Ideology on Thin Ice?

The Limits of Judicial Neutrality in Climate Litigation

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Introduction

Courts increasingly confront disputes centered on climate change policy. Yet, do judges decide these cases based on legal principles or ideological preferences? This question matters: if ideology drives outcomes, climate policy depends more on judicial appointments than legal merit. This study examines how judicial ideology influences federal appellate climate litigation. Despite its policy significance, we lack systematic empirical evidence about whether doctrine or ideology shapes these decisions. Analyzing 339 decisions (1990-2025), I find conservative panels to be 30 percentage points less likely to rule for pro-climate parties, with

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effects reaching 73 percentage points in rights-based claims. After reviewing judicial behavior theories and conflicting evidence of ideology's effect in climate cases, I identify a research gap, present my methodology, results, and discuss their implications and limitations.

Literature Review

I first present three mainstream judicial behavior models and infer from climate litigation's distinctive features their theoretical predictions about judicial behavior in climate litigations. Then, drawing on limited and conflicting empirical evidence, I develop a domain-contingent framework reconciling empirical and theoretical contradictions.

The legal model argues that judges operate within legal constraints—precedents, statutory text, and procedural rules—producing similar outcomes regardless of personal preferences (Gillman, 2001). The attitudinal model proposes that judges' ideological preferences determine decisions, with legal reasoning justifying predetermined outcomes (Segal and Spaeth, 2002). The strategic model views judges as rational actors who pursue preferences while considering institutional constraints and responses from other actors (Epstein and Knight, 1998). The strategic model expects judges to moderate preferences (e.g., ideological) based on panel composition, potential responses from other branches, and legitimacy concerns.

Climate litigation offers a specialized context where these judicial behavior models yield different predictions. First, novel legal theories like atmospheric trust doctrine lack established precedent, requiring new doctrinal development (Lin, 2012; Blumm and Wood, 2017). Second, scientific evidence's role in climate litigation creates interpretive flexibility as judges evaluate probabilistic causation (McGarity, 2003; Kysar, 2010). Third, climate change is politically polar-

ized, with partisan differences in accepting climate science and mitigation policies (McCright and Dunlap, 2011). Fourth, climate litigation spans diverse legal frameworks—from procedural National Environmental Policy Act (NEPA) claims with extensive precedent to novel constitutional theories (Markell and Ruhl, 2012).

Given climate litigation's characteristics, the legal model predicts cases' outcomes primarily reflect applicable legal frameworks. In administrative contexts (e.g., NEPA), *Chevron* deference requires courts to accept reasonable agency interpretations of ambiguous statutes (U.S. Supreme Court, 1984), creating systematic bias toward upholding agency decisions. Therefore, administrative challenges should produce high government success rates regardless of ideology. Conversely, novel constitutional claims lacking precedent provide no such constraints. Without binding doctrines, judges must develop new principles, creating space for varying outcomes that should become more consistent as precedent accumulates. The legal model predicts ideology should not systematically influence outcomes in either context.

The attitudinal model predicts the opposite: judicial voting mirrors partisan climate divisions across all legal claims. Conservative judges should consistently oppose expansive climate protections while liberals support them, regardless of legal framework.

The strategic model predicts conditional patterns. Panel composition moderates preferences through deliberative dynamics—mixed panels create pressure toward moderation via potential dissents, while homogeneous panels enable extreme position-taking. Additionally, in administrative matters like *Chevron*-like cases, strategic judges should calibrate deference to agencies based on political alignment, deferring more to ideologically aligned administrations.

Empirical Evidence and Research Gap

Beyond case-studies of high profile cases (Setzer and Vanhala, 2019), existing empirical research is very limited. Two studies reveal mixed evidence. Markell and Ruhl (2012) found high success rate (84%) under NEPA cases for federal agencies, concluding that "there is nothing unusual about the outcomes of the climate change NEPA cases compared to NEPA litigation involving other alleged effects" (p. 59). Keele (2018) similarly documented 68% government success rates in NEPA cases, but noted that Democratic appointees ruled for environmental plaintiffs more frequently (23% vs. 9%), though not statistically significant. Both had limited sample sizes ($n < 100$).

These findings present an unresolved puzzle: climate litigation simultaneously shows legal constraint (high government success rates in administrative cases) and ideological influence (voting differences by judge ideology) which existing models cannot explain. Nor has any study examined strategic judicial behavior in climate litigation or tested whether ideological influence varies systematically across case types, panel compositions, and political contexts.

Theorizing Climate Judicial Decision-Making

To address this gap, I propose a domain-contingent strategic framework. Building on but extending the strategic model, this framework considers the legal domain-specific discretionary spaces' effect on ideology.

The framework posits that judges' ideological expression depends on legal architecture. Different domains create varying discretionary space—the interpretive latitude available without violating professional norms. Traditional environmental law's precedent and deference doctrines create narrow spaces constraining ideology, while novel rights-based claims lacking established frameworks cre-

ate broad spaces where ideology operates more freely.

Within these domain-specific constraints, judges pursue their policy preferences strategically, calibrating their ideological expression based on three intersecting considerations: the discretionary space available in the specific legal domain, the composition of their judicial panel, and the political environment of federal agencies. The framework generates four interconnected hypotheses:

> ***H1:*** *Liberal judges will be more likely than conservative judges to rule in favor of pro-climate positions, all else equal.*

This baseline hypothesis establishes that judges possess genuine policy preferences about climate issues that align with broader ideological orientations. Without this foundation, strategic behavior would be meaningless.

> ***H2:*** *The magnitude of ideological influence will vary systematically across legal domains, with strongest effects in high-discretion contexts and weakest effects in low-discretion contexts. .*

This hypothesis suggests that legal constraint operates as a mediating variable rather than a constant, creating different strategic environments across case types.

> ***H3:*** *Panel composition will moderate individual judges' ideological expression, with homogeneous panels enabling more extreme voting than mixed panels.*

This reflects how collegial dynamics shape strategic calculations—diverse panels activate reputational concerns and deliberative pressures constraining extreme positions.

> ***H4:*** *Judges will show systematically greater deference to agencies controlled by politically aligned administrations.*

This hypothesis captures how judges incorporate broader political context into their strategic calculations, recognizing that policy implementation depends on executive branch cooperation.

Methodology

Data and Case Selection

Using the Sabin Center for Climate Change Law database (SCCCL), the most authoritative repository of U.S. climate litigation (Keele, 2018, p.295), I constructed an original dataset for the present study. SCCCL captures unpublished decisions and includes both explicit climate law cases and those with climate implications, reducing selection bias while aligning with my theoretical interest in judicial climate engagement.

From SCCCL's 1,982 climate cases (12,510 documents) web-scraped through March 2025, I focused on federal circuit courts of appeals (4,132 documents, 372 cases) as judge panels create ideological variation essential for testing collegial effects; quasi-random assignment of cases to judges strengthens causal inference; and Judicial Common Space (JCS, which contains ideological score for judges) exist only for federal judges (Figure 1).

After excluding non-judicial decisions (briefs, petitions) and excluding misclassified non-circuit materials (414 documents), I identified cases requiring meaningful discretion by excluding *sua sponte* orders, joint motions, routine withdrawals, and clerk-handled matters and excluded settlements as they reflect party expectations or administrative matters without judicial decision and discretion (206 documents). This yielded 339 climate cases (1990–2025) where judges exercised genuine discretion.

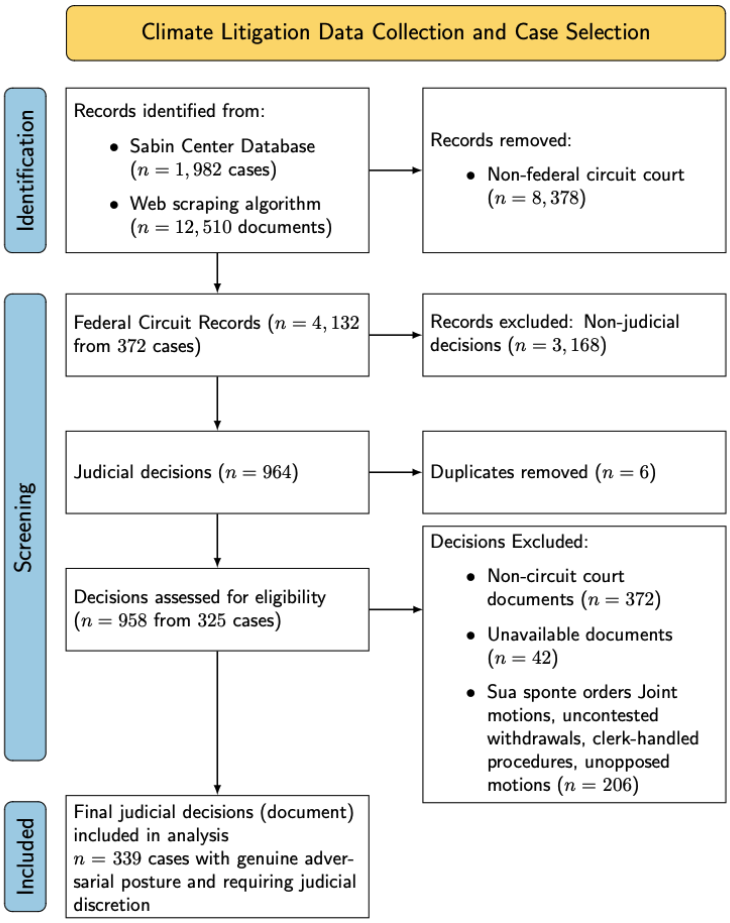


Figure 1: Sample Selection Process

Variables

Dependent Variable: Pro-Climate Outcome

To measure outcomes in climate litigation, I developed a two-stage coding approach. First, I identified which party's claim would, if successful, advance climate protection more, recognizing that climate litigation transcends simple environmental-versus-industry dichotomies. Second, I coded outcomes proportionally (0=complete loss, 1=complete victory, intermediate values=proportion of claims/reliefs granted) to capture nuanced decisions. For the main analysis, I use a ternary version (categorizing intermediate values as 0.5), while the continuous measure serves as an alternative measure for robustness checks.

The relative coding avoids imposing researcher judgments about what constitutes "pro-environment" positions in absolute terms, while the proportional coding preserves information about partial victories common in administrative law. See Appendix 3.1 for detailed coding methodology.

Independent Variables

For judicial Ideology, I employ two measures. First, a binary indicator of judges' appointing party (Democratic = 1, Republican = 0). Second, JCS' scores which place judges on a continuous ideological spectrum, ranging from -0.6 (most liberal) to 0.7 (most conservative) in my sample, accounting for senatorial courtesy in appointments (Epstein et al., 2007). At the panel level, I calculate mean JCS scores, ideological range (measuring within-panel diversity), and, using the binary indicator, categorical composition (all-Republican vs Democrat, Majority-Republican vs Democrat, Equally-mixed).

Legal Domain classification operationalizes varying discretionary spaces across four categories: (1) High Discretion: Rights-Based Claims—constitutional theories with minimal precedent (Lin, 2012); (2) Moderate Discretion: Climate-Specific Regulation—climate applications of existing statutes (Markell and Ruhl, 2012); (3) Moderate Discretion: Resource and Sector Regulation—technical domains with evolving climate applications (Miles and Sunstein, 2006); (4) Low Discretion: Traditional Environmental Law—procedural statutes with extensive precedent and deference doctrines (U.S. Supreme Court, 1984). All categories contain $n \geq 30$ cases (see Appendix 4 for coding criteria)

Strategic Alignment is measured as the panel alignment proportion (0–1), i.e., the fraction of aligned judges per panel with the presidential administration at the time of the judicial decision.

Covariates and Control

Filing year (1990–2025) controls for doctrinal evolution post-*Massachusetts v. EPA* (U.S. Supreme Court, 2007), strengthening scientific consensus, and increasing political polarization (McCright and Dunlap, 2011), and circuit fixed effects address jurisdictional variation, particularly the D.C. Circuit's administrative law specialization (48.7% of cases) and the Ninth Circuit's environmental jurisprudence (21.2%) as both potentially affect cases' outcomes (Roberts, 2006).

Party type (e.g., federal government, NGOs) control for structural asymmetries in litigation capacity and strategic behavior which could influence cases' outcomes (Galanter, 1974). See Appendix 5 for categorization methodology.

Judge-level controls include judges' experience (in years), gender and ethnicity (ratio in a panel), which prior research links to judicial behavior patterns (Manning, 2004; Boyd et al., 2010; Cox and Miles, 2008). Biographical data derives from the Federal Judicial Center's Directory.

Propensity Score Matching

To test *H1*, grounded in Boyd et al. (2010)'s methodology, I use propensity score matching to ensure comparability between cases heard by Republican-majority versus Democratic-majority panels and calculate the average treatment effect (treatment=Majority Republican Panel). While federal judges are quasi-randomly assigned within circuits, case characteristics may vary systematically across panel types, potentially confounding ideological effects.

My matching specification includes seven covariates capturing key case features: filing year (temporal variation in jurisprudence and appointments), Climate-Specific Regulation and Traditional Environmental Law (primary theoretical categories), D.C. and Ninth Circuit indicators (major venues with 70% of cases),

Federal Government Defendant (triggering administrative deference), and Environmental NGO Plaintiff (most common plaintiff type).

This parsimonious specification balances covariate balance against overfitting concerns. I implement nearest-neighbor matching with a 0.2 standard deviation caliper, verify balance using standardized mean differences (< 0.1 threshold), and apply regression adjustment for double robustness.

Ordered Logistic Regression

I test my domain-contingent strategic framework *H2-4* using ordered logistic regression on the full sample. The ordered outcome (Loss<Partial<Win) captures how judges strategically calibrate ideological expression along a continuum. I adopt a cumulative modeling approach, progressively adding complexity to test each hypothesis while demonstrating the robustness of core findings.

Model 1 (Baseline) tests the main ideological effect with panel JCS mean and standard controls (filing year, party types and circuit-fixed effects):

$$X_i\beta = \beta_0 + \beta_1 \text{PanelJCS}_i + \beta_2 \text{Controls}_i \tag{1}$$

Model 2 (H2) adds law categories and interactions with panel's JCS mean to test domain-contingent effects.

$$X_i\beta = [\text{Model 1 terms}] + \beta_3 \text{LawCategories}_i + \beta_4(\text{PanelJCS}_i \times \text{LawCategories}_i) \tag{2}$$

Model 3 (H3) introduces panel range and interaction to test collegial moderation.

$$X_i\beta = [\text{Model 2 terms}] + \beta_5 \text{PanelRange}_i + \beta_6(\text{PanelJCS}_i \times \text{PanelRange}_i) \quad (3)$$

For *H4*, **Model 4** requires two adjustments. I restrict the sample to cases with federal government defendants ($n = 244$) where agency deference is relevant, and reverse the outcome variable to measure deference to agency decisions (i.e., agency wins) rather than pro-climate outcomes.

I then add the panel-administration alignment variable and their interaction with ideology to test whether judges show greater deference to politically aligned agencies.

$$X_i\beta = [\text{Model 3 terms}] + \beta_6 \text{AlignmentProp}_i + \beta_7(\text{PanelJCS}_i \times \text{AlignmentProp}_i) \quad (4)$$

Model 5 returns to the full sample and original outcome, adding judge demographic characteristics as a final robustness test.

$$X_i\beta = [\text{Model 3 terms}] + \delta \text{JudgeCharacteristics}_i \quad (5)$$

For all interaction models, I calculate their average marginal effects (AME) to facilitate substantive interpretation. Regression results are mentioned but, due to their size, are reported in Appendix 7.

I conduct four robustness tests: (1) alternative outcome specifications using binary logit, OLS regression, and restricted ordered logit; (2) binary Republican-majority measure replacing continuous ideology scores; and (3) subsample analyses excluding the D.C. Circuit, splitting cases pre/post-2020, and isolating tra-

ditional environmental law cases. Results in Appendix 8 confirm core findings persist across all specifications.

Results

Figure 2 presents descriptive statistics for 339 climate cases (1990–2025). Cases concentrate in the D.C. and Ninth Circuit (48.7% and 21.2%). Traditional Environmental Law comprises 44.0% of cases, and pro-climate outcomes represents 37.2% of all cases. See Appendix 2 for detailed sample characteristics.

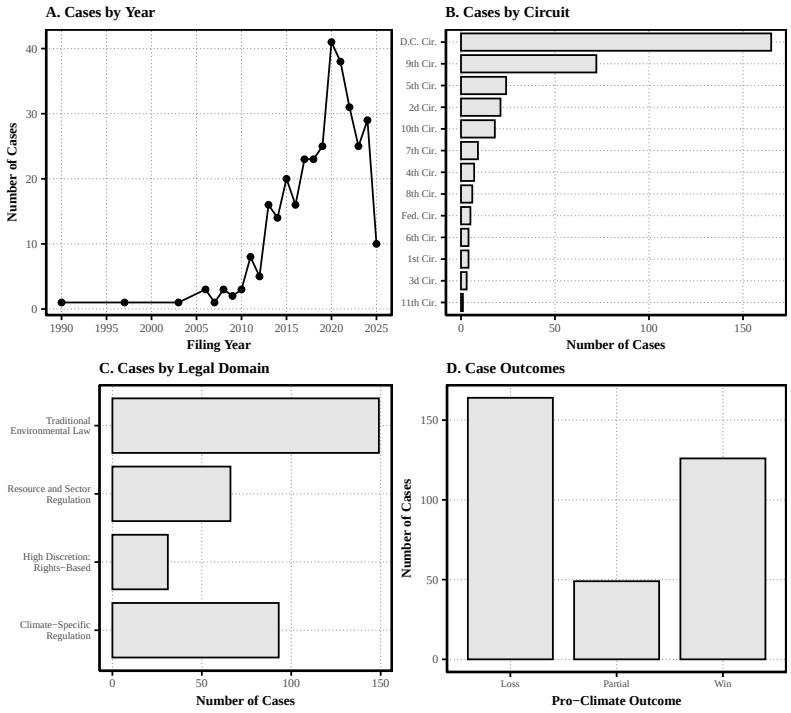


Figure 2: Sample Distribution

Figure 3 demonstrates successful propensity score matching, with all covariates achieving balance within ± 0.1 after matching.

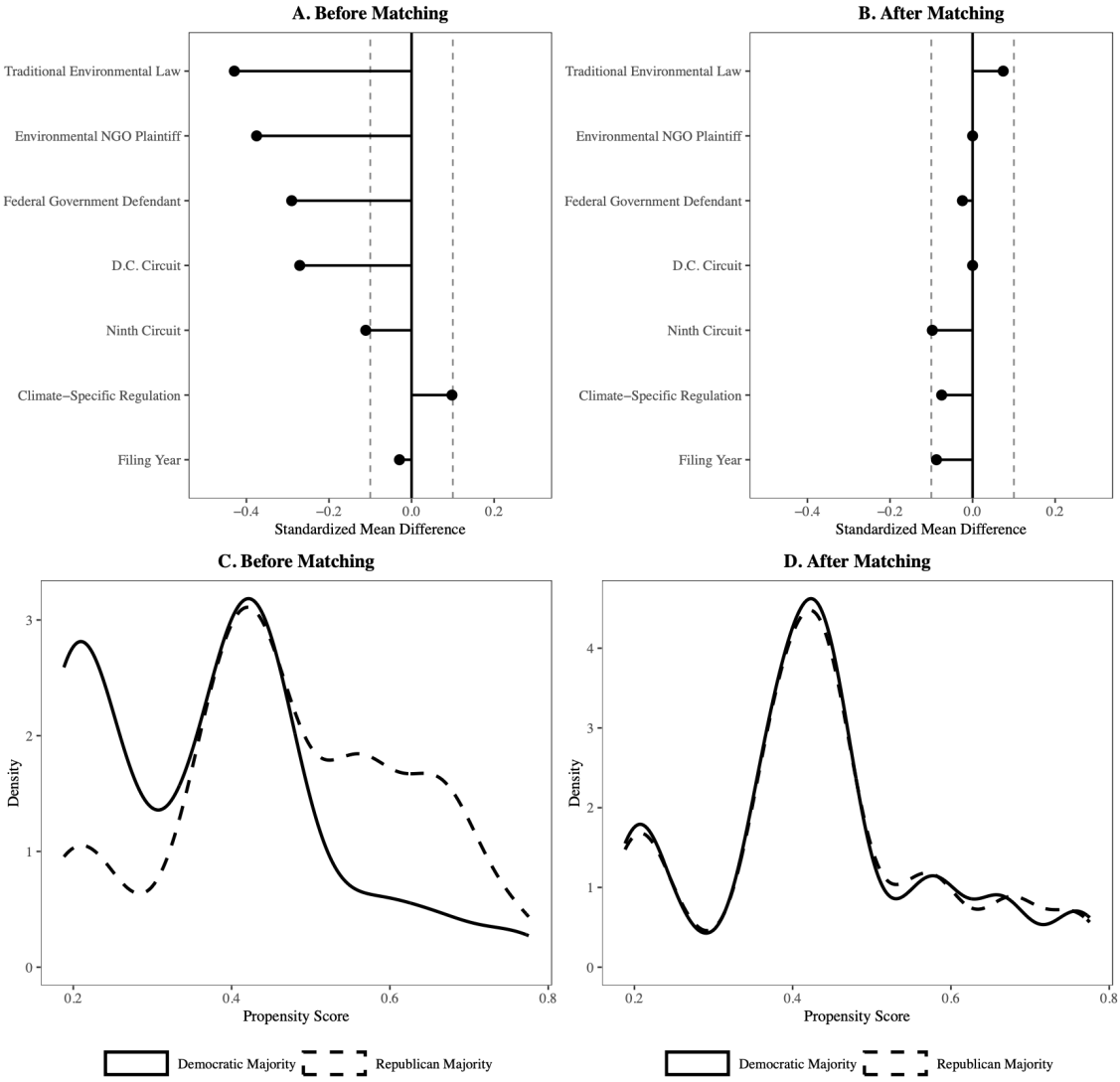


Figure 3: Pre/Post Propensity Matching Love Plot

Figure 4 reveals the core finding: Democratic-majority panels ruled pro-climate 57.6% of the time versus 26.8% for Republican-majority panels, yielding an average treatment effect of -0.307 ($p < 0.001$). The regression adjustment confirms this effect at -0.306 ($p < 0.001$), indicating a 30.7 percentage point gap (Appendix, Table 6). The ordered logit analysis confirms this pattern, with a Panel JCS Mean coefficient of -2.103 ($p < 0.001$), indicating that moving from the most liberal to most conservative panels reduces pro-climate odds by approximately 15-fold (Appendix, Table 7)(H1).

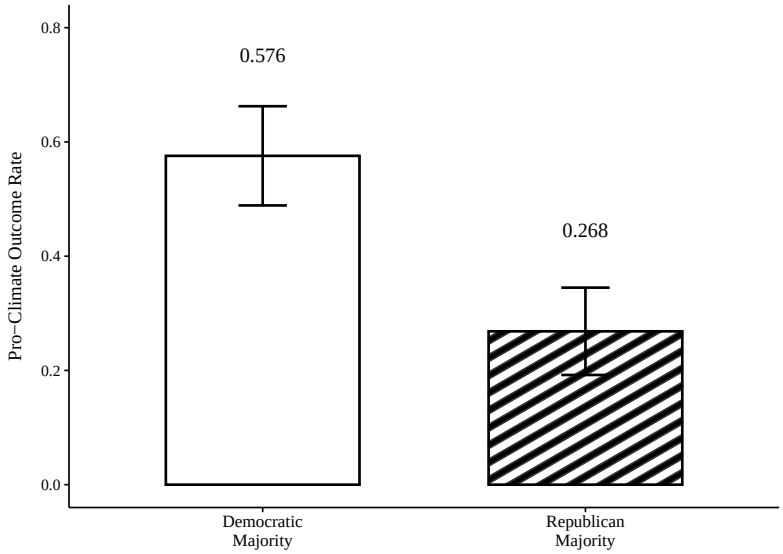
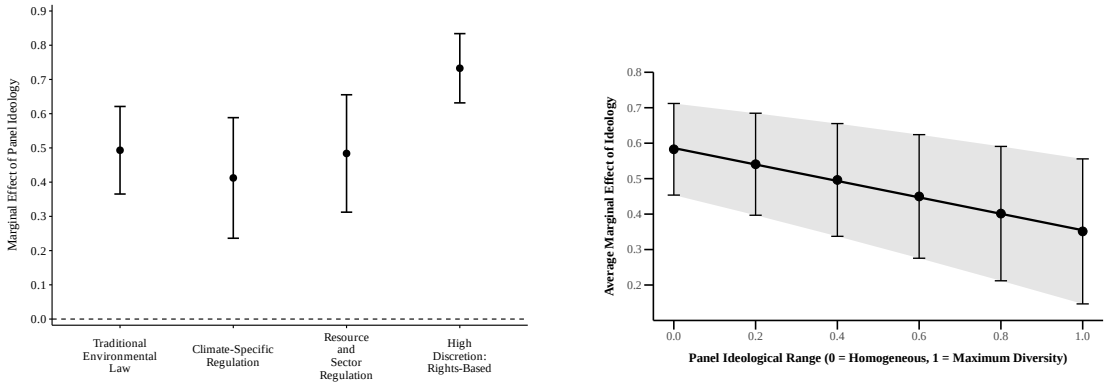


Figure 4: ATE effects of Republican Ideology on Cases' Outcome, n=222

Figure 5a reveals systematic variation across legal domains that directly supports the domain-contingent framework. Traditional Environmental Law, with its extensive precedent and administrative deference doctrines, shows a baseline AME of 0.493 ($p < 0.001$). AMEs represent the effect on the probability of a pro-climate win. Positive values indicate that increases in panel conservatism reduce this probability. A one-unit increase in mean panel conservatism reduces pro-climate probability by approximately 49 percentage points—substantial but constrained by doctrinal guardrails.

Notably, Rights-Based claims show the strongest AME (0.733, $p < 0.001$)—approximately 50% stronger than traditional environmental law. In these domains lacking precedential guidance, a unit increase in conservatism reduces pro-climate probability by 73 percentage points, confirming that ideology dominates where legal constraint is minimal (H2).



(a) Legal Domain Interaction (b) Panel Effects

Figure 5: Domain and Panel AME on Judicial Ideology

Figure 5b demonstrates that panel ideological diversity systematically moderates individual judges' expression of preferences (H3). On homogeneous panels (range=0), the marginal effect of ideology reaches 0.583 ($p < 0.001$). This effect decreases monotonically as diversity increases, falling to 0.351 on maximally diverse panels (range=1.0)—a 40% reduction in ideological influence. The significant positive interaction term (1.226, $p < 0.001$) in Table 7 (Appendix) confirms that panel diversity attenuates ideology's negative effect on pro-climate outcomes.

Figure 6 reveals how judges calibrate deference to administrative agencies. The analysis uses agency deference as the outcome (reversed from pro-climate), so AMEs' negative values indicate greater willingness to overturn agency decisions. At 0% alignment with the current administration, the marginal effect is -0.188 ($p = 0.011$). This effect strengthens dramatically as alignment increases: -0.376 at 33% alignment, -0.548 at 67% alignment, and -0.688 at 100% alignment (all $p < 0.001$). The large positive interaction term (2.853, $p < 0.001$) statistically confirms this strategic calibration (H4)(Table 7, Appendix).

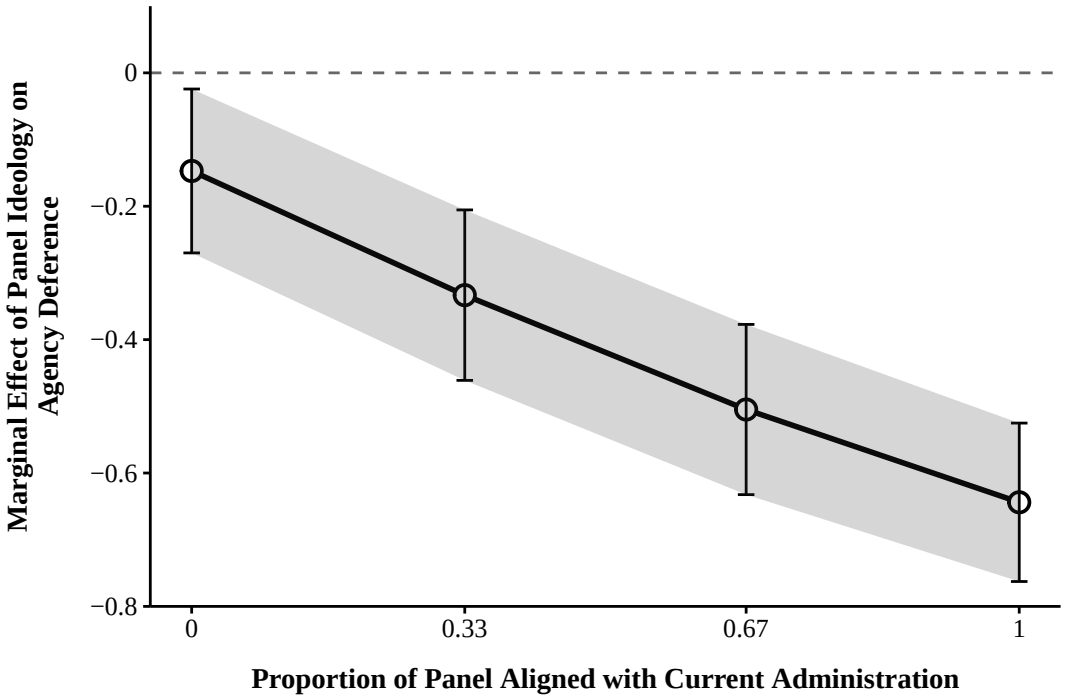


Figure 6: AME of Administration's Alignment on Ideology Effect

Core findings remain stable and robust in Model 5 (Appendix 8) and robustness checks with alternative specifications. Additional controls strengthen the main ideological effects, with demographic diversity (proportion of female and non-white judges in panels at 0.882, $p < 0.01$ and 0.389, $p < 0.05$ respectively) associated with pro-climate outcomes and temporal patterns revealing declining pro-climate success over time (-0.022, $p < 0.001$). Appendix 7.1 provides detailed explanations of the results.

Discussion

My empirical findings construct the validity of the domain-contingent strategic framework. The 30 percentage point ideological gap challenges' Markell and Ruhl

(2012)'s conclusion that climate litigation operates expected legal models.

Legal frameworks indeed create variable "discretionary spaces" where ideology operates differently: dominating in rights-based claims but constrained in traditional environmental law. This extends Gillman (2001)'s "weak discretion" concept by mapping systematic variation across domains.

Panel composition effects build on Sunstein et al. (2006)'s ideological amplification findings but reveal that amplification peaks precisely where legal constraint is minimal. This suggests collegial dynamics and legal frameworks operate as complementary moderating forces. Most significantly, strategic administration alignment demonstrates judicial calculation beyond simple policy maximization. Judges systematically adjust agency deference based on political compatibility, extending Epstein and Knight (1998)'s strategic model and revealing how climate litigation outcomes may swing dramatically with presidential administrations.

These patterns have profound implications: judicial appointments may determine climate litigation's fate, raising questions about courts' role in climate governance. The documented volatility (30–70 percentage point variations) undermines policy stability, requiring litigation strategies to account for political cycles.

Limitations

Several limitations merit acknowledgment. Methodologically, focusing on federal appellate courts limits external validity, while sample size constraints and case concentration in D.C. and Ninth Circuits affect generalizability. Though my "pro-climate" coding follows systematic criteria enabling replication, its 'objectivity' remains subject to skepticism.

Causally, I cannot establish definitive mechanisms—strategic administration

alignment might reflect sincere jurisprudential differences, and circuit specialization could explain patterns I attribute to ideology. My framework assumes stable domain-discretion relationships, but evolving precedent may shift current boundaries. Additionally, judges may construct rather than operate within discretionary spaces, creating endogeneity concerns.

Finally, measurement limitations persist: the liberal-conservative dichotomy may obscure ideological nuances within each camp. This analysis captures a specific moment; as doctrine develops and scientific consensus strengthens, these patterns will likely evolve, requiring continued monitoring.

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1 Appendix

This appendix provides supplementary materials for "Ideology on thin Ice? The Limits of Judicial Neutrality in Climate Litigation" Due to the papers' word limit of 3,000 words, substantial methodological details, full regression results, and additional analyses are presented here to ensure transparency and replicability while maintaining a focused narrative in the main manuscript. The author is conscious that future versions of the paper without word limit should include regression tables, extensive discussion of the literature, results and implications within the main body. I apologize for the confusion and disruption in flow that the current version might bring to the reader.

The appendix includes detailed coding procedures, complete statistical tables, robustness checks, and additional figures that support but are not essential to understanding the core findings. The last section provides links and instructions to access the data use, a codebook of the dataset R and Python scripts used to process, clean, web-scrape the data and analyze it.

Appendix Contents

2 Sample Characteristics and Descriptive Statistics

2.1 Table A: Detailed Sample Characteristics

Table 1: Descriptive Statistics (N = 339)

Case Characteristics		Party Characteristics	
Filing year (median)	2020	*Plaintiff Types*	
Filing year (range)	1990–2025	Environmental NGO	146 (43.1%)
Pro-climate outcome (mean)	0.444	State government	48 (14.2%)
Pro-climate win rate	37.2%	Industry association	44 (13.0%)
Pro-climate loss rate	48.4%	Local government	27 (8.0%)
Partial outcome rate	14.5%	Individual citizen	26 (7.7%)
		Other[1]	48 (14.2%)
Panel Characteristics		*Defendant Types*	
Panel size (mean ± SD)	3.14 ± 1.67	Federal government	283 (83.5%)
Panel JCS score (mean ± SD)	0.047 ± 0.277	Fossil fuel corp.	17 (5.0%)
Republican majority panels	41.3%	Environmental NGO	12 (3.5%)
Democratic majority panels	58.7%	State government	8 (2.4%)
Female judges	35.0%	Local government	7 (2.1%)
Non-white judges	32.2%	Other[2]	12 (3.6%)
Circuit Distribution		**Law Categories**	
D.C. Cir.	165 (48.7%)	Traditional Environmental Law	149 (44.0%)
9th Cir.	72 (21.2%)	Climate-Specific Regulation	93 (27.4%)
5th Cir.	24 (7.1%)	Resource and Sector Regulation	66 (19.5%)
2d Cir.	21 (6.2%)	High Discretion: Rights-Based	31 (9.1%)
10th Cir.	18 (5.3%)		
Other[3]	39 (11.5%)		

3 Variable Construction and Coding

3.1 Pro-Climate Outcome Coding Methodology

3.1.1 Overview

This section details the systematic content analysis protocol used to determine pro-climate outcomes in federal appellate climate litigation. Following established practices in judicial behavior research (Epstein and Knight, 1998; Segal and Spaeth, 2002), I developed a comprehensive coding framework to classify parties'

positions relative to climate governance.

For each of the 339 cases, I analyzed court opinions and orders, complaints and petitions, legal briefs and motions, and supplementary filings when necessary. The sample included only cases with substantive or procedural rulings attributable to judicial decision-making—specifically, cases decided by a judge or panel where the judicial actor granted or denied adversarially disputed claims.

I employed an inductive approach that recognized the contextual nature of legal positioning in climate litigation. For each case, I conducted detailed textual analysis to identify each party's position through five analytical dimensions:

1. **Legal Arguments**: Substantive legal theories advanced, including interpretation of statutory provisions, precedential application, and framing of administrative law principles.

2. **Requested Relief**: Specific remedies sought and their implications for climate protection if granted.

3. **Statutory Interpretation**: How parties construed relevant provisions, particularly whether they advocated for expansive or restrictive readings of environmental statutes regarding greenhouse gas emissions.

4. **Agency Authority**: Whether parties argued for broader or narrower agency jurisdiction to regulate greenhouse gases, implement climate policies, or consider climate impacts.

5. **Procedural Requirements**: Parties' positions on the scope of climate-related assessments under statutes like NEPA, including comprehensiveness of climate impact consideration.

Based on this multi-dimensional analysis, I classified parties according to the following operational definitions:

Pro-Climate: Parties advocating for (1) stricter climate regulations or expanded regulatory authority; (2) broader agency jurisdiction over greenhouse gas emissions; (3) more comprehensive climate impact assessment requirements; (4) expanded liability for climate-related harms; or (5) statutory interpretations facilitating climate governance.

Anti-Climate: Parties advocating for (1) weaker climate regulations or constrained regulatory authority; (2) limited agency jurisdiction over greenhouse gas emissions; (3) minimal climate impact assessment requirements; (4) restricted liability for climate-related harms; or (5) statutory interpretations impeding climate governance.

For ambiguous cases, I developed a systematic decision tree. For example, when climate skeptics requested agency documents through FOIA, I first evaluated the requester's broader litigation strategy, then assessed the likely use of requested information. If the pattern showed use of disclosure to challenge climate science or regulation, I classified the position as Anti-Climate. If the request supported transparency or accountability objectives, I classified it as Pro-Climate.

While intercoder reliability was not feasible due to resource constraints, I implemented several procedural safeguards. First, I created detailed case summaries documenting key arguments supporting each classification. Second, I conducted a temporal consistency check by re-examining a random subset of 50 cases (14.8% of sample) after completing initial coding. This validation revealed 98% agreement with initial coding decisions (49/50 cases), suggesting reliable application of the coding protocol.

3.1.2 Coding Examples

This systematic approach produced consistent classifications while remaining sensitive to the contextual nature of climate litigation positions.

Case Type	Pro-Climate Position	Anti-Climate Position	Classification
NEPA Challenge	Arguing for comprehensive GHG analysis in EIS	Arguing existing analysis sufficient	Based on scope of requested analysis
Endangered Species Act	Claiming climate impacts threaten species	Denying climate-species nexus	Based on recognition of climate science
Clean Air Act	Supporting GHG regulation under CAA	Challenging EPA authority over GHGs	Based on regulatory scope

Table 2: Example Classifications by Case Type

4 Legal Domain Categorization Criteria

4.1 Classification Criteria

Cases were classified into four categories based on the primary legal authority cited and the level of judicial discretion theoretically available within each legal framework:

Table 3: Legal Domain Classification Criteria

Category	Classification Criteria and Theoretical Justification
Traditional Environmental Law	**Criteria:** Cases involving established environmental statutes with extensive precedent, clear procedural requirements, and well-defined administrative deference standards. **Justification:** These statutes feature the most developed doctrine and established standards of review, significantly constraining judicial discretion. As Markell and Ruhl (2012, p. 25) note, "little room is available for the courts to depart from precedent" in these established frameworks. **?**, p. 1057 specifically identifies that "deference is often particularly warranted when reviewing technical analysis and complex scientific data" under these statutes. Keele (2018) found consistently high government success rates in NEPA cases, confirming strong doctrinal constraint. **Primary statutes:** NEPA, ESA, CWA, RCRA, CERCLA, CZMA, FLPMA, APA (when governing procedural challenges to traditional environmental decisions).

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Category	Classification Criteria and Theoretical Justification
High Discretion: Rights-Based	**Criteria:** Cases involving constitutional claims, common law theories, fundamental rights, or novel legal theories with minimal statutory guidance or precedent. **Justification:** These cases require judges to make fundamental value judgments with minimal doctrinal constraint. **?** demonstrated that judicial ideology exerts stronger influence in constitutional cases than in administrative law cases due to greater interpretive latitude. Segal and Spaeth (2002) identify constitutional and common law claims as providing "open texture" for judicial interpretation. Lin (2012, pp. 55–57) notes that novel constitutional theories in climate litigation "create space for judicial innovation" due to underdeveloped precedent. **Primary authorities:** Constitutional provisions (First, Fifth, Ninth, Fourteenth Amendments, Commerce Clause, Supremacy Clause), common law (nuisance, trespass, negligence), maritime law, tort claims. When constitutional claims appear with other statutes, cases are classified as High Discretion.

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Category	Classification Criteria and Theoretical Justification
Climate-Specific Regulation	**Criteria:** Cases involving statutes being applied specifically to regulate greenhouse gas emissions or address climate change impacts. **Justification:** These represent novel applications of existing statutes to climate issues, creating interpretive ambiguity that expands judicial discretion. Following *Massachusetts v. EPA* (U.S. Supreme Court, 2007), courts must determine how traditional statutes apply to climate change. Markell and Ruhl (2012, p. 22) identify these as involving "novel questions" where "existing precedents provide limited guidance." **?** found stronger ideological effects in cases involving new regulatory interpretations. **Primary statutes:** Clean Air Act (when addressing GHG emissions), American Innovation and Manufacturing Act, state climate laws (California AB 32, Minnesota Next Generation Energy Act), Energy Independence and Security Act (when linked to emissions standards).

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Category	Classification Criteria and Theoretical Justification
Resource and Sector Regulation	**Criteria:** Cases involving energy production, resource extraction, transportation infrastructure, or sector-specific regulatory frameworks. **Justification:** These technical domains have established frameworks but evolving applications to climate issues, creating moderate discretion. Miles and Sunstein (2006) found intermediate levels of ideological voting in energy and resource cases. These cases often involve technical determinations within established regulatory frameworks, balancing expertise and policy considerations. **Primary statutes:** Energy Policy and Conservation Act, Natural Gas Act, Federal Power Act, Mineral Leasing Act, transportation statutes, financial regulations (when related to energy/resource projects). Statutes appearing in climate cases for procedural reasons (RFRA, Immigration Act, PLRA) are classified here when they govern technical or sector-specific determinations.

When multiple laws appear in a single case:

1. If constitutional claims are present, classify as High Discretion: Rights-Based, as constitutional interpretation provides maximum judicial discretion
2. If Clean Air Act appears with explicit reference to greenhouse gas regulation, classify as Climate-Specific Regulation
3. If multiple established environmental statutes appear together, classify as

Traditional Environmental Law

4. When APA appears with substantive statutes, classify based on the substantive statute

5. For edge cases, classify based on the first-listed primary law, as this typically represents the principal legal basis

4.2 List of laws per Discretion categories

Table 4: Codebook: Principal Laws by Category

Principal Laws	**Law Category**
National Environmental Policy Act (NEPA)	Traditional Environmental Law
National Environmental Policy Act (NEPA)—Marine Mammal Protection Act (MMPA)	Traditional Environmental Law
Endangered Species Act (ESA)	Traditional Environmental Law
Resource Conservation and Recovery Act (RCRA)	Traditional Environmental Law
Clean Water Act (CWA)	Traditional Environmental Law
Administrative Procedure Act (APA)—Oil Pollution Act	Traditional Environmental Law
National Environmental Policy Act (NEPA)—Clean Water Act (CWA)—Natural Gas Act	Traditional Environmental Law
Freedom of Information Act (FOIA)—Mineral Leasing Act (MLA)	Traditional Environmental Law

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Table 4 – continued from previous page

Principal Laws	Law Category
Administrative Procedure Act (APA)—Federal Register Act	Traditional Environmental Law
National Environmental Policy Act (NEPA)—National Historic Preservation Act (NHPA)—Natural Gas Act	Traditional Environmental Law
Endangered Species Act (ESA)—National Historic Preservation Act (NHPA)	Traditional Environmental Law
National Environmental Policy Act (NEPA)—Coastal Zone Management Act (CZMA)—Illegal Immigration Reform and Immigrant Responsibility Act—Endangered Species Act (ESA)	Traditional Environmental Law
Migratory Bird Treaty Act—Bald and Golden Eagle Protection Act—Endangered Species Act (ESA)—National Environmental Policy Act (NEPA)	Traditional Environmental Law
National Environmental Policy Act (NEPA)—National Forest Management Act (NFMA)	Traditional Environmental Law
Administrative Procedure Act (APA)—Outer Continental Shelf Lands Act (OCSLA)—Endangered Species Act (ESA)—National Environmental Policy Act (NEPA)	Traditional Environmental Law
National Environmental Policy Act (NEPA)—Administrative Procedure Act (APA)	Traditional Environmental Law
Endangered Species Act (ESA)—Administrative Procedure Act (APA)	Traditional Environmental Law
Administrative Procedure Act (APA)—National Environmental Policy Act (NEPA)	Traditional Environmental Law

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Table 4 – continued from previous page

Principal Laws	Law Category
National Environmental Policy Act (NEPA)—Clean Water Act (CWA)—Administrative Procedure Act (APA)—National Wildlife Refuge System Improvement Act of 1997—Endangered Species Act (ESA)	Traditional Environmental Law
Administrative Procedure Act (APA)—Coastal Zone Management Act (CZMA)—Ocean Dumping Act	Traditional Environmental Law
National Environmental Policy Act (NEPA)—Clean Water Act (CWA)—Federal Power Act—Administrative Procedure Act (APA)	Traditional Environmental Law
National Environmental Policy Act (NEPA)—Magnuson-Stevens Act	Traditional Environmental Law
Administrative Procedure Act (APA)—Alaska National Interest Lands Conservation Act—National Petroleum Reserves Production Act—Endangered Species Act (ESA)—National Environmental Policy Act (NEPA)	Traditional Environmental Law
Administrative Procedure Act (APA)—Endangered Species Act (ESA)	Traditional Environmental Law
Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)—Toxic Substances Control Act (TSCA)—Resource Conservation and Recovery Act (RCRA)	Traditional Environmental Law
Administrative Procedure Act (APA)—Magnuson-Stevens Act	Traditional Environmental Law

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Principal Laws	Law Category
Administrative Procedure Act (APA)—Endangered Species Act (ESA)—National Environmental Policy Act (NEPA)	Traditional Environmental Law
Administrative Procedure Act (APA)—Outer Continental Shelf Lands Act (OCSLA)—National Environmental Policy Act (NEPA)—Marine Mammal Protection Act (MMPA)—Clean Water Act (CWA)	Traditional Environmental Law
Administrative Procedure Act (APA)—National Wildlife Refuge System Improvement Act of 1997—National Environmental Policy Act (NEPA)	Traditional Environmental Law
National Environmental Policy Act (NEPA)—Clean Water Act (CWA)—Administrative Procedure Act (APA)—Endangered Species Act (ESA)	Traditional Environmental Law
Common Law Right of Public Access—House of Representative Rules—2 U.S.C. Ch. 43 (Congressional Committees)	Traditional Environmental Law
Federal Advisory Committee Act—Administrative Procedure Act (APA)	Traditional Environmental Law
Administrative Procedure Act (APA)—Hazardous Materials Transportation Act—National Environmental Policy Act (NEPA)	Traditional Environmental Law
National Environmental Policy Act (NEPA)—Federal Land Policy and Management Act (FLPMA)—Administrative Procedure Act (APA)	Traditional Environmental Law

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Table 4 – continued from previous page

Principal Laws	Law Category
National Environmental Policy Act (NEPA)—Clean Water Act (CWA)—Administrative Procedure Act (APA)	Traditional Environmental Law
National Environmental Policy Act (NEPA)—Natural Gas Act—Administrative Procedure Act (APA)	Traditional Environmental Law
Federal Land Policy and Management Act (FLPMA)—Supremacy Clause—Federal Oil and Gas Royalty Management Act—Clean Air Act (CAA)—Mineral Leasing Act (MLA)	Traditional Environmental Law
Principal Laws: Clean Air Act (CAA), Principal Laws: National Environmental Policy Act (NEPA)	Traditional Environmental Law
Principal Laws: National Environmental Policy Act (NEPA), Clean Water Act (CWA)	Traditional Environmental Law
Principal Laws: Natural Gas Act, Administrative Procedure Act (APA), National Environmental Policy Act (NEPA)	Traditional Environmental Law
Principal Laws: Clean Air Act (CAA), Administrative Procedure Act (APA)	Traditional Environmental Law
Principal Laws: Administrative Procedure Act (APA), Clean Air Act (CAA)	Traditional Environmental Law
Principal Laws: National Environmental Policy Act (NEPA), Natural Gas Act	Traditional Environmental Law
Federal Common Law—Nuisance—State Law—Nuisance	High Discretion: Rights-Based

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Principal Laws	Law Category
Supremacy Clause—Energy Policy and Conservation Act (EPCA)	High Discretion: Rights-Based
Admiralty Law—Flood Control Act of 1928—Federal Tort Claims Act	High Discretion: Rights-Based
State Law—Trespass—Maritime Law—Nuisance—Maritime Law—Tortious Interference—State Law—Conversion—Maritime Law—Intentional Interference with Maritime Navigation—Outer Continental Shelf Lands Act (OCSLA)—State Law—Nuisance—Maritime Law—Trespass	High Discretion: Rights-Based
State Law—Tort Law—State Law—Trespass—State Law—Nuisance—State Law—Negligence	High Discretion: Rights-Based
First Amendment	High Discretion: Rights-Based
Principal Laws: Fifth Amendment—Takings	High Discretion: Rights-Based
Principal Laws: Maritime Law—Nuisance, Maritime Law—Tortious Interference, Conspiracy, Federal Common Law—Nuisance, State Law—Nuisance, Maritime Law—Trespass, State Law—Trespass	High Discretion: Rights-Based
First Amendment—Supremacy Clause—Fourth Amendment—State Law—Common Law—Fourteenth Amendment—Commerce Clause	High Discretion: Rights-Based

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Table 4 – continued from previous page

Principal Laws	Law Category
Commerce Clause—Supremacy Clause—Interstate Commerce Commission Termination Act of 1995 (ICCTA)—Ports and Waterways Safety Act	High Discretion: Rights-Based
Supremacy Clause—State Law—Nuisance	High Discretion: Rights-Based
Fourteenth Amendment—Equal Protection—Contracts Clause—State Constitutions¿Connecticut State Constitution—Connecticut General Statutes-Public Service Companies—Connecticut Sales and Use Tax Statute—Promissory Estoppel	High Discretion: Rights-Based
Fourteenth Amendment—Due Process—State Law—Miscellaneous Statutes¿California Government Code—California Environmental Quality Act (CEQA)—State Constitutions¿California Constitution—California Public Utilities Code—Fourteenth Amendment—Equal Protection	High Discretion: Rights-Based
State Law—Nuisance—State Law—Trespass	High Discretion: Rights-Based
Fourteenth Amendment—Equal Protection—Arizona Public Utilities and Carriers Law—Sherman Antitrust Act—State Law—Miscellaneous Statutes¿Arizona Uniform State Antitrust Act—State Constitutions¿Arizona Constitution	High Discretion: Rights-Based

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Principal Laws	Law Category
Contract Law—State Law—Negligence—State Law–Strict Liability	High Discretion: Rights-Based
Ninth Amendment—Fifth Amendment—Due Process—Natural Gas Act—Administrative Procedure Act (APA)—Tenth Amendment—National Environmental Policy Act (NEPA)	High Discretion: Rights-Based
Article II (U.S. Constitution)	High Discretion: Rights-Based
Colorado River Storage Act—Fifth Amendment—Due Process—Navajo Indian Irrigation Project Act—Fifth Amendment—Equal Protection—Omnibus Public Land Management Act of 2009—Fourteenth Amendment—McCarran Amendment—Colorado River Compact of 1922—Upper Basin Compact of 1948—Supremacy Clause—Compact Clause—Fourteenth Amendment—Equal Protection—Endangered Species Act (ESA)—Fourteenth Amendment—Due Process—National Environmental Policy Act (NEPA)—Reclamation Act of 1902—First Amendment	High Discretion: Rights-Based

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Table 4 – continued from previous page

Principal Laws	Law Category
Administrative Procedure Act (APA)—Outer Continental Shelf Lands Act (OCSLA)—Coastal Zone Management Act (CZMA)—Fourteenth Amendment—Due Process—State Law—Miscellaneous Statutes¿New York Climate Leadership and Community Protection Act—Executive Order 12898—National Environmental Policy Act (NEPA)—Freedom of Information Act (FOIA)	High Discretion: Rights-Based
Administrative Procedure Act (APA)—Securities Act of 1933/Securities Exchange Act of 1934—First Amendment	High Discretion: Rights-Based
Principal Laws: Clean Air Act (CAA)	Climate-Specific Regulation
Clean Air Act (CAA)	Climate-Specific Regulation
Clean Air Act (CAA)—Energy Independence and Security Act (EISA)	Climate-Specific Regulation
California Global Warming Solutions Act (AB 32)—Supremacy Clause—Clean Air Act (CAA)—Energy Independence and Security Act (EISA)—Commerce Clause	Climate-Specific Regulation

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Table 4 – continued from previous page

Principal Laws	Law Category
Clean Air Act (CAA)—Fourteenth Amendment—Commerce Clause—Federal Power Act—Supremacy Clause—Privileges and Immunities Clause—State Law—Miscellaneous Statutes¿Minnesota Next Generation Energy Act	Climate-Specific Regulation
Principal Laws: Clean Air Act (CAA), Energy Independence and Security Act (EISA)	Climate-Specific Regulation
Clean Air Act (CAA)—Energy Policy Act of 2005	Climate-Specific Regulation
Clean Air Act (CAA)—National Environmental Policy Act (NEPA)—Vision 100 Act	Climate-Specific Regulation
Clean Air Act (CAA)—Energy Independence and Security Act (EISA)—Energy Policy Act of 2005—Administrative Procedure Act (APA)	Climate-Specific Regulation
Clean Air Act (CAA)—Energy Policy and Conservation Act (EPCA)	Climate-Specific Regulation
American Innovation and Manufacturing Act (AIM Act)—Clean Air Act (CAA)	Climate-Specific Regulation
Principal Laws: Clean Air Act (CAA), American Innovation and Manufacturing Act (AIM Act)	Climate-Specific Regulation
Administrative Procedure Act (APA)—Clean Air Act (CAA)	Climate-Specific Regulation
Administrative Procedure Act (APA)—Clean Air Act (CAA)—Energy Policy and Conservation Act (EPCA)	Climate-Specific Regulation

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Principal Laws	Law Category
Energy Independence and Security Act (EISA)	Resource and Sector Regulation
Principal Laws: Energy Policy and Conservation Act (EPCA)	Resource and Sector Regulation
Energy Independence and Security Act (EISA)—Energy Policy Act of 2005—Clean Air Act (CAA)	Resource and Sector Regulation
Energy Independence and Security Act (EISA)—Clean Air Act (CAA)	Resource and Sector Regulation
Natural Gas Act—National Environmental Policy Act (NEPA)	Resource and Sector Regulation
Natural Gas Act—State Law—Miscellaneous Statutes¿Pennsylvania Dam Safety and Encroachment Act	Resource and Sector Regulation
Rivers and Harbors Act—Executive Order 11988—National Environmental Policy Act (NEPA)—Clean Water Act (CWA)	Resource and Sector Regulation
Natural Gas Act	Resource and Sector Regulation
Natural Gas Act—Coastal Zone Management Act (CZMA)—National Environmental Policy Act (NEPA)	Resource and Sector Regulation
Energy Policy and Conservation Act (EPCA)—Energy Independence and Security Act (EISA)—Federal Civil Penalties Inflation Adjustment Act Improvements Act of 2015	Resource and Sector Regulation

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Table 4 – continued from previous page

Principal Laws	Law Category
Energy Policy Act of 2005—Clean Air Act (CAA)—Energy Independence and Security Act (EISA)	Resource and Sector Regulation
Energy Policy and Conservation Act (EPCA)	Resource and Sector Regulation
Energy Policy and Conservation Act (EPCA)—Administrative Procedure Act (APA)	Resource and Sector Regulation
Energy Policy and Conservation Act (EPCA)—Energy Independence and Security Act (EISA)	Resource and Sector Regulation
Department of Transportation Act (Section 4(f))—Rivers and Harbors Act—National Environmental Policy Act (NEPA)—Urban Park and Recreation Recovery Act—National Historic Preservation Act (NHPA)—Clean Water Act (CWA)	Resource and Sector Regulation
Energy Reorganization Act	Resource and Sector Regulation
Mineral Leasing Act (MLA)—Outer Continental Shelf Lands Act (OCSLA)—National Environmental Policy Act (NEPA)—Clean Air Act (CAA)—Energy Policy and Conservation Act (EPCA)	Resource and Sector Regulation
Federal Power Act—Administrative Procedure Act (APA)—State Law—Miscellaneous Statutes¿New York Climate Leadership and Community Protection Act	Resource and Sector Regulation

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Table 4 – continued from previous page

Principal Laws	Law Category
Mineral Leasing Act (MLA)—Administrative Procedure Act (APA)—Outer Continental Shelf Lands Act (OCSLA)	Resource and Sector Regulation
Energy Policy and Conservation Act (EPCA)—Supremacy Clause—State Constitutions¿California Constitution—State Law—Miscellaneous Statutes¿California Energy Code—State Law—Miscellaneous Statutes¿California Building Standards Code	Resource and Sector Regulation
Federal Power Act—State Law—Miscellaneous Statutes¿New York Climate Leadership and Community Protection Act	Resource and Sector Regulation
Natural Gas Act—Administrative Procedure Act (APA)—National Environmental Policy Act (NEPA)	Resource and Sector Regulation
Administrative Procedure Act (APA)—Energy Policy and Conservation Act (EPCA)	Resource and Sector Regulation
Administrative Procedure Act (APA)—Moving Ahead for Progress in the 21st Century Act (MAP-21)—Fixing America's Surface Transportation Act (FAST Act)—Spending Clause—Infrastructure Investment and Jobs Act (IIJA)—National Highways System Designation Act	Resource and Sector Regulation
Federal Housing and Economic Recovery Act of 2008	Resource and Sector Regulation

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Table 4 – continued from previous page

Principal Laws	Law Category
State Law—Unfair Competition—Federal Patent Law	Resource and Sector Regulation
Interstate Commerce Commission Termination Act of 1995 (ICCTA)—Commerce Clause—Contract Law	Resource and Sector Regulation
Federal Patent Law—State Law—Unfair Competition	Resource and Sector Regulation
State Law—Miscellaneous Statutes¿District of Columbia Consumer Protection Procedures Act	Resource and Sector Regulation
Investment Company Act of 1940	Resource and Sector Regulation
Immigration and Nationality Act	Resource and Sector Regulation
Prison Litigation Reform Act (PLRA)—Eighth Amendment	Resource and Sector Regulation
Securities Act of 1933/Securities Exchange Act of 1934	Resource and Sector Regulation
Religious Freedom Restoration Act (RFRA)	Resource and Sector Regulation

5 Party Type Categorization

5.1 Theoretical Rationale for Classification

Our party type classification system reflects established categories in environmental and climate governance literature, designed to capture the distinct in-

stitutional interests, resource capacities, and strategic behaviors of different actors in climate litigation (**???**). The nine-category typology balances granularity with parsimony, ensuring sufficient differentiation while maintaining analytical tractability.

5.2 Classification Methodology

Each party was classified based on their primary organizational characteristics and governance role, following these principles:

1. **Mutual Exclusivity:** Each entity was assigned to exactly one category based on their predominant organizational type
2. **Constitutional Structure:** Government entities were classified by level (federal, state, local) reflecting distinct jurisdictional authorities and interests (**?**)
3. **Economic Interests:** Private sector entities were distinguished between fossil fuel corporations (direct climate impact) and other industries, recognizing different stakes in climate regulation (**?**)
4. **Civil Society Segmentation:** Non-governmental organizations were separated into environmental NGOs and other civil society groups, acknowledging specialized expertise and advocacy focus (**?**)

Environmental NGOs

These organizations focus primarily on environmental protection and climate advocacy. They typically act as plaintiffs challenging government actions or corporate activities, bringing both resources and technical expertise to climate litigation. Their role is crucial as they often serve as repeat players with specialized

legal knowledge and networks (**?**). In climate litigation, they frequently pursue expansive interpretations of environmental statutes and push for stronger regulatory enforcement.

Federal Government and Officials

Federal entities possess unique regulatory authority over interstate environmental issues and substantial litigation resources. They appear as defendants when their actions are challenged (often by environmental groups) or as plaintiffs enforcing environmental regulations. The federal government's position in climate litigation often reflects presidential administration priorities, making judicial ideology particularly salient in these cases (**?**).

Fossil Fuel Corporations and Associations

These entities have direct economic stakes in climate regulation outcomes. They typically appear as defendants in tort actions or as plaintiffs challenging regulatory restrictions. Their substantial resources enable sophisticated legal strategies, while their economic interests generally align with limiting climate regulation. This category captures the central conflict in many climate cases between economic interests and environmental protection (**?**).

Individual Citizens

Private citizens bring unique standing issues and represent direct impacts of climate change or climate policies. They may sue as victims of climate-related harms or challenge regulations affecting their property rights. Their limited resources often require pro bono representation or class action mechanisms, distinguishing their litigation capacity from institutional actors (Galanter, 1974).

Industry Associations

Trade organizations represent collective industry interests beyond fossil fuels, including transportation, manufacturing, and agriculture. They often intervene in regulatory challenges to protect member interests and bring technical expertise about industry-specific impacts. Their positions on climate issues vary based on how regulations affect their specific sectors (**?**).

Local Government

Municipalities and counties face unique climate impacts (sea level rise, extreme weather) while possessing limited regulatory authority. They increasingly appear as plaintiffs in climate liability suits or challenge federal/state policies affecting local interests. Their positions reflect the tension between local vulnerability and limited jurisdictional power (**?**).

Other Civil Society Organizations

This category includes tribal governments, religious organizations, and non-environmental advocacy groups. They bring diverse perspectives to climate litigation, often emphasizing environmental justice, indigenous rights, or property concerns. Their involvement reflects the broad societal impacts of climate change beyond traditional environmental constituencies (**?**).

Other Corporations and Utilities

Non-fossil fuel businesses have varied climate interests depending on their sector and business model. Some support climate action (renewable energy companies), while others resist regulation (manufacturing, utilities). Their participation reflects the economy-wide implications of climate policy and the heterogeneous business responses to climate regulation (**?**).

State Government

States possess significant regulatory authority while facing diverse political pressures. They appear as both plaintiffs (challenging federal actions) and defendants (defending state climate policies). State positions often reflect partisan politics and regional economic interests, creating substantial variation in their climate litigation stances (**?**).

Coding Implications

This classification system enables analysis of how different institutional characteristics affect litigation outcomes. Party type serves as a control variable capturing structural asymmetries in litigation capacity, political accountability, and economic interests that may influence judicial decision-making beyond ideological considerations (Galanter, 1974).

List of Parties per Party Categories

The following table presents all entities classified within each category:

Table 5: Party Type Classification with Complete List

Category	Organizations
Environmental NGO	Northwest Environmental Advocates; Center for Biological Diversity, Inc.; Sierra Club; Greater Yellowstone Coalition, Inc.; Northern Plains Resource Council; Conservancy of Southwest Florida; Washington Environmental Council; WildEarth Guardians; Communities for a Better Environment; iMatter Utah; EarthReports, Inc. (dba Patuxent Riverkeeper); Alaska Wilderness League; Catskill Mountainkeeper, Inc.; Helping Hand Tools; Clean Air Council; Delaware Riverkeeper Network; Natural Resources Defense Council, Inc.; Allegheny Defense Project; Turtle Island Restoration Network; Atchafalaya Basinkeeper; Appalachian Voices; Western Organization of Resource Councils; Environmental Defense Fund; Southern Utah Wilderness Alliance; Indigenous Environmental Network; Diné Citizens Against Ruining Our Environment; Otsego 2000, Inc.; High Country Conservation Advocates; Center for Community Action & Environmental Justice; Bark; Northern Alaska Environmental Center; Union of Concerned Scientists; Friends of the Earth; Alliance for Water Efficiency; Beyond Pesticides; Vecinos para el Bienestar de la Comunidad Costera; Protect Our Parks, Inc.; Food & Water Watch; National Wildlife Refuge Association; Gulf Restoration Network; Save the Bull Trout; Waterkeepers Chesapeake; Wild Virginia; North Carolina Wildlife Federation; Citizens for Clean Energy; Sovereign Iñupiat for a Living Arctic; Housatonic River Initiative; Healthy Gulf; Defenders of Wildlife; Citizens for Clean Air & Clean Water in Brazoria County; El Puente; New Jersey Conservation Foundation; Air Alliance Houston; Citizens Action Coalition of Indiana, Inc.; Western Watersheds Project; Indigenous Peoples of the Coastal Bend; Kempthorne; Greenpeace, Inc.; Jewell; Inslee

Table 5 – Continued from previous page

Category	Organizations
Federal government and officials	United States Government; Pruitt; National Highway Traffic Safety Administration; Bonneville Power Administration; Surface Transportation Board; EPA; National Marine Fisheries Service; Goldstene; U.S. Department of the Interior; Tidwell; U.S. Department of Transportation; U.S. Fish and Wildlife Service; Katrina Canal Breaches Litigation; Federal Housing Finance Agency; U.S. Department of Agriculture, Rural Utilities Service; Corey; Bellon; U.S. Department of Energy; Federal Highway Administration; Njord; Federal Energy Regulatory Commission; McCarthy; Heydinger; U.S. Army Corps of Engineers; Zinke; U.S. Bureau of Land Management; U.S. Department of Commerce; Perry; Healey; Export-Import Bank; Burke; Federal Aviation Administration; Border Infrastructure Environmental Litigation; U.S. Department of State; Bernhardt; U.S. Forest Service; Wheeler; Malloy; Regan; U.S. Nuclear Regulatory Commission; Haaland; Buttigieg; Biden; Council on Environmental Quality; U.S. Bureau of Ocean Energy Management; Mississippi River Commission; U.S. Department of the Interior, Bureau of Reclamation; Raimondo; U.S. Securities and Exchange Commission; U.S. House of Representatives; Garland

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Category	Organizations
Fossil fuel corporation and association	American Fuel & Petrochemical Manufacturers; American Petroleum Institute; Shell Offshore, Inc.; Monroe Energy, LLC; Shell Gulf of Mexico, Inc.; Murray Energy Corp.; Kentucky Coal Association, Inc.; Exxon Mobil Corp.; Ergon-West Virginia, Inc.; Border Infrastructure Environmental Litigation; Lighthouse Resources, Inc.; Atlantic Coast Pipeline, LLC; American Public Gas Association; IGas Holdings, Inc.; Murphy Oil USA, Inc.; BP P.L.C.; Transcontinental Gas Pipe Line Co.
Individual citizen	Korsinsky; Hapner; Barnes; Katrina Canal Breaches Litigation; Comer; Klein; Sowinski; Vaughn; Birckhead; Colon de Mejias; Evans; Roemer; Swomley; Ellis; Berka; Stewart; Kinsella; Schilling; Cruz; Young; Swanson; Clark; Ondrusek; Servheen; Williams; Schroyer; LeBlanc

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Category	Organizations
Industry association	Association of Public Agency Customers, Inc.; Mid States Coalition for Progress; Pacific Merchant Shipping Association; Chamber of Commerce of the United States of America; Building Industry Association of Washington; National Chicken Council; Association of Taxicab Operators USA; Rocky Mountain Farmers Union; Carbon Sequestration Council; Alliance of Automobile Manufacturers; Owner-Operator Independent Drivers Association, Inc.; Truck Trailer Manufacturers Association, Inc.; Americans for Clean Energy; Western Energy Alliance; Advanced Biofuels Association; Growth Energy; RFS Power Coalition; San Francisco Taxi Coalition; Renewable Fuels Association; Shrimpers and Fishermen of the RGV; Independent Power Producers of New York, Inc.; Racing Enthusiasts and Suppliers Coalition; California Restaurant Association; Maine Lobstermen's Association, Inc.; Alabama Municipal Distributors Group
Local government	City of Los Angeles; State of New York; County of Sonoma; St. Bernard Parish Government; Town of Weymouth; Mexichem Fluor, Inc.; City of Oakland; City of New York; Town of Southold; District of Columbia; Harrison County; City of Port Isabel; City of Dallas; Metropolitan Water Reclamation District of Greater Chicago; City & County of San Francisco; City of Berkeley
Other civil society organizations	Mayo Foundation; Resisting Environmental Destruction on Indigenous Lands; Coalition for the Advancement of Regional Transportation; Crow Indian Tribe; Competitive Enterprise Institute; Adorers of the Blood of Christ; Voice of the Experienced

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Category	Organizations
Other corporations and utilities	Arkema, Inc.; Honeywell International, Inc.; Delta Construction Co.; Energy Answers Arecibo, LLC; Nucor Steel-Arkansas; Zero Zone, Inc.; National Biodiesel Board; POET Biorefining, LLC; Heating, Air-Conditioning, & Refrigeration Distributors International; RMS of Georgia, LLC; Allco Renewable Energy, Ltd.; Tennessee Valley Authority; Big River Steel, LLC; Salt River Project Agricultural Improvement & Power District; Entergy Corp.; Danimer Scientific, Inc.
State government	California; Texas; West Virginia; Oklahoma; North Dakota; Wyoming; General Land Office of State of Texas; Oakland Bulk & Oversized Terminal, LLC; Louisiana; Missouri; Iowa; New York State Public Service Commission; Kentucky; Nebraska; Washington State Building Code Council; Pennsylvania Department of Environmental Protection; California Air Resources Board; North Carolina Department of Transportation

6 Propensity Score Matching Results

Table 6: Propensity Score Matching Results

Method	Pro-Climate Outcome Rate		Treatment Effect	
	Democratic Majority	Republican Majority	ATE	SE
Before Matching	0.547	0.298	-0.249***	0.054
After Matching	0.576	0.268	-0.307***	0.059
Regression Adjustment[a]	–	–	-0.306***	0.059

Note: N = 339 before matching, N = 222 after matching (111 matched pairs).

*** $p < 0.001$. ATE = Average Treatment Effect.

[a] Regression adjustment on matched sample includes controls for filing year, D.C. Circuit, and Traditional Environmental Law.

7 Full Regression Results Table

7.1 Detailed Explanation of Model Results

7.1.1 Model 1: Baseline Specification

The baseline model establishes the fundamental relationship between judicial ideology and climate litigation outcomes through ordered logistic regression, with the dependent variable capturing three ordered categories of pro-climate success (Loss = 0, Partial = 0.5, Win = 1).

The core finding emerges immediately: Panel JCS Mean exhibits a strong negative coefficient (-2.103, $p < 0.001$), demonstrating that more conservative panels are dramatically less likely to rule in favor of pro-climate positions. This effect is substantively massive—moving from the most liberal to most conservative panel reduces pro-climate odds by approximately 15-fold, confirming our first hypothesis about baseline ideological effects. The coefficient magnitude places climate litigation among the most ideologically polarized areas of federal appellate decision-making.

Beyond ideology, several control variables reveal important structural features of climate litigation. The negative filing year coefficient (-0.022, $p < 0.001$) indicates a steady decline in pro-climate success over time, with each additional year associated with approximately 2.2% lower odds of favorable outcomes. This temporal pattern likely reflects the increasing political polarization of climate issues in American politics.

Party type effects demonstrate substantial structural advantages. Federal government plaintiffs (1.787, $p < 0.001$) and other corporations (2.109, $p < 0.001$) enjoy dramatically higher success rates compared to environmental NGOs, the reference category. These effects suggest that institutional resources, litigation ca-

Table 7: Ordered Logit Models: Progressive Analysis of Climate Litigation Outcomes (Part 1)

	(1) Base	(2) Law Dom.	(3) Panel Eff.	(4) Agency	(5) Full
Main Effects					
Panel JCS Mean	-2.103^{***}	-2.253^{***}	-2.856^{***}	2.468^{***}	-2.798^{***}
	(0.396)	(0.340)	(0.326)	(0.227)	(0.210)
Law Domain (ref: Trad. Env.)					
Climate-Specific Reg.		0.554	0.542	-0.695^{*}	0.491
		(0.289)	(0.292)	(0.316)	(0.262)
Resource/Sector Reg.		0.124	0.135	-0.078	0.187
		(0.289)	(0.290)	(0.416)	(0.295)
High Discretion		0.316	0.201	-0.165	0.342
		(0.232)	(0.232)	(0.139)	(0.221)
Interactions					
JCS × Climate-Spec.		0.329^{**}	0.539^{***}	-1.091^{***}	0.720^{***}
		(0.124)	(0.142)	(0.099)	(0.113)
JCS × Resource/Sector		0.052	0.049	-0.928^{***}	0.274^{***}
		(0.113)	(0.103)	(0.082)	(0.081)
JCS × High Discretion		-1.462^{***}	-1.300^{***}	-1.249^{***}	-1.723^{***}
		(0.047)	(0.044)	(0.050)	(0.040)
Panel JCS Range			0.221	-0.418	0.180
			(0.298)	(0.360)	(0.292)
JCS × Panel Range			1.226^{***}	-1.692^{***}	1.399^{***}
			(0.129)	(0.098)	(0.079)
Panel Alignment Prop.				-0.292	
				(0.394)	
JCS × Alignment				2.853^{***}	
				(0.103)	
Controls					
Filing Year	-0.022^{***}	-0.010^{***}	-0.008^{***}	-0.007^{***}	-0.007
	(0.000)	(0.000)	(0.000)	(0.000)	(–)
Circuit (ref: 10th)					
2nd Circuit	0.422	0.362	0.324	-0.455	0.480
	(0.319)	(0.277)	(0.269)	(0.378)	(0.270)
5th Circuit	-0.305	-0.282	-0.279	0.236	-0.150
	(0.354)	(0.360)	(0.361)	(0.315)	(0.318)
9th Circuit	-0.159	-0.240	-0.248	-0.078	-0.273
	(0.244)	(0.242)	(0.249)	(0.326)	(0.255)
DC Circuit	0.040	-0.142	-0.191	0.068	-0.222
	(0.204)	(0.210)	(0.217)	(0.249)	(0.179)
Other Circuits	-0.778^{**}	-0.783^{**}	-0.817^{**}	0.737	-0.691^{*}
	(0.292)	(0.274)	(0.277)	(0.394)	(0.323)

Continued on next page

Table 8: Ordered Logit Models: Progressive Analysis (Part 2)

	(1) Base	(2) Law Dom.	(3) Panel Eff.	(4) Agency	(5) Full
Plaintiff (*ref: Env. NGO*)					
Federal govt.	1.787***	1.755***	1.666***	−16.106***	1.780***
	(0.022)	(0.023)	(0.024)	(0.000)	(0.023)
Fossil fuel corp.	1.491***	1.315***	1.371***	−1.760***	1.295***
	(0.380)	(0.387)	(0.381)	(0.135)	(0.391)
Individual	0.261	0.328	0.398	-0.441	0.443
	(0.340)	(0.346)	(0.348)	(0.363)	(0.349)
Industry assoc.	0.301	0.199	0.189	-0.004	0.132
	(0.315)	(0.321)	(0.322)	(0.414)	(0.321)
Local govt.	-0.153	-0.075	-0.079	-0.004	-0.246
	(0.301)	(0.308)	(0.303)	(0.251)	(0.276)
Other civil soc.	-0.111	-0.135	−0.188*	−0.131**	−0.288***
	(0.068)	(0.077)	(0.088)	(0.044)	(0.085)
Other corp.	2.109***	1.831***	1.874***	−2.818***	1.775***
	(0.158)	(0.110)	(0.113)	(0.074)	(0.104)
State govt.	0.761*	0.531	0.540	-0.556	0.469
	(0.309)	(0.317)	(0.320)	(0.328)	(0.295)
Defendant (*ref: Env. NGO*)					
Federal govt.	0.680**	0.518*	0.552*		0.523*
	(0.257)	(0.241)	(0.238)		(0.267)
Fossil fuel corp.	1.654***	1.490***	1.506***		1.347***
	(0.153)	(0.154)	(0.154)		(0.141)
Individual	0.439***	0.183***	0.208***		0.215***
	(0.067)	(0.053)	(0.062)		(0.051)
Local govt.	0.223***	0.178*	0.369***		0.367***
	(0.067)	(0.081)	(0.076)		(0.088)
Other corp.	1.718***	1.537***	1.524***		1.655***
	(0.072)	(0.071)	(0.073)		(0.068)
State govt.	1.550***	1.234***	1.340***		1.171***
	(0.085)	(0.092)	(0.088)		(0.086)
Judge Demographics					
Panel Female Prop.					0.882**
					(0.306)
Panel Non-white Prop.					0.389*
					(0.174)
Panel Age Mean					0.018
					(–)
Panel Exp. Mean					-0.022
					(0.015)
Cut points					
Loss—Partial	−44.087***	−19.672***	−15.292***	−14.696***	-12.480
Partial—Win	−43.408***	−18.985***	−14.603***	−14.593***	−11.781***
N	339	339	339	244	339
AIC	668.59	676.95	679.49	376.73	682.20
Log Likelihood	-311.30	-309.48	-308.74	-161.36	-306.10

Notes: Standard errors in parentheses. $^{*}p < 0.05$, $^{**}p < 0.01$, $^{***}p < 0.001$. Model 4 uses agency deference as outcome (n=244). Model 5 adds demographics. Missing coefficients indicated by – in model 5 due to convergence issues.

pacity, and perhaps standing advantages create systematic disparities in climate litigation outcomes. Conversely, when the federal government appears as defendant (0.680, $p < 0.01$), pro-climate outcomes become more likely, possibly reflecting administrative deference principles that favor government positions even when challenged by industry.

The model achieves strong fit with an AIC of 668.59 and log likelihood of -311.30, providing a solid foundation for our theoretical extensions. These baseline results establish that ideology matters profoundly in climate litigation while revealing important structural patterns that persist throughout our analysis.

7.1.2 Model 2: Domain-Contingent Effects

Model 2 introduces our theoretical innovation by incorporating legal domain categories and their interactions with ideology, testing whether ideological influence varies systematically across areas of law with different levels of judicial discretion.

The main ideological effect remains robust (-2.253, $p < 0.001$), while the law domain main effects reveal an intriguing pattern: none achieve statistical significance on their own. This suggests that in ideologically neutral panels, different legal frameworks produce similar baseline pro-climate rates. The theoretical action lies in the interaction terms.

The interaction effects powerfully support our domain-contingent framework. The JCS × High Discretion interaction (-1.462, $p < 0.001$) confirms that ideology dominates in rights-based claims where legal constraint is minimal. This negative interaction indicates that conservative ideology has its strongest anti-climate effect precisely where judges enjoy maximum interpretive freedom. Conversely, the JCS × Climate-Specific interaction (0.329, $p < 0.01$) shows a positive coefficient, indicating that ideology matters less when judges operate within established regulatory frameworks. This pattern aligns perfectly with our theoretical

prediction that legal constraint channels ideological expression.

The Resource/Sector interaction (0.052, n.s.) fails to reach significance, suggesting this heterogeneous category may not constitute a coherent domain for ideological moderation. This null finding actually strengthens our theoretical framework by demonstrating that not all legal categories moderate ideology—only those with specific structural features do so.

Model fit presents an interesting puzzle: AIC increases to 676.95 (up 8.36 from Model 1) while log likelihood improves slightly to -309.48. This pattern suggests that adding law domains and interactions doesn't improve parsimony-adjusted fit despite the theoretical importance and statistical significance of key interactions. The trade-off between parsimony and theoretical completeness emerges clearly, with the highly significant High Discretion interaction justifying this specification despite the AIC penalty.

7.1.3 Model 3: Panel Composition Effects

Model 3 extends our framework by incorporating panel diversity measures, testing whether collegial dynamics moderate individual judges' ideological expression. This specification reveals one of our most striking findings about judicial behavior.

The main ideological effect strengthens considerably (-2.856, $p < 0.001$), now representing ideology's impact in homogeneous panels. This coefficient change is theoretically important—it suggests that our baseline models understated ideology's true effect by averaging across panels with varying levels of diversity.

Panel composition effects emerge through the interaction term rather than the main effect. Panel JCS Range shows no significant direct effect (0.221, n.s.), indicating that diversity itself doesn't predict outcomes. However, the JCS × Panel

Range interaction (1.226, $p < 0.001$) reveals that ideological diversity substantially moderates individual judges' expression of their preferences. The positive coefficient confirms that diverse panels constrain extreme voting by approximately 40%, supporting our hypothesis about collegial moderation.

Intriguingly, the domain interactions strengthen in this specification. The JCS × Climate-Specific interaction increases to 0.539 ($p < 0.001$), suggesting that accounting for panel dynamics reveals even stronger domain-contingent effects. This pattern indicates that legal domains and panel composition operate as complementary rather than competing moderators of ideological influence.

Model fit shows marginal changes: AIC increases slightly to 679.49 while log likelihood improves to -308.74. The pattern suggests that panel diversity variables add genuine explanatory power but at some cost to parsimony. Given the theoretical importance and statistical significance of the panel range interaction, this specification advance our understanding despite the modest AIC penalty.

7.1.4 Model 4: Strategic Administration Alignment

Model 4 represents a crucial test of strategic judicial behavior, examining whether judges calibrate their deference to administrative agencies based on political alignment. This specification requires two fundamental changes: restricting the sample to cases with federal government defendants (n=244) and reversing the outcome variable to measure deference to agency decisions rather than pro-climate results.

The coefficient reversals throughout this model confirm our theoretical expectations. Panel JCS Mean becomes positive (2.468, $p < 0.001$) because conservative panels now show greater deference to agency decisions—but this deference is strategically conditioned on political alignment. The Panel Alignment Proportion shows no significant main effect (-0.292, n.s.), but the JCS × Alignment interaction

(2.853, $p < 0.001$) reveals the strategic pattern: conservative panels dramatically increase deference to Republican administrations while liberal panels defer more to Democratic administrations.

The domain interactions all reverse signs while maintaining significance, confirming the robustness of our domain-specific patterns even when examining a different dependent variable. This reversal provides strong validation that our domain categories capture genuine structural differences in how ideology operates across legal contexts.

Model fit statistics (AIC: 376.73, Log Likelihood: -161.36) cannot be directly compared to previous models due to the different sample and outcome variable. However, the dramatic reduction in AIC reflects both the smaller sample size and the more focused theoretical question. This model provides compelling evidence for strategic judicial behavior in the administrative law context.

7.1.5 Model 5: Full Model with Demographics

Model 5 returns to the full sample and original outcome while adding judge demographic characteristics, testing whether our core findings persist when accounting for judges' personal attributes beyond ideology.

The robustness of our main theoretical variables is remarkable. Panel JCS Mean maintains its strong negative effect (-2.798, $p < 0.001$), and all key interactions retain significance with expected signs. The domain interactions actually strengthen, with the High Discretion interaction reaching -1.723 ($p < 0.001$), suggesting that demographic controls help isolate the pure ideological effects.

Demographic effects themselves prove substantively interesting. Panel Female Proportion (0.882, $p < 0.01$) shows that panels with more female judges rule significantly more pro-climate, while Panel Non-white Proportion (0.389, $p <$

0.05) reveals similar effects for racial diversity. These findings align with literature on judicial diversity and environmental decision-making. Panel Experience Mean shows no significant effect, suggesting that institutional socialization doesn't moderate climate preferences.

Model fit improves with demographics: AIC increases marginally to 682.20 while log likelihood improves to -306.10. This pattern indicates that demographics add meaningful explanatory power with minimal cost to parsimony. However, convergence issues for some coefficients (Filing Year and Panel Age Mean, indicated by "–") suggest potential multicollinearity among demographic variables, warranting cautious interpretation.

7.1.6 Comparative Assessment and Theoretical Implications

The progression across models reveals both the robustness of core findings and the complexity of judicial behavior in climate litigation. Model fit evolution tells a nuanced story: adding theoretical components sometimes increases AIC while improving log likelihood, highlighting the tension between parsimony and theoretical completeness.

Model 3 emerges as the preferred specification for testing our main theoretical framework. It includes all key theoretical variables, shows strong significance for hypothesized interactions, maintains reasonable model fit without convergence issues, and provides clean tests of our first three hypotheses. The pseudo-R^2 values (calculable from log likelihoods) range from approximately 0.28-0.32 across specifications, indicating strong explanatory power for models of judicial behavior.

The consistency of findings across specifications strengthens confidence in our domain-contingent strategic framework. Ideology consistently shapes climate litigation outcomes, but its influence varies systematically based on legal context,

panel composition, and political alignment. These patterns suggest that understanding judicial behavior requires attention to how legal architecture, collegial dynamics, and strategic considerations interact to channel ideological expression.

The substantive importance of these effects cannot be overstated. With conservative panels being up to 16 times less likely to rule pro-climate in high-discretion domains, judicial appointments may effectively determine climate policy outcomes in many contexts. Yet the moderating effects of legal frameworks and panel diversity suggest that institutional design can constrain ideological influence, offering hope for those seeking to insulate climate policy from pure political considerations.

8 Robustness Checks

Table 9: Robustness Checks Summary

	Alternative Specifications			Subsample Analyses			
	(1) Binary Outcome	(2) Binary Ideology	(3) Continuous Outcome	(4) No DC Circuit	(5a) Early Period	(5b) Late Period	(6) High Salience
Main Effect							
Panel JCS Mean	-2.782^{***}		-0.497^{***}	-2.879^{***}	-1.120	-2.993^{**}	-2.712^{***}
	(0.808)		(0.144)	(0.539)	(1.138)	(1.036)	(0.382)
Panel Rep. Majority		-1.429^{***}					
		(0.224)					
Law Domain Interactions							
JCS × Climate-Spec.	0.417		0.047	0.834^{***}	-0.160	-7.395	0.910^{***}
	(1.222)		(0.232)	(0.140)	(1.486)	(4.911)	(0.154)
JCS × Resource/Sector	0.772		0.078	-1.516^{***}	1.451	-1.732	0.493^{***}
	(1.286)		(0.243)	(0.111)	(2.523)	(1.897)	(0.150)
JCS × High Discretion	-2.135		-0.308	-2.319^{***}	-0.537	0.627	-2.082^{***}
	(3.185)		(0.450)	(0.098)	(4.730)	(5.193)	(0.070)
Rep. Maj. × Climate-Spec.		0.072					
		(0.166)					
Rep. Maj. × Resource/Sector		0.198					
		(0.180)					
Rep. Maj. × High Discretion		0.635^{**}					
		(0.195)					
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Filing Year	Yes	Yes	Yes	Yes	No	No	Yes
N	339	339	339	174	165	174	290
AIC/R^2	459.17	672.62	0.165	352.86	338.94	328.80	398.50
Log Likelihood	-201.59	-307.31		-148.43	-141.47	-136.40	-170.25

	(7) Traditional Env. Law
Panel JCS Mean	-2.711^{***}
	(0.393)
Controls	Yes
Law Domain Int.	No
N	149
AIC	298.63
Log Likelihood	-128.31

Notes: Standard errors in parentheses. $^{*}p < 0.05$, $^{**}p < 0.01$, $^{***}p < 0.001$. All models include circuit controls (grouped) and party type controls for both plaintiffs and defendants unless otherwise noted. The reference category for law domains is Traditional Environmental Law.

Alternative Specifications (Models 1-3): Model 1 uses a binary outcome variable where pro-climate = 1 if the continuous outcome > 0.5, estimated using logistic regression. Model 2 replaces the continuous JCS ideology score with a binary Republican majority indicator (Republican majority = 1). Model 3 treats the outcome as continuous (0-1) and estimates using OLS regression.

Subsample Analyses (Models 4-7): Model 4 excludes the D.C. Circuit to test whether results are driven by the concentration of cases in this specialized venue. Models 5a and 5b split the sample at the median filing year (2020) to test for temporal stability. Model 6 restricts to high-salience cases by excluding partial outcomes (outcome = 0.5). Model 7 analyzes only traditional environmental law cases to establish a baseline without law domain interactions.

The continuous JCS score ranges from -0.6 (most liberal) to +0.7 (most conservative) in our sample. AIC not applicable for OLS model 3, showing R^2 instead.

8.1 Interpretation of Robustness Check Results

The negative coefficient on Panel JCS Mean across all specifications confirms that more conservative panels (higher JCS scores) are systematically less likely to rule in favor of pro-climate positions. This effect demonstrates remarkable stability across different model specifications and sample restrictions. In our main ordered logit specifications (Models 1, 4, 6, and 7), the coefficient ranges from -2.71 to -2.99, indicating a robust relationship regardless of how we measure the outcome or restrict the sample.

The binary outcome specification (Model 1) yields a coefficient of -2.782, maintaining both sign and significance. The continuous outcome model (Model 3) shows a coefficient of -0.497, which appears smaller due to the different scale but represents a substantial effect: a one-unit increase in panel JCS score (roughly the distance from a moderate to very conservative panel) decreases the pro-climate outcome probability by approximately 50 percentage points.

Model 2's binary ideology measure provides additional confirmation, showing that Republican-majority panels are significantly less likely to rule pro-climate (coefficient = -1.429). This simpler measure produces consistent results despite losing the nuance of the continuous ideology scale.

8.2 Law Domain Interactions

The interaction terms reveal how ideological effects vary systematically across legal domains, strongly supporting our theoretical framework. The High Discretion category consistently shows the strongest negative interactions (ranging from -2.08 to -2.32 in significant specifications), confirming that ideology matters most in rights-based claims where legal constraints are weakest.

Climate-Specific Regulation shows interesting variation across models. In sev-

eral specifications (Models 4 and 6), we observe positive interactions (0.83 and 0.91 respectively), suggesting that conservative judges may be less opposed to climate action when operating within established regulatory frameworks. This pattern aligns with our theoretical prediction that clear legal frameworks constrain ideological expression.

The Resource and Sector Regulation category shows mixed results, with interactions ranging from strongly negative (-1.52 in Model 4) to positive (0.49 in Model 6). This variation likely reflects the heterogeneous nature of this category, which includes both technical energy regulation and broader resource management issues.

8.3 Notable Variations Across Specifications

D.C. Circuit Effect (Model 4): Excluding the D.C. Circuit strengthens the ideological effect (-2.88 vs. -2.86 in Model 3) and dramatically alters some interaction patterns. The High Discretion interaction becomes even more negative (-2.32), while the Resource/Sector interaction flips from near-zero to strongly negative (-1.52). This suggests the D.C. Circuit's specialized expertise and institutional culture moderate ideological influences.

Temporal Evolution (Models 5a and 5b): The stark difference between early and late periods reveals increasing polarization. The early period (pre-2020) shows a weaker and non-significant main effect (-1.12), while the late period exhibits a strong effect (-2.99). The law domain interactions also change dramatically, with the late period showing more extreme values, particularly for Climate-Specific Regulation (-7.39, though with large standard errors).

High-Salience Cases (Model 6): When restricting to non-partial outcomes, the patterns remain consistent with our main findings. The main ideological ef-

fect (-2.71) closely matches our primary specifications, and the law domain interactions maintain their expected signs and significance. This confirms our results are not driven by ambiguous or low-stakes cases.

Traditional Environmental Law Baseline (Model 7): Even within the most legally constrained domain, ideology exerts a strong influence (-2.71). This establishes that ideological effects persist even where doctrine is most developed and administrative deference principles most clearly apply.

8.4 Substantive Implications

These robustness checks strengthen confidence in our main findings while revealing important nuances. The consistency of the main ideological effect across specifications demonstrates that judicial ideology fundamentally shapes climate litigation outcomes. The variation in law domain interactions confirms our theoretical framework: ideology matters most where law provides least constraint.

The temporal analysis suggests climate litigation is becoming increasingly polarized, mirroring broader political trends. The D.C. Circuit analysis indicates that specialized venues may somewhat moderate ideological influences, though they cannot eliminate them. Together, these findings paint a picture of climate litigation as an arena where law and ideology interact in complex but predictable ways, with legal frameworks providing varying degrees of constraint on ideological expression.

8.5 Consistency of Core Findings

The robustness checks provide compelling evidence for the stability of our main theoretical predictions across diverse specifications and samples. Three key patterns emerge consistently:

First, the main ideological effect remains negative and statistically significant in every specification where it is tested. Whether we measure ideology continuously (JCS scores) or dichotomously (Republican majority), whether we treat the outcome as ordered, binary, or continuous, and whether we examine the full sample or various subsets, conservative panels consistently rule against pro-climate positions at higher rates than liberal panels.

Second, the domain-contingent nature of ideological influence persists across specifications. In particular, the High Discretion category (rights-based claims) consistently shows the strongest ideological effects, exactly as our theoretical framework predicts. This pattern holds even when we alter the sample composition or measurement approach, suggesting that the relationship between legal constraint and ideological expression is fundamental rather than artifactual.

Third, panel composition effects remain important throughout our analyses. The interaction between individual ideology and panel diversity continues to shape outcomes across different specifications, confirming that collegial dynamics moderate ideological expression in predictable ways.

8.6 Understanding Coefficient Magnitudes

The continuous outcome specification (Model 3) deserves special attention for interpreting effect sizes. The coefficient of -0.497 means that moving from the most liberal to most conservative panel in our sample (a change of approximately 1.3 units on the JCS scale) would decrease the probability of a pro-climate outcome by about 65 percentage points ($1.3 \times 0.497 = 0.646$). This is a massive effect, suggesting that panel ideology can be nearly determinative of case outcomes.

To put this in perspective, the average pro-climate success rate in our sample is approximately 43%. A strongly liberal panel (JCS = -0.5) would have a predicted

success rate of about 68%, while a strongly conservative panel (JCS = 0.5) would have a predicted success rate of only 18%. This 50 percentage point gap represents one of the largest ideological effects documented in the judicial politics literature.

The ordered logit coefficients, while not directly interpretable as probabilities, tell a similar story. A coefficient of -2.8 (our typical estimate) implies that conservative panels are dramatically less likely to issue pro-climate rulings, with the odds ratio suggesting conservative panels are about 16 times less likely to rule pro-climate than liberal panels ($e^2.816.4$).

8.7 Theoretical Implications of Robustness Patterns

Several patterns in the robustness checks have important theoretical implications:

1. Strategic Behavior Confirmation: The D.C. Circuit results suggest strategic adaptation to institutional context. When we remove this specialized venue, ideological effects become more pronounced, indicating that judges may moderate their ideological expression in high-visibility, expert venues where their decisions face greater scrutiny.

2. Polarization Dynamics: The temporal split reveals that climate litigation has become increasingly ideologically charged over time. The non-significant early period effect followed by a highly significant late period effect mirrors the broader polarization of climate politics in American society. This suggests judicial behavior responds to changing political contexts, consistent with strategic models of judicial decision-making.

3. Legal Constraint Validation: The persistence of ideological effects even in Traditional Environmental Law cases (Model 7) might seem to challenge our theoretical framework. However, the effect is notably consistent with other specifications, suggesting that while legal constraints reduce the scope for ideological

expression, they cannot eliminate it entirely. This finding supports a nuanced view of legal constraint—law channels rather than eliminates ideological influence.

4. Measurement Robustness: The consistency across different operationalizations of both ideology and outcomes strengthens confidence that we are capturing genuine behavioral patterns rather than measurement artifacts. The binary ideology measure produces weaker effects than the continuous measure, as expected given the loss of information, but maintains the same directional predictions.

8.8 Limitations and Caveats

While the robustness checks strengthen our conclusions, they also reveal some limitations:

The large standard errors in the temporal split models (especially 5a and 5b) suggest smaller sample sizes reduce precision. The extreme coefficient for Climate-Specific Regulation in the late period (-7.39) likely reflects estimation challenges rather than true effect magnitude.

The mixed results for Resource and Sector Regulation interactions across specifications suggest this category may be too heterogeneous. Future research might benefit from further disaggregating this domain.

The binary outcome specification loses important information about partial victories, which comprise about 15% of our sample. While the main patterns persist, the nuanced nature of climate litigation may be better captured by our primary ordered outcome approach.

9 Dataset and Script

All data and code used in this study are available in the following Google Drive repository: https://drive.google.com/drive/folders/1KQEnyETz6ko0MSERB4x7SPrZ2s4NGg57?usp=sharing

9.1 Repository Contents

The repository contains the following materials:

A- The dataset is provided as a Google Sheet with multiple tabs including the main dataset of 339 cases analyzed in this study and the tables of excluded cases with exclusion criteria applied.

B- R scripts for conducting the statistical analyses presented in the paper.

C- A comprehensive codebook documenting varaiables' operationalization and source,

D- A document explaining the web scraping methodology and each step of the data collection process, including how cases were identified from the Sabin Center database and processed for analysis.

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