U.S. States' Financial Vulnerability to Extreme Weather Disasters: The Role of States' Support for Climate Action

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ABSTRACT

According to the National Oceanic and Atmospheric Administration (NOAA), the United States experienced an annual average of 23 billion-dollar weather disasters between 2020 and 2024 – more than triple the annual average from 1980 to 2019. Although state governments differ in their institutional capacity and fiscal resilience, many have not adjusted their financial systems to match the escalating frequency and costs of these disasters, leaving them exposed to climate-related financial vulnerabilities. Using NOAA's billion-dollar disaster database from 2010-2023, we construct a panel of 700 state-year observations across all 50 U.S. states to estimate the financial impact of extreme weather disasters. We find that in these extreme disaster years, total tax revenue per capita declines by about 2.2%, with property and sales tax revenues falling by 8.9% and 1.2%, respectively. Conditioning on climate action support (CAS), the impact of extreme disasters on states with low CAS is comparable to these results. Importantly, the negative effects of extreme disasters are fully offset in states with high levels of CAS. Our results suggest that high CAS mitigates states' fiscal exposure to climate risk, highlighting a novel channel through which extreme weather and climate action support interact to shape public finances.

Keywords: Climate risk, extreme weather disasters, state government finances, tax revenues, political economy of climate policy, U.S. Congress Representatives' climate action votes

JEL Classifications: H71, Q54, Q58

Data Availability: The data used in this study are available from the public sources described herein.

1. Introduction

According to the National Oceanic and Atmospheric Administration's (NOAA) National Centers for Environmental Information (NCEI), the United States experienced an annual average of 6.5 billion-dollar weather disasters between 1980 and 2019 (Smith 2020b). From 2020 to 2024, that annual average more than tripled to 23 disasters.[1] Over this recent five-year period, major disasters caused an estimated $746.7 billion in damages – an amount equal to three-quarters of the previous decade's total losses and more than double the $335.3 billion cost of all disasters in the 1990s, adjusted for inflation.[2]

A growing body of research documents the wide-ranging economic impact of climate change. A meta-analysis of 87 studies published between 1994 and 2020 finds that climate change negatively affects gross domestic product (GDP), labor productivity, and sector-specific outputs (Tan, Zhou, Zheng, and Li 2021). Consistent with this, over 3,600 U.S. economists have agreed that climate change poses a serious economic threat requiring policy interventions to reduce global greenhouse gas (GHG) emissions (WSJ 2019).

Public opinion is also broadly aligned: a recent survey by Yale and George Mason University shows that a majority of registered U.S. voters – across the political spectrum –

[1] According to NOAA's NCEI, extreme weather disasters are large-scale natural catastrophic events that deviate from normal climate patterns, potentially causing widespread damage, disruption, or loss of life. These events, which include hurricanes, tornadoes, flooding, severe thunderstorms, wildfires, and longer-term changes in climate patterns (e.g., sea level rise, sustained severe droughts), are typically categorized by their intensity, duration, and the extent of their impact on people, property, and ecosystems. See NOAA's National Centers for Environmental Information for further details.

[2] These inflation-adjusted disaster cost assessments are developed using public and private sector sources and represent the costs that would not have been incurred had the event not taken place. These costs capture the total, direct costs (both insured and uninsured) of the weather and climate events, including: physical damage to residential, commercial, and municipal buildings, material assets within buildings, losses from business interruption or loss of living quarters; damages to public assets including roads, bridges, levees; electrical infrastructure, offshore energy platforms; agricultural assets, and wildfire suppression costs, among others. These disaster cost estimates are conservative, as they do not include the value of a statistical life lost; or losses to natural capital, supply chain, contingent business interruption costs, and healthcare-related costs. See NCEI's Billion-Dollar Weather and Climate Disasters for further details.

believe global warming should be a high or very high priority for the U.S. Congress (Leiserowitz, Maibach, Rosenthal, and Kotcher 2025). Despite this broad consensus, U.S. states' support for climate action varies widely – both across states and over time (Gillers 2024).

Importantly, despite the escalating frequency and costs of weather disasters, most states devote less than 1% of spending to climate risk management (The Pew Charitable Trusts 2025). Against this backdrop, we examine the association between extreme weather disasters and state finances, and whether state-level support for federal climate action– measured through the voting behavior of their representatives in the U.S. Congress – moderates this relationship.

Investigating state governments' financial vulnerability to extreme weather disasters is of particular interest for various reasons. First, state governments are a front-line defense against climate risks (Intergovernmental Panel on Climate Change (IPCC) 2022) and can enact policies and regulations that are more stringent than those at the federal level. Second, state governments bear primary responsibility for infrastructure financing and development as well as many aspects of environmental policy (Rabe 2013). Third, state governments are able to implement alternative climate policy approaches not contained in existing federal laws (Gilmore and St.Clair 2018; Goulder and Stavins 2010). Although weather disasters do not appear as an explicit line item in state general fund statements, they impose significant demands on already constrained public resources (Gilmore and St.Clair 2018). Therefore, as these disasters become more frequent and costly (IPCC 2022; NCEI 2024), it is increasingly critical for state governments to design effective financial responses and fiscal management to better adapt to and mitigate the financial shocks of such disasters.

Our study lies at the intersection of climate change, support for climate action, and state government finances. Accordingly, we collect data from various sources, including NOAA's

Billion-dollar Weather and Climate Disasters database, the Bureau of Economic Analyses (BEA), the League of Conservation Voters (LCV), and the U.S. Census Bureau's Annual Survey of State Government Tax Collections database, among others. We examine the impact of weather disasters on state finances of the 50 U.S. states over the 2010-2023 period, yielding a panel of 700 state-year observations. Our dependent variable – state finances – is proxied using Census Bureau data on tax revenues, with revenues scaled by state population to account for cross-state size differences.

We measure two independent variables, extreme weather disasters and states' support for climate action. For weather disasters, we use NOAA's billion-dollar disaster database to calculate each state's total estimated annual disaster costs, scaled by the prior year's gross state product (GSP). For each year in our sample, a state is classified as experiencing an extreme weather disaster if the scaled disaster costs exceed the average cost across all state-year observations in our sample. To capture states' support for climate action, we compile roll-call voting records of U.S. House and Senate representatives from 2010 to 2023 on bills proposing climate action. We collect these data from the LCV's annual National Environmental Scorecard reports.[3]

We find that extreme weather disasters are associated with statistically significant declines in state governments' tax revenue sources: total tax revenue falls by about 2.2%, with similar negative effects for key components — sales taxes (1.2%) and property taxes (8.9%) — and no detectable effect for income taxes. Conditioning on climate action support (CAS), the impact of extreme disasters on states with low CAS is comparable to these results. CAS moderates the impact of weather disasters on tax revenues: the interaction effect is positive and

[3] While state-level climate policies are often set by governors and state legislatures, Congressional voting patterns provide a consistent, longitudinal indicator of how states' representatives position themselves on federal climate action, which can shape both fiscal responses to extreme weather and access to intergovernmental support (e.g., see Bromley-Trujillo and Holman 2020). For more details on the LCV, see https://www.lcv.org/.

significant for total taxes, sales taxes, and property taxes, and is not significant for income taxes. Our analyses show that the declines in these sources of state government revenues caused by extreme weather disasters are fully offset for high-CAS states.

We conduct several sensitivity tests to assess the robustness of our main results, and our inferences are unchanged. These tests include using the midpoint estimate of NOAA's billion-dollar disaster cost data instead of the upper-bound (high) estimate; using the average roll-call voting records of both the U.S. House and Senate delegations instead of using only the U.S. House votes; using Yale's Climate Opinion Survey data instead of the state representatives' Congress voting records; and controlling for federal assistance from the Federal Emergency Management Agency (FEMA) and the U.S. Department of Housing and Urban Development (HUD). The results of both our main tests and robustness tests reveal a novel channel through which these extreme weather disasters and climate action support interact to shape public finances.

Our study contributes to the growing literature on the financial and economic impacts of state governments' climate risk exposure. Evidence from asset markets indicates that climate risk is priced. Prior research shows that climate risk affects the value of real assets and may trigger substantial revaluations. Gourevitch et al. (2023) estimate that residential properties exposed to flood risk are overvalued by US$121–$237 billion, depending on the discount rate. Baldauf, Garlappi, and Yannelis (2020) examine the effect of flooding projections and local climate-change beliefs on U.S. housing prices.[4] They find that homes exposed to sea-level rise trade at discounts, but only in counties where residents generally accept climate science, not in climate-

[4] Baldauf et al. (2020) employ three data sources for their empirical analyses: (1) scientific forecast data on sea levels obtained from NOAA's database for their flooding projections; (2) data on beliefs about climate change risk obtained from the Yale Climate Opinion survey question: "Do you think that global warming is happening?"; and proprietary data from Zillow on repeated home transactions, matched to sea-level rise projections.

contrarian counties.[5] These results highlight the role of climate beliefs in shaping the extent to which property tax bases erode. Murfin and Spiegel (2020) similarly find that U.S. homes exposed to projected sea-level rise sell at lower prices, although the effects are modest and vary across housing markets.

Collectively, the above studies underscore that climate shocks can disrupt both asset values and public-sector finances. Our study extends prior research by examining the relationship between extreme weather disasters and state government finances, focusing on the role of states' support – or lack thereof – for climate action. In doing so, our study both extends descriptive evidence beyond budget allocations and responds to Gilmore, Kousky, and St.Clair's (2022) call for research that examines institutional responses to climate-related risk.

We also contribute to the literature on politics and finance, which shows that political institutions shape financial outcomes (Butler, Fauver, and Mortal 2009; Engelberg, Henriksson, Manela, and Williams 2023). Our findings highlight that the fiscal impact of weather disasters depends critically on the extent of the states' support for climate action in the U.S. Congress. Taken together, our results establish a new channel through which climate risk interacts with political representation to influence public finances, with implications for the resilience of state budgets in the face of climate change.

Finally, we examine how extreme weather disasters affect state-government tax revenues. While prior research has emphasized the rising costs of these disasters and the financial vulnerabilities from the additional expenditures imposed on states, little attention has been paid

[5] Dunlap (2013) posits that some actors are open to evidence that supports climate change (i.e., skeptics), while others reject climate change categorically (i.e., deniers), thus viewing skepticism-denial as a continuum. The discussion of the distinction between skeptics and deniers is beyond the scope of this study. Therefore, herein we use the more neutral term, "contrarian," which includes both climate skeptics and deniers. See also O'Neil and Boykoff (2010) and Rahmstorf (2004).

to the lost revenues from these disasters. Most disaster-related expenditures are covered by the federal government (Congressional Research Service 2023, pg. 11), but any loss of state tax revenues is absorbed entirely at the state level, compounding their financial vulnerability. Miao, Hou, and Abrigo (2018) examine the fiscal effects of natural disasters on U.S. states from 1970 to 2013 and find that disasters primarily increase state expenditures and federal transfers, while total tax revenues remain largely unaffected. Their results show that fluctuations in different revenue components (e.g., temporary gains in sales taxes but losses in property taxes) tend to offset one another, leaving aggregate state revenues neutral. Importantly, their study covers a period before the sharp rise in the frequency, intensity, and costs of extreme weather disasters in the U.S.

Our study extends Miao et al.'s (2018) work in two key ways. First, we focus directly on tax revenue losses rather than broad fiscal aggregates, and demonstrate that extreme weather disasters reduce per capita tax revenues – especially from property and sales taxes – creating a significant source of fiscal vulnerability that Miao et al. did not emphasize. Second, we introduce the role of climate action support as a moderating factor, showing that states with stronger congressional backing for climate action are able to offset these tax revenue losses. To our knowledge, our study is the first to systematically analyze these tax revenue losses, addressing a critical gap in understanding the full fiscal consequences of extreme weather disasters on U.S. state finances.

2. Literature Review and Hypotheses Development

2.1 Weather Disasters and State Government Finances

Climate change, especially when extreme weather events grow more frequent and severe, threatens both short- and long-term economic growth and increases volatility. Such events can directly damage infrastructure, housing, and agricultural output, while also disrupting energy supply, transportation, and supply chains. Over time, indirect effects can accumulate, and recovery from some disasters may be only partial. Physical climate risks can reduce productivity and investment, especially in sectors vulnerable to climate variability, which contributes to slower growth and greater economic uncertainty (International Monetary Fund 2025).

Unlike corporations, states – and their counties and municipalities – are unable to relocate away from weather disasters. For instance, coastal states, such as Florida, Louisiana, and Texas, cannot relocate their infrastructure. Therefore, they cannot avoid the financial impact of coastal flooding caused by hurricanes as easily as a global company would by relocating their manufacturing plants (Painter 2020).

A study of 270 U.S. cities with populations of at least 100,000 finds that those facing the greatest climate threats are also the least prepared to address them (Chen et al. 2015). Consistent with these findings, Lu and Nakhmurina (2023) show that among 431 U.S. cities with elevated flood risk from 2013 to 2020, those with shorter planning horizons are more likely to exhibit an adaptation gap – that is, a shortfall between existing adaptation measures and those needed to reduce climate risk to acceptable levels. Although our inquiry focuses on states rather than cities, Chen et al.'s (2015) findings suggest that states likewise differ in their climate vulnerabilities (e.g., exposure, sensitivity, and coping capacity) and readiness (e.g., economic, governance, and social capacity to mobilize resources and implement adaptation actions).[6]

An emerging body of research examines the association between climate risk and public finances. Gilmore and St.Clair (2018) conduct a small-sample descriptive study using U.S. state governments' budget data for fiscal years 2014 through 2016 and find that climate mitigation and

[6] For further details, see the Notre Dame Global Adaptation Initiative (https://gain.nd.edu/).

adaptation spending comprises less than 1% of total expenditures in most states. They also find that, absent standardized guidelines, states prioritize short-term investments while underinvesting in long-term climate strategies. Building on this line of inquiry, Gilmore et al. (2022) provide a conceptual framework that highlights the dual fiscal pressures climate hazards create for local governments: reducing revenues (e.g., through property tax devaluation) and increasing expenditures (e.g., disaster relief, infrastructure repair).

States' financial vulnerabilities to extreme weather disasters include, among others, litigation risk, declining tax bases, and the uninsured or underinsured costs of catastrophes, such as floods, hurricanes, and wildfires. Weather disasters can also generate major casualty losses – for example, the destruction of a local employer or damage to a government facility by a tornado (Governmental Accounting Standards Board [GASB] 2024, §2250). In addition, permanent damage from floods or hurricanes may materially affect estimates of capital asset lives, residual values, and asset retirement obligations. Beyond these balance-sheet impacts, financial markets also price governments' exposure to climate risk. Painter (2020) and Goldsmith-Pinkham, Gustafson, Lewis, and Schwert (2023) find that counties and municipalities with greater climate risk exposure – particularly to sea-level-rise – face higher initial offering yields and underwriting fees on long-maturity municipal bonds, while short-maturity issues show no such premium. Together, these findings suggest that investors demand compensation for governments' long-horizon climate risk.

The above discussion suggests that the impact of weather disasters may be relevant to a state government's overall financial position, improvement or deterioration in financial position, and changes in the condition of infrastructure assets (GASB 2024, §2200). This discussion yields the following hypothesis, stated in the alternative form:

Hypothesis 1: State government finances are negatively affected by extreme weather disasters.

There are at least two reasons why our hypothesis may not obtain. First, in U.S. microdata, Addoum, Ng, and Ortiz-Bobea (2020) find no significant effect of extreme temperature exposure on establishment-level sales or productivity and no firm-level relation with sales, productivity, or profitability, consistent with substantial adaptation in a wealthy economy. However, it is unclear whether these findings extend to state governments, which have far less flexibility to relocate away from disaster-prone areas. Second, federal safety-net transfers can offset local income losses for many years after disasters, potentially blunting state revenue declines. For example, Deryugina (2017) shows that hurricanes trigger large increases in non-disaster transfers whose present value exceeds direct disaster aid. Yet, federal funding for public assistance programs, which reimburse states and local governments for costs such as debris removal, first responders, and other immediate needs, is often strained, especially after extreme disasters (Bogage and Joselow 2024).

2.2 Divergence in States' Support for Climate Action

Research findings from the politics and finance literatures show that political institutions shape financial outcomes (Butler, Fauver, and Mortal 2009; Engelberg, Henriksson, Manela, and Williams 2023). We examine climate action support for two reasons. First, climate change has been labeled a "super-wicked" problem, in that it lacks straightforward policy solutions and requires various complex policies that could together mitigate its adverse consequences (Rittel and Webber 1973; Levin, Cashore, Bernstein, and Auld 2012; Peters 2018; Keohane and Victor 2016). Second, recent studies show that climate action support has been increasingly diverging across U.S. states (Smith, Bognar, and Mayer 2024; Gilmore and St.Clair 2018; Mayer and

Smith 2023; Jenkins-Smith et al. 2020; Boudet et al. 2020). According to these studies, this divergence is driven, at least in part, by increasing polarization along party-political lines (Montagnes, Peskowitz, and Sridharan 2025; Smith et al. 2024; Bromley-Trujillo, Holman, and Sandoval 2019). This polarization mirrors the shifts in federal support for climate policies during the Obama (Executive Order No. 13693, 2015) and Biden (Public Law 117-169 117th Congress, 2022) administrations, and against climate policies in the Trump administration (Executive Order No. 13783, 2017; Executive Orders No. 14154 and 14262, 2025).

Using evidence from five decades of U.S. surveys, Smith et al. (2024) show that today's partisan divide is roughly symmetric but is historically driven by asymmetric shifts. That is, Republicans have shifted away from pro-environmental positions beginning in the early 1990s, followed by a recent greening among Democrats in the mid-2010s. Mayer and Smith (2023) find that different dimensions of partisan identity strongly influence climate action support, suggesting that similar exposures can produce very different policy preferences depending on political contexts. Jenkins-Smith et al. (2020) report that climate beliefs on the political right are less stable over time than those on the left, which makes right-leaning populations more responsive to political messaging and short-term events. Boudet et al. (2020) show that extreme weather events do not automatically generate climate action support; instead, discussion of climate change increases only when such events are explicitly linked to climate change and when the partisan context is favorable.

Using 25,000 state-legislator-bill dyads from 2011 to 2015, Bromley-Trujillo, Holman, and Sandoval (2019) show that localized temperature anomalies – which raise the salience of climate change – increase Democratic legislators' propensity to sponsor climate bills. In contrast, Republican legislators are largely unresponsive to the same climatic conditions. Their findings indicate strong partisan conditioning of agenda-setting and highlight that exposure to weather disasters alone is insufficient to shape policy agendas. This implies that hotter districts do not automatically translate into more climate-policy support. Instead, climate-change exposure translates into sponsorship mainly where partisan context is supportive, helping explain the divergence in states' climate action support.

Prior studies link differences in climate-risk budget spending to political party affiliation (Mayer and Smith 2023; Jenkins-Smith et al. 2020; Boudet et al. 2020). Gilmore and St.Clair (2018) argue that, while some states have shown a willingness to adopt climate policies, these policies may be politically unpopular in other states. Consistent with this, research shows that, relative to Democrat-led states, Republican-led states place a lower probability on climate risk. Therefore, while Democratic-led states seek to incorporate environmental initiatives (Kishan and Moran 2022), Republican-led states seek to push back on them (Ropes & Gray 2022) and to coordinate opposition to climate actions (Gelles 2022; Coleman and Rosenberg 2022).

Recent evidence points to substantial alignment between legislators and their constituents. Matsusaka (2025) matches individual roll-call votes to district-level referendum outcomes on the same laws and finds legislators voted with their district's majority/median 66% of the time. Because his sample consists of laws controversial enough to be challenged via referendum – citizen-initiated elections that can uphold or repeal a recently passed law after enough signatures are gathered – this 66% is viewed as a lower bound on overall congruence. Canes-Wrone, Brady, and Cogan (2002) demonstrate that legislators who vote more consistently with their party than with the public's opinion lose electoral support and face greater risks of defeat, even in safe seats. Ansolabehere and Kuriwaki (2022) show that voters do hold members accountable for specific roll-call votes. That is, when voters perceive agreement with their representatives, they are more likely to support them.

Findings from the research discussed above have direct implications for understanding the association between extreme weather disasters and state-government finances. Just as partisan alignment and political commitment may determine whether legislators support climate action, they may also shape how states absorb or offset the financial consequences of weather disasters. Where state representatives in Congress consistently support climate action, their alignment may signal greater willingness to mitigate climate-related financial shocks. Conversely, where state representatives oppose climate action, state governments may be left more exposed, with climate shocks translating more directly into tax revenue losses.

Building on the findings from prior research that exposure to weather disasters alone does not automatically guarantee climate action support, we expect a similar moderating effect in the state governments' financial domain: weather disasters are more likely to erode state tax bases in states that show little to no climate action support, while the financial impacts of these disasters should be mitigated in states that support climate action.

This discussion yields the following interaction hypothesis, stated in the alternative form:

Hypothesis 2: The negative impact of extreme weather disasters on state government finances is weaker in states with higher levels of support for climate action than in states with lower levels of support.

There are at least two reasons why our hypothesis may not obtain. First, a study that examines the flood risk adaptation of 431 U.S. cities over 2013-2020 finds no association between the cities' political party affiliation and their likelihood of having a flood risk adaptation gap (Lu and Nakhmurina 2023). The authors posit that a potential explanation of their findings is that, even though Republican-led cities are less likely than Democrat-led cities to specifically mention "climate change" or to explicitly identify certain activities as climate-related, they may nevertheless address flood risks that can impact the local economy and residents' well-being.

Second, findings from research that examine the association between legislators' revealed policy positions – via their votes – and their states' public opinion are mixed. Ansolabehere, Snyder, and Stewart (2001a; 2001b) show that while legislators' roll-call behavior reflects both personal preferences and district opinion, national party pressures often dominate, especially on close or procedural votes. These studies' findings underscore that congressional voting reflects a complex mix of constituency preferences, party influence, and electoral accountability, rather than simple responsiveness to majority opinion.

3. Data and Methodology

3.1 Sample

We examine the impact of weather disasters on finances of the 50 U.S. states over the 2010-2023 period, yielding 700 state-year observations. We exclude U.S. territories and Washington, D.C. from our analyses because their fiscal structures, budgeting rules, and funding mechanisms are not fully comparable to those of the 50 states. Our sample period begins in 2010 because there has been a sharp increase in the frequency and intensity of billion-dollar weather disasters over the last 15 years. Specifically, there were 59 such disasters in the 2000-2009 decade (CPI-adjusted), almost doubling to 119 in the 2010-2019 decade (Smith 2020b), and 115 such disasters in the 2020-2024 period.[7] Thus, there is a growing concern about the state governments' ability to operate effectively in the disasters' aftermath (GAO 12-838, 2012).

[7] See NOAA's National Centers for Environmental Information for further details.

We use multiple data sources to construct our measures. First, we use the taxes collected by the states as our measure of state governments' finances and obtain tax revenue data from the Annual Survey of State Government Tax Collections database, published by the U.S. Census Bureau.[8] We collect data on total tax revenues and three major components of total taxes, namely, total income taxes (which include personal and corporate income taxes), sales taxes, and property taxes. To account for macroeconomic differences associated with the size of the states' economies (IMF 2025), we scale all the tax revenues by the state's population for each year in our sample. We obtain the state population data from the U.S. Census Bureau's National and State Population Estimates series.

We obtain data on weather disasters from NOAA's Billion-dollar Weather and Climate Disasters database (Smith 2020). NOAA provides a range of cost assessments based on several public and private data sources to capture the total, direct inflation-adjusted costs (both insured and uninsured) of the weather and climate disasters (e.g., tropical cyclones, inland floods, drought and heat waves, wildfires, crop freeze events and winter storms). We use NOAA's upper bound of the cost estimate for each weather disaster attributable to each state as our measure of disaster costs. We obtain the GSP data from the Bureau of Economic Analysis (BEA).

To proxy for the states' support for climate action, we use data on the roll-call voting records of the states' representatives in the U.S. Congress on bills that advance climate action legislation, compiled annually by the League of Conservation Voters (LCV). LCV publishes consistent annual vote records on the bills, and the data are used by prior research to track members' positions over time (e.g., Brulle, Carmichael, and Jenkins 2012; Garrett and Sobel 2003; Ilinitch, Soderstrom, and Thomas 1998). LCV annually calculates a score separately for

[8] For more information, see: https://www.census.gov/programs-surveys/stc.html.

the Senate and the House for each state. The scores are calculated by state by aggregating the votes as a proportion of the maximum possible votes on the issue in the House or the Senate. A higher score indicates greater support for climate action.[9]

3.2 Empirical Models and Variable Definitions

To analyze the effects of weather disasters on state finances (H1), we estimate the following specification:

$$TAXREV_{i,t} = \beta_0 + \beta_1 WDSTR_{i,t} + STATE\ FE_{i,t} + YEAR\ FE_{i,t} + \varepsilon_{i,t} \qquad (1)$$

where *TAXREV* is the per capita tax revenues collected by state *i* in fiscal year *t*. In addition to total tax revenues, we analyze three disaggregated categories: total income tax, sales tax, and property tax collected by state *i* in year *t*. We use the natural logs of all per capita tax variables because per-capita tax data are right-skewed. To create our extreme weather disaster variable, *WDSTR*, we first divide each state's total cost of billion-dollar disasters in a year by its one-year-lagged gross state product (GSP). The average across our sample is 0.89%. We then define *WDSTR* as a binary indicator variable equal to 1 if, for state *i* in year *t*, the sum of the damage costs for all billion-dollar weather disasters, as a percentage of one-year-lagged GSP, is greater than 0.89%, or 0 otherwise.

To analyze the effects of weather disasters on state finances as a function of the states' climate action support (H2), we estimate the following specification:

$$TAXREV_{i,t} = \beta_0 + \beta_1 WDSTR_{i,t} + \beta_2 CAS_{i,t} + \beta_3 (WDSTR \times CAS)_{i,t} + STATE\ FE_{i,t} + YEAR\ FE_{i,t} + \varepsilon_{i,t} \qquad (2)$$

[9] LCV uses a panel of experts to identify key issues that impact the environment (LCV 2024).

where *CAS* is a binary indicator variable equal to 1 if, for state *i* in year *t*, at least 60% of the House votes by the state's representatives in Congress supported climate action, or 0 otherwise. We adopt a 60% cutoff to mirror the U.S. Senate's supermajority standard for invoking the cloture rule on most matters (i.e., the Senate procedure to end debate and move to a vote, which on most legislation requires three-fifths – 60 votes – of all Senators). Thus, this is a widely recognized threshold for advancing major policy.[10] All our estimates include state and year fixed effects. We cluster our standard errors by state.

4. Descriptive Statistics and Results

4.1 Descriptive Statistics

Table 1 provides summary descriptive statistics of our variables for the full state-year sample and the underlying data used in constructing our variables. The mean (median) GSP per capita over our 2010-2023 sample period is $56,850 ($55,659). The mean (median) weather disasters inflation-adjusted cost is 0.89% (0.24%) of the one-year lagged state GSP. At the 95th percentile, however, these disasters cost 3.41% of lagged GSP. The mean total tax revenue per capita (*Total Tax PC*) of $3,185 is significantly higher than the median total tax revenue of $2,872, indicating the presence of some states with large *Total Tax PC*. The mean and median are similar for income tax per capita (*Income Tax PC*) and sales tax per capita (*Sales Tax PC*), indicating the presence of few outliers. However, the mean of $130 for property tax per capita (*Prop Tax PC*) is almost eight times larger than the median of $16.40. Notably, ten states levy property taxes at the city and county levels but not at the state level. Therefore, we have fewer observations for property taxes.[11] Overall, because the tax data per capita are very right skewed,

[10] For further details, see "Filibusters and Cloture in the Senate," available here: https://www.congress.gov/crs-product/RL30360.

[11] In addition, we lose one observation in the total tax and sales tax regressions because these data were not available for New York state for fiscal year 2023 at the time of data collection.

we use the natural logs of the taxes per capita in our regression specifications. As shown in Table 1, the natural logs of total *taxes* (*TTaxpc_ln*), income taxes (*IncTaxpc_ln*), sales taxes (*SalesTaxpc_ln*), and property taxes (*PropTaxpc_ln*) are better distributed.

The mean (median) House vote (*HouseVote*) score is 44.40% (37%), indicating that fewer than half of the state representatives' House votes supported climate action. However, at the 75th quartile, just over 70% of the votes supported climate action. In contrast, almost 51% of the votes in the Senate (*SenateVote*) supported climate action, on average, increasing to 94% of the votes at the 75th quartile.

Table 2, Panel A and Figure 1 show the frequencies of weather disasters (*WDSTR*) and climate action support (*CAS*) by state over our sample period of 2010-2023. Of the 700 state-year observations in our sample, 161 (23%) had aggregate disaster costs, as a percentage of lagged GSP, greater than 0.89% (i.e., these observations are classified in the *WDSTR* = 1 group). Over the 14-year sample period, the state of Oklahoma experienced the most years with weather disasters (i.e., ten), while ten states (20%) recorded no weather disasters over this period.

Regarding climate action support (*CAS*), Panel A shows that there were 21 states (42%) for which the votes by their representatives in the House were less than 60% in support of climate action for all 14 years in our sample period. In contrast, there were only 10 states (20%) for which the votes by their House representatives were at least 60% in support of climate action over the same period. Figure 1 shows a U.S. state map that overlays the frequencies of weather disasters on the percentage of House votes in the U.S. Congress in support of climate action. The figure shows that, paradoxically, the states with the highest number of weather disasters also have the lowest percentages of House representatives' votes in support of climate action.

Table 2, Panel B presents the 14-year distribution of the weather disasters in our sample. The highest frequency of weather disasters occurred in 2011, when 21 of the 50 states experienced such events. The lowest frequency of weather disasters occurred in 2010, when only three states experienced such events. Regarding climate action support, except for 2010, the number of states with at least 60% of the House votes in support of climate action has been fewer than the number of states with less than 60% of the votes in support. Overall, however, Panel B shows an increasing trend in the number of states voting in support of climate action, as evidenced by the higher numbers in the most recent years relative to the earlier years.

Table 3 provides univariate tests comparing our variables by *WDSTR* group. Overall, except for *Sales Tax PC* and *SalesTaxpc_ln*, the differences in the means and/or medians between the *WDSTR* = 1 and *WDSTR* = 0 groups are in the expected direction and statistically significant ($p < 0.10$ or better, two-tailed). We highlight some of the results here. Across the entire sample, both the mean and median *GSP Per Capita* are significantly lower for the *WDSRT* = 1 group compared to the *WDSRT* = 0 group. Disaster costs as a percentage of lagged GSP (*Disaster Cost %*) for the *WDSRT* = 1 group are an order of magnitude higher, both at the mean and median, than those for the *WDSRT* = 0 group (mean: 3.15% vs. 0.215%; median: 1.88% vs. 0.135%). Further, across the distribution, all per capita tax revenues are significantly lower for the *WDSRT* = 1 group than for the *WDSRT* = 0 group. The difference in *Property Tax PC* between the two groups is the most striking: the median *Property Tax PC* for the *WDSRT* = 1 group ($8.14) is only one-third of the median of the *WDSRT* = 0 group ($25.9).

Paradoxically but consistent with Figure 1, Table 3 shows that *HouseVote*, which we use to construct our proxy for climate action support (*CAS*), is significantly higher for the *WDSRT* = 0 group than for the *WDSRT* = 1 group, with a mean (median) of 49.2 vs. 28.3 (45 vs. 24) (p = 0.00). Similarly, *SenateVote*, which we use in robustness tests of *CAS*, is also higher for the *WDSRT* = 0 group than for the *WDSRT* = 1group, with a mean (median) of 56.1 vs. 32.9 (57 vs. 18) (p = 0.00). Figure 2 plots the cost of weather disasters as a percentage of one-year lagged GSP across the two groups. Disaster costs are rising across both groups, but they are rising more for the *WDSTR* = 1 group relative to the *WDSTR* = 0. The slope of the trend line for the *WDSTR* = 1 group (0.1134) is almost three times the slope of the trend line for the *WDSTR* = 0 group (0.0044).

Table 4 shows the Spearman correlations for our variables and we highlight some results here. *WDSTR* is significantly and negatively correlated with *TTaxpc_ln* and *IncTaxpc_ln*, but not with *SalesTaxpc_ln* or *PropTaxpc_ln*. Except for *PropTaxpc_ln*, *CAS* is significantly and positively correlated with all the tax variables, indicating that states with high support for climate action policies are likely to be high-tax burden states. Consistent with Figure 1, *CAS* and *WDSTR* are significantly and negatively correlated.

4.2 Main Empirical Tests and Results

4.2.1 Test of Hypothesis 1

Hypothesis 1 predicts that state government finances are negatively affected by extreme weather disasters. Thus, our first set of analyses examines the impact of extreme weather disasters (*WDSTR*) on the states' tax revenues per capita. Our analyses include controls for state and year fixed effects. Panel A of Table 5 shows results for H1. We find that the *WDSTR* coefficient for total tax revenue per capita, *TTaxpc_ln* (Col. 1) is negative and significant (-0.0220, $p < 0.10$). This translates to an average loss of total tax revenue per capita of approximately 2.2% relative to state-years without weather disasters. We also examine the impact of weather disasters on three key components of state governments' tax revenue sources:

total income tax revenues (*IncTaxpc_ln*), total sales tax (*SalesTaxpc_ln*), and property taxes (*PropTaxpc_ln*). As shown in Table 5, Panel A, the *WDSTR* coefficients for *SalesTaxpc_ln* (-0.0119, Col. 3) and for *PropTaxpc_ln* (-0.0892, Col. 4) are negative and significant ($p < 0.05$). These results translate to an average loss of sales tax and property tax revenues per capita of approximately 1.19% and 8.92%, respectively, relative to state-years without weather disasters. We find no evidence of an association between *WDSTR* and income tax revenues (*IncTaxpc_ln*) (Col. 2). Taken together, our results support H1: tax revenues decline in years with extreme weather disasters.

4.2.2 Test of Hypothesis 2

Hypothesis 2 predicts that the negative impact of extreme weather disasters on state government finances is weaker in states with higher levels of support for climate action than in states with lower levels of support. Panel B of Table 5 shows our regression results to test for H2. First, Panel B shows that, except for *IncTaxpc_ln* (Col. 2), the coefficients for *WDSTR* are negative and larger in magnitude than the *WDSTR* coefficients in Panel A. The *WDSTR* coefficient for *TTaxpc_ln* (Col. 1) is negative and significant (-0.0296, $p < 0.01$). This indicates that in extreme weather disaster years, states with low climate action support (*CAS*) lose almost 3% of total tax revenues relative to years without weather disasters. Similarly, extreme weather disasters are associated with declines in *SalesTaxpc_ln* (Col. 3) of 1.51% ($p < 0.05$) and declines in *PropTaxpc_ln* (Col. 4) of 10.5% ($p < 0.05$) for states with low *CAS*. We find no evidence of an association between *CAS* and our four tax revenue variables, indicating that there is no difference in tax revenues between high and low climate action support states.

We next examine the impact of extreme weather disasters for states with high climate action support (i.e., *WDSTR* × *CAS* in equation 2). As shown in Panel B, Table 5, the interaction coefficients are positive and statistically significant for *TTaxpc_ln* (Col 1: 0.0532; $p < 0.01$), *SalesTaxpc_ln* (Col. 3: 0.0233; $p < 0.10$), and *PropTaxpc_ln* (Col. 4: 0.093, $p < 0.10$). These results indicate that the average declines in total tax revenue (2.96%), sales tax revenue (1.51%), and property tax revenue (10.5%) caused by the extreme weather disasters are offset for states with high levels of climate action support. We find no evidence of an association between extreme weather disasters and income tax revenues (*IncTaxpc_ln*, Col. 2). Taken together, our results support H2.

Having documented our tests that support H2, we further examine: does high climate action support fully offset the declines in these tax revenue sources caused by extreme weather disasters? To examine this question, we test the null hypothesis that the sum of the coefficients for *WDSTR* and the *WDSTR* × *CAS* interaction in equation 2 is equal to zero. As shown in Table 5, Panel B, the results of F-tests for *TTaxpc_ln* (1.87), *SalesTaxpc_ln* (0.31), and *PropTaxpc_ln* (0.10) are not statistically significant, indicating that we cannot reject the null hypothesis. These results are consistent with the argument that states with high climate action support are able to fully offset the negative impacts of extreme weather disasters on their total tax revenues, sales taxes, and property taxes. Taken together, these results support H2.

4.2.3 Summary and Discussion

We find that extreme weather disasters (*WDSTR*) are associated with statistically significant declines in state governments' tax revenue sources: total tax revenue falls by about 2.2%, with similar negative effects for key components – sales taxes (1.2%) and property taxes (8.9%) – and no detectable effect for income taxes (*IncTaxpc_ln*). Conditioning on *CAS* (H2), the impact of extreme disasters on states with low *CAS* is comparable to these results. *CAS* shows no main effect on any tax revenue variables, but it does moderate the impact of weather disasters: the *WDSTR* × *CAS* interaction effect is positive and significant for total taxes, sales taxes, and property taxes, and is not significant for income taxes. F-tests fail to reject the null hypothesis that *WDSTR* + (*WDSTR* × *CAS*) = 0 for total taxes, sales taxes, and property taxes, consistent with high-*CAS* states fully offsetting the declines in these sources of state government revenues caused by extreme weather disasters. Overall, the evidence supports both H1 and H2: extreme weather disasters depress state revenues on average, and higher climate action support mitigates (and can fully offset) those losses for total taxes, sales taxes, and property taxes.

4.2.4 Robustness Tests and Sensitivity Analyses

We conduct several sensitivity analyses to assess the robustness of the main results. The first set of analyses uses the midpoint of the disaster cost estimates instead of the upper bound. The average of the midpoint of the disaster cost estimates for all billion-dollar disasters, as a percentage of lagged GSP, across all state-years is 0.65%. Thus, we code *WDSTR* as one if the sum of the damage cost estimates for all billion-dollar disasters for state *i* in year *t* is greater than 0.65%, zero otherwise. We first examine our empirical tests for H1. As shown in Table 6, Panel A, the *WDSTR* coefficient for total tax revenue per capita (*TTaxpc_ln*) is negative and significant (Col. 1: -0.0232; $p < 0.10$). This translates to an average loss of total tax revenue per capita of 2.32%. Similarly, the *WDSTR* coefficients for *SalesTaxpc_ln* (-0.0124, Col. 3) and for *PropTaxpc_ln* (-0.103, Col. 4) are negative and significant ($p < 0.05$). These results translate to an average loss of sales and property tax revenues per capita of 1.24% and 10.3%, respectively. We find no evidence of an association between *WDSTR* and income tax revenues (*IncTapc_ln*). Taken together, the results using the midpoint of the disasters' cost estimates are similar to our main results that use the upper-bound of the disasters' cost estimates (see Table 5, Panel A), thus supporting H1.

We next examine our empirical tests for H2. As shown in Panel B of Table 6, similar to our main results, the coefficient on *WDSTR* is negative and significant for *TTaxpc_ln* (Col. 1: -0.031), *SalesTaxpc_ln* (Col. 3: -0.0158), and *PropTaxpc_ln* (Col. 4: -0.121) (all p-values < 0.05). Further, we find no evidence of an association between *CAS* and our four tax revenue variables.

Panel B also shows that the *WDSTR* × *CAS* interaction coefficient is positive and significant for *TTaxpc_ln* (Col. 1: 0.0544, p < 0.01), *SalesTaxpc_ln* (Col. 3: 0.0238, p < 0.10), and *PropTaxpc_ln* (Col. 4: 0.107, p < 0.10). We find no evidence of a *WDSTR* × *CAS* interaction for *IncTaxpc_ln* (Col. 2). Finally, looking at tests of the null hypothesis that the sum of the coefficients for *WDSTR* and *WDSTR* × *CAS* is equal to zero, Panel B shows that the F-test results are not statistically significant for any of the tax revenue sources. Taken together, our results are comparable in magnitude and significance to the main results (Table 5, Panel B), thus supporting H2.

As a robustness check on House votes as a measure for climate action support, we use two alternative constructs. First, we use data from the Yale Climate Opinion survey, consistent with prior research that shows that opinion surveys capture constituent preferences and are complementary to constituent votes (e.g., see Matsusaka 2025). We construct a binary indicator variable, *CAS_YCO*, using the survey question that is most comparable to the House voting record on climate action support issues: "*Do you think the U.S. Congress should be doing more or less to address global warming?*" We code *CAS_YCO* equal to one if, for state *i* in year *t*, at least 60% of the respondents (i.e., a super-majority) selected "More" or "Much more" in response to the question, and code *CAS_YCO* equal to zero if the respondents selected "Currently doing the right amount," "Less," or "Much less." For our second alternative construct for climate action support, we calculate the average of the Senate and House votes by state-year (i.e., *AvVote*).

As shown in Panel A of Table 7, all four measures (*CAS_YCO*, *SenateVote*, *HouseVote*, and *AvVote*) are positively and significantly correlated (at $p < 0.01$ or better), with correlations ranging from 0.61 to 0.92. Notably, the correlation between *HouseVote* and *CAS_YCO* is 0.70, which validates our expectation that *HouseVote* reasonably captures constituents' climate action support preferences.

As shown in Panel B of Table 7, our regression results are inferentially similar to our main results (reported in Table 5). The coefficients are comparable in magnitude and significance to the coefficients for our main results. Similar to our main results, we find a significant decline in tax revenues per capita across all categories of tax revenues, other than income taxes, caused by extreme weather disasters (at $p < 0.05$ or better). The *WDSTR* × *CAS_YCO* coefficients are positive and statistically significant for *TTaxpc_ln* (Col 1: 0.0331; $p < 0.05$) and *PropTaxpc_ln* (Col. 4: 0.292; $p < 0.05$). These results indicate that the average declines in total tax revenue (2.92%) and property tax revenue (14.3%) caused by the extreme weather disasters are offset for states with high levels of climate action support. We find no evidence of an interaction for income tax revenues (*IncTaxpc_ln*, Col. 2) and sales tax revenues (*SalesTaxpc_ln*, Col. 3). Finally, results of the F-tests (for the null hypothesis that the sum of the coefficients for *WDSTR* and the *WDSTR* × *CAS_YCO* interaction in regression 2 is equal to zero) are not statistically significant, consistent with our main results. Taken together, our results support H2. Finally, sensitivity analysis results using average votes in Congress (*AvVote*) are similar in magnitude and significance to our main results (untabulated).

Our final sensitivity analysis examines the impact of federal aid on tax revenues when weather disasters hit states (Table 8). We obtain federal disaster aid data from the Disaster Dollar database, maintained by the Carnegie Endowment for International Peace. This database tracks major sources of grant-based federal funding given by FEMA and HUD by disaster. Since federal aid grants are provided only for major disasters, we lose observations for all non-disaster years as well as for disaster years where no federal aid was given. Thus, our sample size for these analyses shrinks from 699 to 447 observations for total taxes, and from 503 to 327 for property taxes.

As shown in Table 8, our results are inferentially similar to the main analyses reported in Table 5. The *WDSTR* coefficients for total tax revenues, sales tax, and property taxes are negative and significant (at $p < 0.10$ or better), indicating that these tax revenue sources decline significantly when there are weather disasters, but only for states with low climate action support. The coefficients for *WDSTR* and for *CAS* are very similar to those in Table 5. Notably, the *WDSTR* coefficient for *PropTaxpc_ln* (-0.167, Table 8, Col. 4) is larger than the *WDSTR* coefficient for *PropTaxpc_ln* in our main results (-0.105, Table 5, Col. 4). This result suggests that federal aid is only provided for major weather disasters.

5. Summary and Conclusion

Although state governments differ in their institutional capacity and fiscal resilience, many have not adjusted their financial systems to match the escalating frequency and costs of extreme weather disasters, leaving them exposed to climate-related financial vulnerability. Most states devote less than 1% of spending to climate risk management. Yet, state governments are a key defense against climate risks and have flexibility in developing state-contingent policies and regulations. Moreover, state governments bear notable responsibility for infrastructure financing and development. Weather disasters generally do not appear as an explicit item in state budgets, but impose potentially large demands on constrained public resources. As extreme weather disasters become both more frequent and more costly, states will need strategies to mitigate related financial shocks.

This study examines the association between extreme weather disasters and state financial vulnerability, and whether support for climate action moderates this relationship. Using NOAA's billion-dollar disaster database from 2010-2023, we construct a panel of 700 state-year observations across all 50 U.S. states to estimate the financial impact of extreme weather disasters. We find that in these extreme disaster years, total tax revenue per capita declines by about 2.2%, with property and sales tax revenues falling by 8.9% and 1.2%, respectively. Conditioning on climate action support (CAS), the impact of extreme disasters on states with low CAS is comparable to these results. Notably, these negative effects are fully offset in states with high levels of support for climate action, using two different measures for support for climate action. The first measure uses state representatives' votes on climate action bills in the U.S. House of Representatives, and the second measure uses Yale's Climate Opinion survey data. Our results support identification of a novel channel through which extreme weather and climate action support interact to shape public finances.

Our study contributes to multiple research literatures. First, we contribute to the literature on financial and economic impacts of state government's climate risk exposure by examining the relationship between extreme weather disasters and state government finances, focusing on the role of states' support – or lack thereof – for climate action. In doing so, we contribute research on previously unaddressed institutional responses to climate-related risk. Second, we contribute to the literature on how political institutions shape financial outcomes. Our findings highlight that the fiscal impact of weather disasters depends critically on the extent of the states' support for climate action in the U.S. Congress, with implications for the resilience of state budgets in the face of climate change. Third, we examine how extreme weather disasters affect state-government tax revenues, both in total and among important subcomponents. To our knowledge, our study is the first to delve into this previously unexplored key area in U.S. state finances.

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Appendix 1
Variable Descriptions

Variable Name	Description
WDSTR	Binary indicator variable equal to 1 if, for state *i* in year *t*, the sum of the damage costs for all billion-dollar weather disasters, as a percentage of one-year lagged GSP, is greater than 0.89%; 0 otherwise.
CAS	Binary indicator variable equal to 1 if, for state *i* in year *t*, at least 60% of the House roll-call votes by the state's representatives in the U.S. Congress supported climate action; 0 otherwise. These data are obtained from the League of Conservation Voters (LCV) annual reports.
CAS_YCO	Binary indicator variable equal to 1 if, for state *i* in year *t,* at least 60% of the respondents (i.e., a super-majority) to the Yale Climate Opinion survey selected "*More/Much more"* in response to the question: *"Do you think the U.S. Congress should be doing more or less to address global warming?: Much more; More; Currently doing the right amount; Less; Much less"*; 0 otherwise. Data are available at the Yale Climate Opinion Maps 2024.
GSP Per Capita	Gross State Product per capita for state *i* in year *t*, obtained from the Bureau of Economic Analysis: Gross Domestic Product by State and Personal Income by State, 1st Quarter 2025. The population data are from the U.S. Census Bureau's National and State Population Estimates series.
FedAID_ln	Log of total federal assistance and grants provided to the states by the Federal Emergency Management Agency (FEMA) and the U.S. Department of Housing and Urban Development (HUD), as a percentage of lagged GSP. The data are obtained from the Disaster Dollar database maintained by the Carnegie Endowment for International Peace.
Disaster Cost %	[Sum of the total cost of all billion-dollar weather disasters for state *i* in year *t* /One-year lagged GSP] × 100. The weather disaster data are collected from NOAA's Billion-dollar Weather and Climate Disasters database (Smith 2020).
Total Tax PC	Total tax revenue per capita for the state, including *Income Tax PC*, *Sales Tax PC*, and *Prop Tax PC*, both measured for state *i* in year *t*. The tax data are from the Annual Survey of State Government Tax Collections (STC) database. The population data are from the U.S. Census Bureau's National and State Population Estimates series.
Income Tax PC	Income tax revenue per capita for the state, which includes the sum of corporate and personal income taxes
Sales Tax PC	Sales tax revenue per capita for the state
Prop Tax PC	Property tax revenue per capita for the state
TTaxpc_ln	Log of *Total Tax PC* for the state
IncTaxpc_ln	Log of *Income Tax PC* for the state
SalesTaxpc_ln	Log of *Sales Tax PC* for the state
PropTaxpc_ln	Log of *Prop Tax PC* for the state
HouseVote	The percentage of roll-call House votes, for state *i* in year *t,* in support of climate action policies by the state's representatives in the U.S. Congress
SenateVote	The percentage of roll-call Senate votes, for state *i* in year *t,* in support of climate action policies by the state's representatives in the U.S. Congress
AvVote	The average of the roll-call votes for state *i* in year *t* in support of climate action policies by the state's Senate and House representatives in the U.S. Congress

Figure 1

Frequencies of Weather Disasters and Percentage of House Votes in the U.S. Congress in Support of Climate Action (2010 -2023)

This figure overlays the frequencies of weather disasters on the percentage of state representatives' House votes in support of climate action. The figure shows that, paradoxically, the states with the highest number of weather disasters also have the lowest percentages of state representatives' House votes in the U.S. Congress in support of climate action.

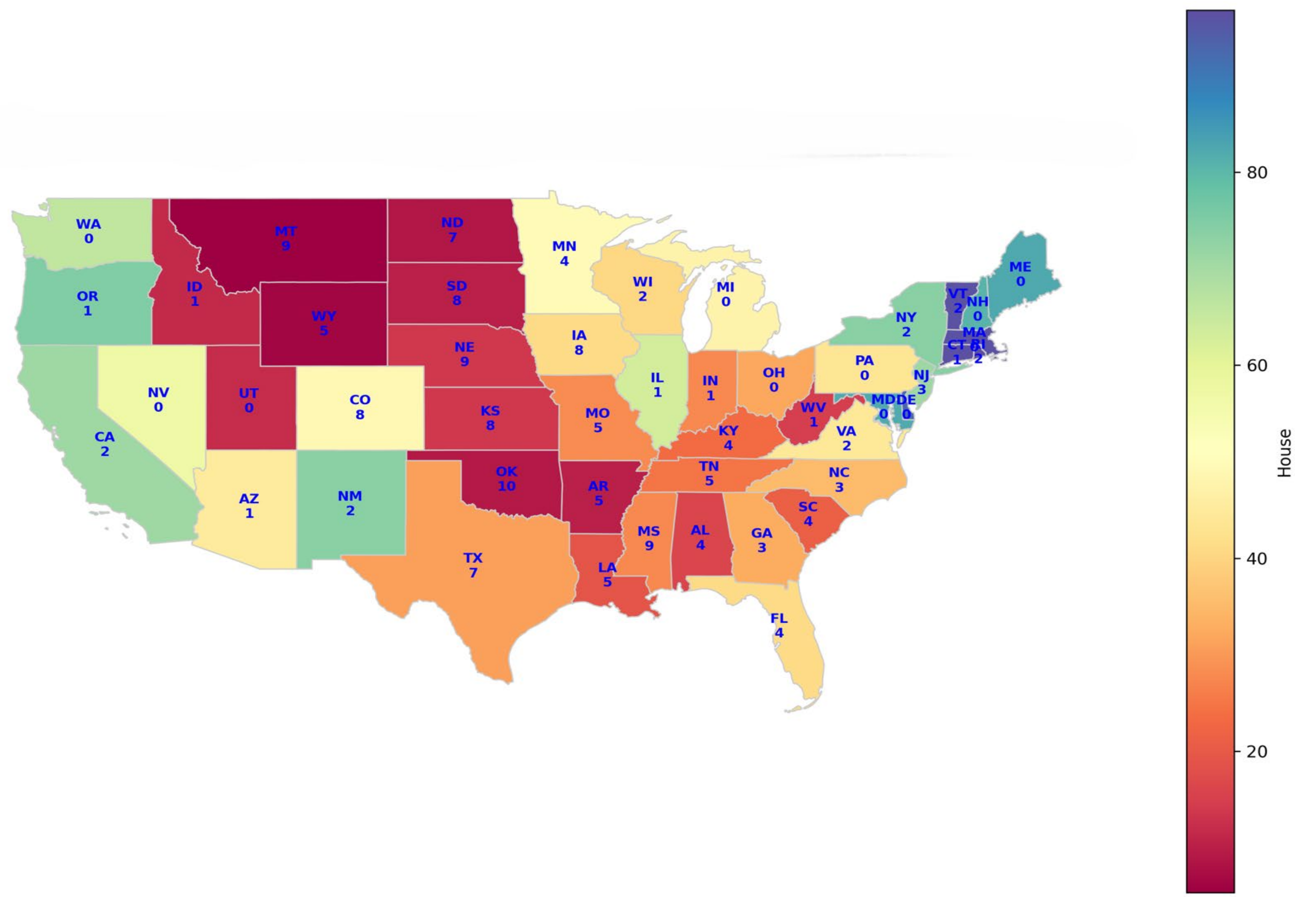
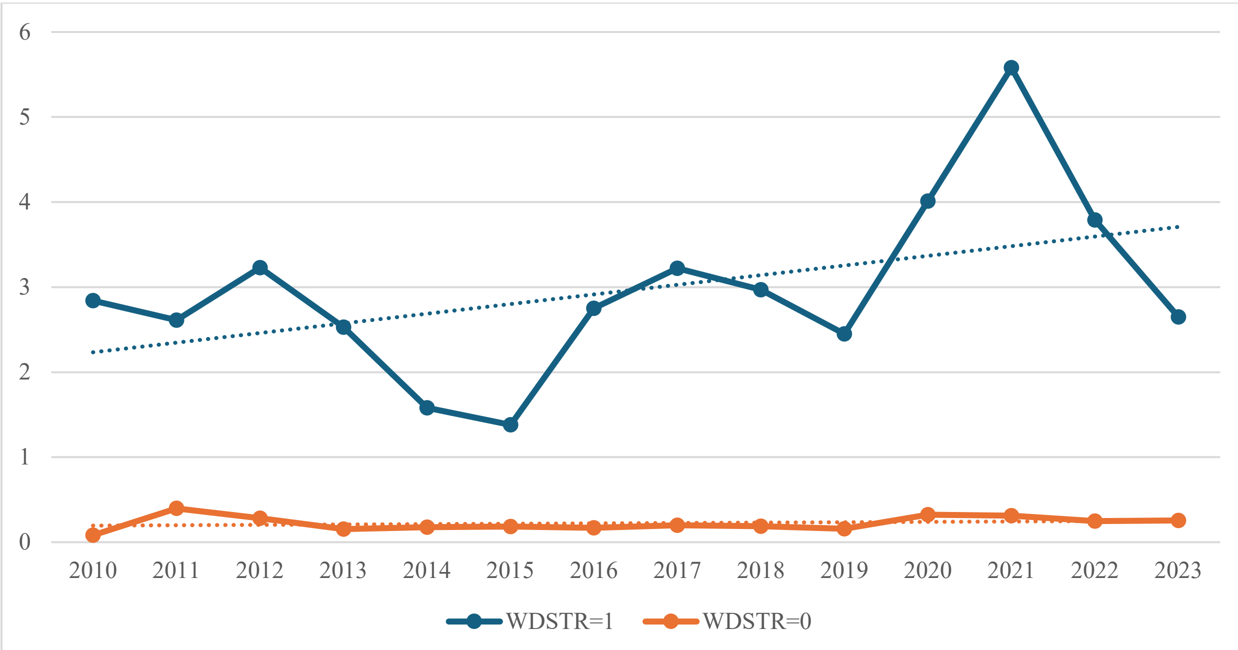


Figure 2
Weather Disaster Costs as a Percentage of Lagged Gross State Product (GSP), by Extreme Weather Disaster Classification (2010 – 2023)[a]



[a] *WDSTR* is a binary indicator variable equal to 1 if, for state *i* in year *t*, the sum of the damage costs for all billion-dollar weather disasters, as a percentage of one-year lagged GSP, is greater than 0.89%; 0 otherwise.

Table 1
Descriptive Statistics - Full Sample (2010 – 2023)

Variable	N	Mean	Median	p1	p5	p25	p75	p95	p99
GSP Per Capita	700	56,850	55,659	36,843	41,213	48,918	63,268	76,897	85,645
Disaster Cost %	700	0.890	0.242	0	0	0.0520	0.783	3.410	10.500
Total Tax PC	699	3,185	2,872	1,619	1,806	2,330	3,759	5,661	7,256
Income Tax PC	660	1,284	1,178	0	101	824	1,625	2,699	3,743
Sales Tax PC	699	1,431	1,391	348	543	1,081	1,715	2,406	3,393
Prop Tax PC	560	130	16.40	0	0	2.610	147	479	1,707
TTaxpc_ln	699	8	7.960	7.390	7.500	7.750	8.230	8.640	8.890
IncTaxpc_ln	644	6.960	7.080	3.640	5.280	6.760	7.400	7.910	8.230
SalesTaxpc_ln	699	7.180	7.240	5.850	6.300	6.990	7.450	7.790	8.130
PropTaxpc_ln	503	3.140	3.360	-3.170	-0.634	1.450	5.100	6.240	7.440
HouseVote	700	44.40	37	0	3	19.50	71	97	100
SenateVote	700	50.70	50	0	0	11	94	100	100

See Appendix 1 for variable descriptions.

Table 2 - Extreme Weather Disasters and Climate Action Support by State (2010 – 2023) (N = 700)

Panel A – Frequencies of Extreme Weather Disasters (WDSTR) and Climate Action Support (CAS) by State

	WDSTR		*CAS*			*WDSTR*		*CAS*	
State	**0**	**1**	**0**	**1**		**0**	**1**	**0**	**1**
AK	12	2	12	2	**MT**	5	9	14	0
AL	10	4	14	0	**NC**	11	3	13	1
AR	9	5	14	0	**ND**	7	7	13	1
AZ	13	1	14	0	**NE**	5	9	14	0
CA	12	2	1	13	**NH**	14	0	4	10
CO	6	8	11	3	**NJ**	11	3	4	10
CT	13	1	0	14	**NM**	12	2	0	14
DE	14	0	0	14	**NV**	14	0	6	8
FL	10	4	14	0	**NY**	12	2	0	14
GA	11	3	14	0	**OH**	14	0	14	0
HI	13	1	0	14	**OK**	4	10	14	0
IA	6	8	11	3	**OR**	13	1	0	14
ID	13	1	14	0	**PA**	14	0	13	1
IL	13	1	6	8	**RI**	12	2	0	14
IN	13	1	14	0	**SC**	10	4	14	0
KS	6	8	14	0	**SD**	6	8	13	1
KY	10	4	14	0	**TN**	9	5	14	0
LA	9	5	14	0	**TX**	7	7	14	0
MA	14	0	0	14	**UT**	14	0	14	0
MD	14	0	0	14	**VA**	12	2	10	4
ME	14	0	3	11	**VT**	12	2	0	14
MI	14	0	12	2	**WA**	14	0	4	10
MN	10	4	12	2	**WI**	12	2	14	0
MO	9	5	14	0	**WV**	13	1	13	1
MS	5	9	13	1	**WY**	9	5	14	0
					Total	**539**	**161**	**468**	**232**

Table 2 - Extreme Weather Disasters and Climate Action Support by Year (2010 – 2023) (N = 700)
Panel B – Frequencies of Extreme Weather Disasters (WDSTR) and Climate Action Support (CAS) by Year

	Weather Disasters (*WDSTR*)[a]			Climate Action Support (*CAS*)[b]		
Year	**0**	**1**	**Total**	**0**	**1**	**Total**
2010	47	3	50	24	26	50
2011	29	21	50	36	14	50
2012	30	20	50	39	11	50
2013	41	9	50	37	13	50
2014	45	5	50	37	13	50
2015	46	4	50	39	11	50
2016	43	7	50	37	13	50
2017	36	14	50	33	17	50
2018	40	10	50	34	16	50
2019	38	12	50	31	19	50
2020	38	12	50	29	21	50
2021	36	14	50	30	20	50
2022	38	12	50	31	19	50
2023	32	18	50	31	19	50
Total	**539**	**161**	**700**	**468**	**232**	**700**

[a]*WDSTR* is a binary indicator variable equal to 1 if, for state *i* in year *t*, the sum of the damage costs for all billion-dollar weather disasters, as a percentage of one-year lagged GSP, is greater than 0.89%; 0 otherwise.
[b]*CAS* is a binary indicator equal to 1 if, for state *i* in year *t*, at least 60% of the House roll-call votes by the state's representatives in the U.S. Congress supported climate action.

Table 3
Descriptive Statistics, Grouped by Extreme Weather Disaster (*WDSTR*) Classification

	***WDSTR* = 1**[a]					***WDSTR* = 0**[a]					**T-test**	**Wilcoxon**
Variable	**N**	**Mean**	**Median**	**Q1**	**Q3**	**N**	**Mean**	**Median**	**Q1**	**Q3**	**(p-values)**[b]	
GSP Per Capita	161	55,130	54,171	47,666	62,081	539	57,364	55,815	49,406	64,130	0.01	0.06
Disaster Cost %	161	3.150	1.880	1.290	3.160	539	0.215	0.135	0.0194	0.331	0.00	0.00
Total Tax PC	161	3,039	2,683	2,252	3,413	538	3,229	2,945	2,367	3,824	0.04	0.02
Income Tax PC	152	1,155	1,115	774	1,455	508	1,322	1,195	847	1,695	0.01	0.03
Sales Tax PC	161	1,413	1,358	1,076	1,711	538	1,436	1,398	1,089	1,715	0.32	0.69
Property Tax PC	128	112	8.14	0.563	144	432	136	25.9	3.2	147	0.18	0.09
TTaxpc_ln	161	7.96	7.89	7.72	8.14	538	8.02	7.99	7.77	8.25	0.02	0.02
IncTaxpc_ln	149	6.8	7.02	6.72	7.28	495	7.01	7.1	6.78	7.45	0.01	0.02
SalesTaxpc_ln	161	7.18	7.21	6.98	7.44	538	7.18	7.24	6.99	7.45	0.53	0.69
PropTaxpc_ln	108	2.83	2.79	1.58	5.13	395	3.22	3.48	1.44	5.07	0.09	0.57
HouseVote	161	28.3	24	8	40	539	49.2	45	23	76	0.00	0.00
SenateVote	161	32.9	18	7	50	539	56.1	57	14	96	0.00	0.00

[a]*WDSTR* is a binary indicator variable equal to 1 if, for state *i* in year *t*, the sum of the damage costs for all billion-dollar weather disasters, as a percentage of one-year lagged GSP, is greater than 0.89%; 0 otherwise.
[b]Two-tailed p-values
All other variables are as described in Appendix 1.

Table 4
Spearman Correlations

	TTaxpc_ln	*IncTaxpc_ln*	*SalesTaxpc_ln*	*PropTaxpc_ln*	*WDSTR*	*CAS*
TTaxpc_ln	1					
IncTaxpc_ln	0.7302**	1				
SalesTaxpc_ln	0.5324**	0.1989**	1			
PropTaxpc_ln	0.0794	-0.1722**	0.0382	1		
WDSTR	-0.0892*	-0.0950*	-0.0152	-0.0253	1	
CAS	0.4415**	0.4476**	0.1208**	0.0034	-0.2478**	1

* (**) significant at p < 0.05 (0.01)

See Appendix 1 for variable descriptions.

Table 5 - Tax Revenues, Extreme Weather Disasters, and Climate Action Support

Panel A – Tax Revenues and Extreme Weather Disasters (H1)

We estimate the following OLS regression:

$$TAXREV_{i,t} = \beta_0 + \beta_1 WDSTR_{i,t} + STATE\ FE_{i,t} + YEAR\ FE_{i,t} + \varepsilon_{i,t} \quad (1)$$

	(1)	(2)	(3)	(4)
Variables[a]	***TTaxpc_ln***	***IncTaxpc_ln***	***SalesTaxpc_ln***	***PropTaxpc_ln***
WDSTR[b]	-0.0220*	0.0139	-0.0119**	-0.0892**
	(-1.54)	(0.72)	(-1.75)	(-2.08)
Observations	699	644	699	503
R-squared (within)	0.659	0.599	0.807	0.192
Number of states	50	47	50	37

***p < 0.01, **p < 0.05, *p < 0.10, one tailed

Panel B – Tax Revenues, Extreme Weather Disasters, and Climate Action Support (H2)

We estimate the following OLS regression:

$$TAXREV_{i,t} = \beta_0 + \beta_1 WDSTR_{i,t} + \beta_2 CAS_{i,t} + \beta_3 (WDSTR \times CAS)_{i,t} + STATE\ FE_{i,t} + YEAR\ FE_{i,t} + \varepsilon_{i,t} \quad (2)$$

	(1)	(2)	(3)	(4)
Variables[a]	***TTaxpc_ln***	***IncTaxpc_ln***	***SalesTaxpc_ln***	***PropTaxpc_ln***
WDSTR[b]	-0.0296**	0.0111	-0.0151**	-0.105**
	(-1.91)	0.49	(-2.23)	(-2.08)
CAS[c]	0.0163	0.0276	0.00932	-0.0620
	(0.92)	(0.22)	(0.32)	(-0.87)
WDSTR × CAS	0.0532***	0.0225	0.0233*	0.0930*
	(2.61)	(0.74)	(1.59)	(1.36)
F-stat [$\beta_1 + \beta_3 = 0$]	1.87	2.46	0.31	0.10
Observations	699	644	699	503
R-squared (within)	0.661	0.600	0.808	0.194
Number of states	50	47	50	37

***p < 0.01, **p < 0.05, *p < 0.10, one tailed

[a]Robust t-statistics in parentheses, clustered by state. All models include state and year fixed effects.
[b]*WDSTR* is a binary indicator variable equal to 1 if, for state *i* in year *t*, the sum of the damage costs for all billion-dollar weather disasters, as a percentage of one-year lagged GSP, is greater than 0.89%; 0 otherwise.
[c]*CAS* is a binary indicator equal to 1 if, for state *i* in year *t*, at least 60% of the House roll-call votes by the state's representatives in U.S. Congress supported climate action.
All other variables are as described in Appendix 1.

Table 6 - Tax Revenues, Extreme Weather Disasters (Midpoint Cost Estimate), and Climate Action Support

Panel A – Tax Revenues and Extreme Weather Disasters
We estimate the following OLS regression:

$$TAXREV_{i,t} = \beta_0 + \beta_1 WDSTR_{i,t} + STATE\ FE_{i,t} + YEAR\ FE_{i,t} + \varepsilon_{i,t} \qquad (1)$$

	(1)	**(2)**	**(3)**	**(4)**
Variables[a]	***TTaxpc_ln***	***IncTaxpc_ln***	***SalesTaxpc_ln***	***PropTaxpc_ln***
WDSTR[b]	-0.0232*	0.0128	-0.0124**	-0.103**
	(-1.61)	(0.66)	(-1.84)	(-2.42)
Observations	699	644	699	503
R-squared (within)	0.659	0.599	0.807	0.194
Number of states	50	47	50	37

***p < 0.01, **p < 0.05, *p < 0.10, one tailed

Panel B – Tax Revenues, Extreme Weather Disasters, and Climate Action Support
We estimate the following OLS regression:

$$TAXREV_{i,t} = \beta_0 + \beta_1 WDSTR_{i,t} + \beta_2 CAS_{i,t} + \beta_3 (WDSTR \times CAS)_{i,t} + STATE\ FE_{i,t} + YEAR\ FE_{i,t} + \varepsilon_{i,t} \qquad (2)$$

	(1)	**(2)**	**(3)**	**(4)**
Variables[a]	***TTaxpc_ln***	***IncTaxpc_ln***	***SalesTaxpc_ln***	***PropTaxpc_ln***
WDSTR[b]	-0.0310**	0.00979	-0.0158**	-0.121**
	(-1.97)	(0.42)	(-2.36)	(-2.39)
CAS[c]	0.0161	0.0273	0.00921	-0.0641
	(0.91)	(1.21)	(0.32)	(-0.90)
WDSTR × CAS	0.0544***	0.0237	0.0238*	0.107*
	(2.65)	(0.77)	(1.63)	(1.52)
F-stat [$\beta_1 + \beta_3 = 0$]	1.83	2.42	0.31	0.14
Observations	699	644	699	503
R-squared (within)	0.661	0.600	0.808	0.197
Number of states	50	47	50	37

***p < 0.01, **p < 0.05, *p < 0.10, one tailed

[a]Robust t-statistics in parentheses, clustered by state. All models include state and year fixed effects.
[b]*WDSTR* is a binary indicator variable equal to 1 if, for state *i* in year *t*, the sum of the damage costs for all billion-dollar weather disasters, as a percentage of one-year lagged GSP, is greater than 0.65%; 0 otherwise.
[c]*CAS* is a binary indicator equal to 1 if, for state *i* in year *t*, at least 60% of the House roll-call votes by the state's representatives in U.S. Congress supported climate action.
All other variables are as described in Appendix 1.

Table 7
Spearman Correlations and OLS Regressions, Using Yale's Climate Opinion Survey

Panel A – Spearman Correlations

	CAS_YCO	***Senate Vote***	***House Vote***	***AvVote***
CAS_YCO[a]	1			
SenateVote	0.61	1		
HouseVote	0.70	0.73	1	
AvVote[b]	0.68	0.92	0.92	1

*All correlations are significant at p < 0.01 or better.

[a]*CAS_YCO* is a binary indicator equal to 1 if, for state *i* in year *t,* at least 60% of respondents (i.e., a super-majority) to the Yale Climate Opinion survey selected "*More/Much more"* in response to the question: *"Do you think the U.S. Congress should be doing more or less to address global warming?: Much more; More; Currently doing the right amount; Less; Much less;"* 0 otherwise.
[b]*AvVote* is the average of the roll-call votes for state *i* in year *t* in support of climate action policy, by the state's Senate and House representatives in the U.S. Congress.
All other variables are as described in Appendix 1.

Panel B - Tax Revenues, Extreme Weather Disasters, and Climate Action Support (based on Yale's Climate Opinion Survey)

We estimate the following OLS regression:

$$TAXREV_{i,t} = \beta_0 + \beta_1 WDSTR_{i,t} + \beta_2\, CAS\_YCO_{i,t} + \beta_3(WDSTR \times CAS\_YCO)_{i,t} + STATE\ FE_{i,t} + YEAR\ FE_{i,t} + \varepsilon_{i,t} \quad (2)$$

	(1)	**(2)**	**(3)**	**(4)**
Variables[a]	***TTaxpc_ln***	***IncTaxpc_ln***	***SalesTaxpc_ln***	***PropTaxpc_ln***
WDSTR	-0.0292**	0.0113	-0.0120**	-0.143***
	(-1.84)	(0.45)	(-1.79)	(-2.62)
CAS_YCO	0.0460	0.0393	0.0212	-0.104
	(1.39)	(0.91)	(1.12)	(-1.13)
WDSTR × CAS_YCO	0.0331**	0.0121	0.0016	0.292**
	(1.94)	(0.36)	(0.10)	(1.95)
F-stat [$\beta_1 + \beta_3 = 0$]	0.08	1.19	0.46	1.45
Observations	699	644	699	503
R-squared	0.664	0.601	0.808	0.207
Number of states	50	47	50	37

***p < 0.01, **p < 0.05, *p < 0.10, one tailed
[a]Robust t-statistics in parentheses, clustered by state. All models include state and year fixed effects.

All other variables are as described in Appendix 1.

Table 8
Extreme Weather Disasters, Climate Action Support, and Tax Revenues – Controlling for Federal Aid

$$TAXREV_{i,t} = \beta_0 + \beta_1 WDSTR_{i,t} + \beta_2 CAS_{i,t} + \beta_3 (WDSTR \times CAS)_{i,t} + \beta_4 FedAID\_ln_{i,t} + STATE\ FE_{i,t} + YEAR\ FE_{i,t} + \varepsilon_{i,t}$$

	(1)	**(2)**	**(3)**	**(4)**
Variables[a]	***TTaxpc_ln***	***IncTaxpc_ln***	***SalesTaxpc_ln***	***PropTaxpc_ln***
WDSTR	-0.0320**	-0.0112	-0.0121*	-0.167***
	(-1.68)	(-0.53)	(-1.33)	(-2.60)
CAS	0.0239*	0.0458**	0.00637	-0.0782
	(1.30)	(1.83)	(0.19)	(-1.07)
WDSTR × CAS	0.0539**	0.0179	0.0236*	0.100*
	(2.29)	(0.53)	(1.31)	(1.55)
FedAID_ln[b]	0.0029	0.008*	0.0003	0.0214*
	(0.85)	(1.34)	(0.14)	(1.37)
F-stat [$\beta_1 + \beta_3 = 0$]	0.78	0.06	0.41	2.12
Observations	447	419	447	327
R-squared	0.654	0.610	0.815	0.191
Number of states	50	47	50	37

***p < 0.01, **p < 0.05, *p < 0.10, one tailed

[a]Robust t-statistics in parentheses, clustered by state. All models include state and year fixed effects.
[b]*FedAID* is the log of total federal assistance and grants provided to the states by the Federal Emergency Management Agency (FEMA) and the U.S. Department of Housing and Urban Development (HUD), as a percentage of lagged GSP.

All other variables are as described in Appendix 1.