapid transitions in socioeconomic structure. In the late 19th century the US shifted rapidly from a largely agrarian economy to an industrial economy (the original dual economy) and from a largely biomass based energy system to one based on fossil fuels. This transition gave rise to a significant populist revolt that pit western farmers against manufacturing and the western states against the northeast (see Frieden 1997). Populism in this era focused on critically important issues (gold, silver, and the monetary standard; commodity price stabilization), shaped presidential elections, and persisted from the 1880s through the 1930s. An even more extreme episode occurred in the mid-19th century as the US outlawed slavery and dismantled the oppressive economic model upon which the wealth of southern plantation owners rested. The demise of the slave plantation system pit sector against sector (cotton versus manufacturing and textiles) and region against region (southern states versus northern states) in ways that defined American politics (and that continue to do so). It is certainly the case that many southern whites who held no slaves opposed emancipation for reasons that had little to do with their narrow economic interests and much more to do with the status conferred by their identity as white men. Yet, nevertheless, most scholarship concludes that the underlying conflict concerned the maintenance of the slave plantation model in its current locations and its possible extension into other states, and not the individual racist views of impoverished southern white men.

Like our current era, these historical episodes saw a traditional economic sector and that drove economic growth and supported local incomes and wealth enter terminal decline and the transition give rise to political division and conflict that pit the declining economy against the expanding one. And in both cases, people living in communities dominated by the declining sector fought for policies that they believed would maintain the value of their property and sustain their existing standard of living. It might be useful to keep these historical cases in mind as America's transition away from the carbon economy, a transition that gains urgency from the climate crisis, gathers momentum.

5 References

1. Abramowitz, Alan, and Jennifer McCoy. 2019. "United States: Racial Resentment, Negative Partisanship, and Polarization in Trump's America." The ANNALS of the American Academy of Political and Social Science 681(1): 137–56.

2. Abramowitz, Alan, and Kyle L. Saunders. 2008. "Is Polarization a Myth?" The Journal of Politics 70(2): 542–55.

3. Aklin, M., Mildenberger, M. 2020. Prisoners of the Wrong Dilemma: Why Distributive Conflict, Not Collective Action, Characterizes the Politics of Climate Change. Global Environmental Politics, 20(4), 4–27.

4. Algan, Y., Guriev, S., Papaioannou, E., and Passari, E. 2017. The European Trust Crisis and the Rise of Populism. Brookings Papers on Economic Activity, 2017(2), 309–400.

5. Alt, J. E., and Gilligan, M. 1994. The Political Economy of Trading States: Factor Specificity, Collective Action Problems, and Domestic Political Institutions The Journal of Political Philosophy, 2(2), 165–192.

6. Ansolabehere, Stephen, Schaffner, Brian, Luks, Samantha, 2020, CCES Common Content, 2019, https://doi.org/10.7910/DVN/WOT7O8, Harvard Dataverse, V1, UNF:6:34vNKfe/vAMemliFcOkbvw== [fileUNF]

7. Arndt, Christoph, Daphne Halikiopoulou, and Christos Vrakopoulos. 2022. "The Centre-Periphery Divide and Attitudes towards Climate Change Measures among Western Europeans." Environmental Politics: 1–26.

8. Autor, David, David Dorn, Gordon Hanson, and Kaveh Majlesi. 2017. Importing Political Polarization? The Electoral Consequences of Rising Trade Exposure.

9. Autor, David H., David Dorn, and Gordon H. Hanson. 2016. "The China Shock: Learning from Labor-Market Adjustment to Large Changes in Trade." Annual Review of Economics 8(1): 205–40.

10. Baccini, Leonardo, and Stephen Weymouth. 2021. "Gone For Good: Deindustrialization, White Voter Backlash, and US Presidential Voting." American Political Science Review 115(2): 550–67.

11. Bachmann, V., Moisio, S. 2022." Reclaiming the knowledge society from "urban economization": Thinking with the Frankfurt School." Geographische Zeitschrift 110(2): 62.

12. Bartels, Larry M. 2020. "Ethnic Antagonism Erodes Republicans' Commitment to Democracy." Proceedings of the National Academy of Sciences 117(37): 22752–59.

13. Bechtel, Michael M., Federica Genovese, and Kenneth F. Scheve. 2019. "Interests, Norms and Support for the Provision of Global Public Goods: The Case of Climate Co-Operation." British Journal of Political Science 49(4): 1333–55.

14. Bergquist, Parrish, and Christopher Warshaw. 2019. "Does Global Warming Increase Public Concern about Climate Change?" The Journal of Politics 81(2): 686–91.

15. Berman, Sheri. 2021. “The Causes of Populism in the West.” Annual Review of Political Science 24(1): 71–88.

16. Brady Dennis, Brady and Steven Mufson 2019 In small towns across the nation, the death of a coal plant leaves an unmistakable void, Washington Post (March 28).

17. Broz, J. Lawrence, Jeffry Frieden, and Stephen Weymouth. 2021. “Populism in Place: The Economic Geography of the Globalization Backlash.” International Organization 75(2): 464–94.

18. California Energy Commission. 2019. Total System Electric Generation. https://www.energy.ca.g reports/energy-almanac/california-electricity-data/2020total-system-electric-generation/2019.

19. Campbell, Eryn et al. 2021. “Predicting the Importance of Global Warming as a Voting Issue among Registered Voters in the United States.” Current Research in Ecological and Social Psychology 2: 100008.

20. Coffin, David, and Amanda Lawrence. 2020. “Demographic Diversity in U.S. Automotive Manufacturing.”

21. Colantone, Italo, and Piero Stanig. 2018. “The Trade Origins of Economic Nationalism: Import Competition and Voting Behavior in Western Europe.” American Journal of Political Science 62(4): 936–53.

22. 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.

23. Dennis, Brady and Steven Mufson 2019. “In small towns across the nation, the death of a coal plant leaves an unmistakable void,” The Washington Post (March 28) https://www.washingtonpost.com/national/health-science/thats-what-happenswhen-a-big-plant-shuts-down-in-a-small-town/2019/03/28/57d62700-4a57-11e9-9663-00ac73f49662 story.html

24. Dunlap, Riley E. 2013. “Climate Change Skepticism and Denial.” American Behavioral Scientist 57(6): 691–98.

25. Dunlap, Riley E., Aaron M. McCright, and Jerrod H. Yarosh. 2016. “The Political Divide on Climate Change: Partisan Polarization Widens in the U.S.” Environment: Science and Policy for Sustainable Development 58(5): 4–23.

26. Egan, Patrick J., and Megan Mullin. 2017. "Climate Change: US Public Opinion." Annual Review of Political Science 20(1): 209–27.

27. Faust, Drew Gilpin. 1981. The Ideology of Slavery: Proslavery Thought in the Antebellum South, 1830–1860. Baton Rouge: LSU Press.

28. FEMA 2022. National Risk Index https://hazards.fema.gov/nri/data-resourcescsvDownload

29. Foster, C., and Frieden, J. 2017. Crisis of trust: Socio-economic determinants of Europeans' confidence in government. European Union Politics, 18(4): 511–535.

30. Frieden, Jeffry. 1997. "Monetary Populism in Nineteenth Century America: An Open Economy Interpretation." Journal of Economic History 57 (June): 367–95.

31. Gabe, Todd M. Jaison R. Abel, and Richard L. Florida. 2018. Can low-wage workers find better jobs?, Staff Report, No. 846, Federal Reserve Bank of New York, New York, NY.

32. Gaikwad, Nikhar, Federica Genovese, and Dustin Tingley. 2022. "Creating Climate Coalitions: Mass Preferences for Compensating Vulnerability in the World's Two Largest Democracies." American Political Science Review: 1–19.

33. Ganong, Peter, and Daniel Shoag. 2017. "Why Has Regional Income Convergence in the U.S. Declined?" Journal of Urban Economics 102 (November): 76–90.

34. Gelles, David and Hiroko Tabuchi 2022. "How an Organized Republican Effort Punishes Companies for Climate Action," New York Times (May 27) https://www.nytimes.com/2 blackrock-climate.html?referringSou

35. Guiso, L., Herrera, H., Morelli, M., and Sonno, T. 2019. Global crises and populism: the role of Eurozone institutions. Economic Policy, 34(97): 95–139.

36. Hacker, J. S., and Pierson, P. (2010). Winner-Take-All Politics: Public Policy, Political Organization, and the Precipitous Rise of Top Incomes in the United States. Politics Society, 38(2), 152–204.

37. Hacker, J. S., and Pierson, P. (2010). Winner Take All Politics: How Washington Made the Rich Richer–and Turned Its Back on the Middle Class. New York: Simon and Schuster.

38. Hart, P. Sol, and Erik C. Nisbet. 2012. "Boomerang Effects in Science Communication." Communication Research 39(6): 701–23.

39. Hiscox, Michael J. 2001. Class Versus Industry Cleavages: Inter-Industry Factor Mobility and the Politics of Trade. International Organization, 55(Winter), 1–46.

40. Hornsey, Matthew J., Emily A. Harris, Paul G. Bain, and Kelly S. Fielding. 2016. "Meta-Analyses of the Determinants and Outcomes of Belief in Climate Change." Nature Climate Change 6(6): 622–26.

41. Howe, Peter D., Matto Mildenberger, Jennifer R. Marlon, and Anthony Leiserowitz. 2015. "Geographic Variation in Opinions on Climate Change at State and Local Scales in the USA." Nature Climate Change 5(6): 596–603.

42. Howe, Peter D, Jennifer R Marlon, Matto Mildenberger, and Brittany S Shield. 2019. "How Will Climate Change Shape Climate Opinion?" Environmental Research Letters 14(11): 113001.

43. Hudson, Ray. 2015. "Uneven development, socio-spatial polarisation and political responses." London: Palgrave Macmillan, pp. 25-39.

44. Iversen, Torben, and David Soskice. 2015. "Democratic Limits to Redistribution: Inclusionary versus Exclusionary Coalitions in the Knowledge Economy." World Politics 67 (2): 185–225.

45. Jensen, J. Bradford, Dennis P. Quinn, and Stephen Weymouth. 2017. "Winners and Losers in International Trade: The Effects on US Presidential Voting." International Organization 71(3): 423–57.

46. Kahan, Dan M. 2015. "Climate-Science Communication and the Measurement Problem." Political Psychology 36: 1–43.

47. Lanzillotti, Robert F. 1971. The Automobile Industry. In The Structure of American Industry, ed. Walter Adams. New York: The MacMillan Company, 256–301.

48. Lewis, W. Arthur. 1954. "Economic Development with Unlimited Supplies of Labour." The Manchester School 22(2): 139–91.

49. Mansfield, Edward D., and Diana C. Mutz. 2009. "Support for Free Trade: Self-Interest, Sociotropic Politics, and Out-Group Anxiety." International Organization 63(3): 425–57.

50. McCright, Aaron M., and Riley E. Dunlap. 2011. "The Politicization of Climate Change and Polarization in the American Public's Views of Global Warming, 2001–2010." The Sociological Quarterly 52(2): 155–94.

51. Meckling, Jonas. 2021 Making Industrial Policy Work for Decarbonization. Global Environmental Politics 21(4).

52. Melcher, Cody R. 2021. "Economic Self-Interest and Americans' Redistributive, Class, and Racial Attitudes: The Case of Economic Insecurity." Political Behavior.

53. Miller, Gary, and Schofield, Norman. 2003. Activists and Partisan Realignment in the United States. American Political Science Review, 97(2): 245-260.

54. Moisio, Sami. 2018. Geopolitics of the Knowledge-Based Economy. Routledge.

55. Moretti, Enrico. 2013. The New Geography of Jobs. Boston: Mariner Books/Houghton Mifflin/Harcourt.

56. Mutz, Diana C. 2018. "Status Threat, Not Economic Hardship, Explains the 2016 Presidential Vote." Proceedings of the National Academy of Sciences 115(19): E4330–39.

57. National Interagency Fire Center. 2021. National Fire News. https://www.nifc.gov/fireinformatic

58. New York City, 2022. Community Development Block Grant Disaster Recovery. "Impact of Hurricane Sandy." https://www1.nyc.gov/site/cdbgdr/about/About

59. Newman, Benjamin J, Sono Shah, and Loren Collingwood. 2018. "Race, Place, and Building a Base." Public Opinion Quarterly 82(1): 122–34.

60. Nivola, Pietro S., and David W. Brady. 2008. Red and Blue Nation? Characteristics and Causes of America's Polarized Politics. Washington, D.C: Brookings Institution.

61. NYC Community Block Grant Disaster Recovery. N.d. Impact of Hurricane Sandy https://www1.nyc.gov/site/cdbgdr/about/AboutHurricaneSandy.page

62. Reny, Tyler T, Loren Collingwood, and Ali A Valenzuela. 2019. "Vote Switching in the 2016 Election: How Racial and Immigration Attitudes, Not Economics, Explain Shifts in White Voting." Public Opinion Quarterly 83(1): 91–113.

63. Rho, Sungmin, and Michael Tomz. 2017. "Why Don't Trade Preferences Reflect Economic Self-Interest?" International Organization 71(S1): S85–108.

64. Rodrik, D. 2014. Green Industrial Policy. Oxford Review of Economic Policy 30 (3): 469–491.

65. Rogers, Paul. 2022. "San Jose: $545 million project breaks ground to improve flood protection along south San Francisco Bay shoreline," Mercury News (April 14) https://www.mercurynews.com/2022/04/14/san-jose-545-million-project-breaksground-to-improve-flood-protection-along-south-san-francisco-bay-shoreline/

66. Sicotte, Diane. 2021. "Will the Green New Deal Bring About a 'Just Transition,' or Just Transition?" Footnotes 49(3).

67. Sides, John, Michael Tesler, and Lynn Vavreck. 2019. Identity Crisis: The 2016 Presidential Campaign and the Battle for the Meaning of America. Princeton: Princeton University Press.

68. Siegler, Kirk. 2019. "The Camp Fire Destroyed 11,000 Homes. A Year Later Only 11 Have Been Rebuilt," National Public Radio (November 9) https://www.npr.org/2019/11/09/77 camp-fire-destroyed-11-000-homes-a-year-later-only-11-have-been-rebuilt

69. Skinner, Rebecca R. 2019. State and Local Financing of Public Schools. Washington, DC.

70. Temin, Peter. 2017. The Vanishing Middle Class: Prejudice and Power in a Dual Economy. Cambridge: MIT Press.

71. Tyson, Alec 2020 How important is climate change to voters in the 2020 election? Pew Research Center (October 6). https://pewrsr.ch/2Sv32hg

72. United States Census Bureau. 2019. County Business Patterns: 2018. https://www.census.gov/da cbp.html

73. United States. Department of Transportation. 1981. The U.S. Automobile Industry: Report to the President from the Secretary of Transportation. Washington D.C.