Climate Bones of Contention

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Introduction

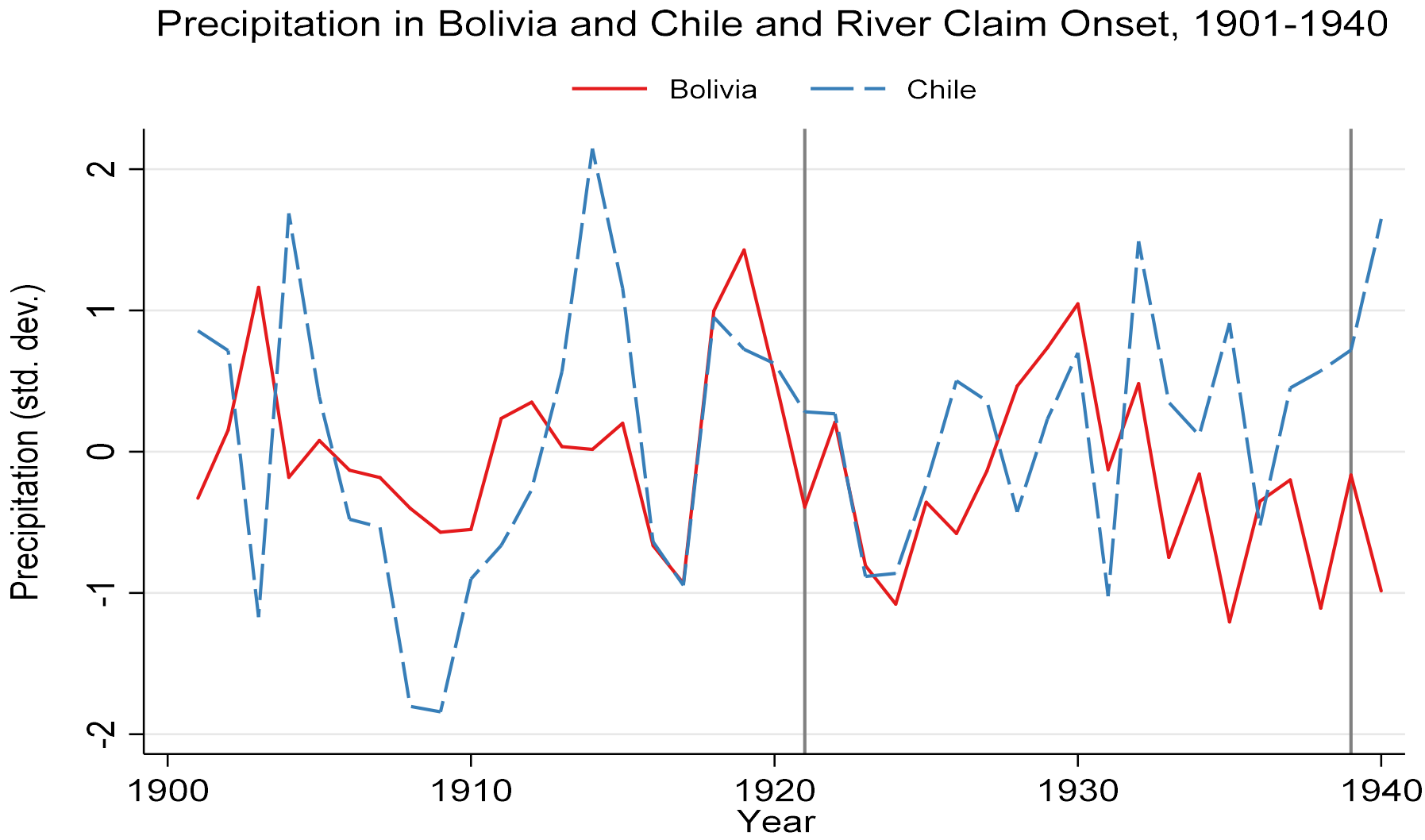
- Climate Change→ Security Risks
  - Changes in "mean conditions" (Barnett & Adger 2007: 640)
    - Increased global *temperatures*
    - Changes in annual *precipitation*
    - Rising sea-levels
  - Changes in intensity/frequency of natural disasters
    - floods, droughts, storms, fires, heatwaves, etc.
- Literature
  - Primarily focuses on civil conflict; empirical findings are contested
  - A general lack of research on how climate change affects *interstate* conflict
  - Failure to examine how climate change influences *diplomatic* conflict
  - A lack of understanding of the causal mechanisms that connect climate change to contested diplomatic issues
- Research Question
  - Is climate change affecting the onset and militarization of diplomatic conflicts over territory, cross-border rivers, and maritime areas?
  - If so, is there evidence of issue heterogeneity?

Literature Review

- Climate Change & Intrastate Conflict
  - Disparate findings connecting temperatures, precipitation, and armed conflict
    - ↑ Annual temperatures in sub-Saharan Africa ↑ civil conflict (Burke et al 2009)
    - Changes in temperatures/precipitation have no effect on armed conflict (Buhaug 2010)
    - Extreme deviations in rainfall increase civil conflict, but stronger for wetter years (Hendrix & Salehyan)
- Climate Change & Interstate Conflict
  - Lateral pressure ↑ interstate resource conflicts (Choucri and North 1975)
  - Climate change influences militarized interstate disputes (MIDs)
    - Population density and soil degradation increase MID risks, but fish, water scarcity, and resource vulnerability have no effect (Stalley 2003)
    - Higher variability and lower mean levels of precipitation increase MID risks (Devlin & Hendrix 2014)
  - Global climate change is associated with peace, not conflict (Gartzke 2012)
- River literature also has conflicting findings (scarcity/conflict)

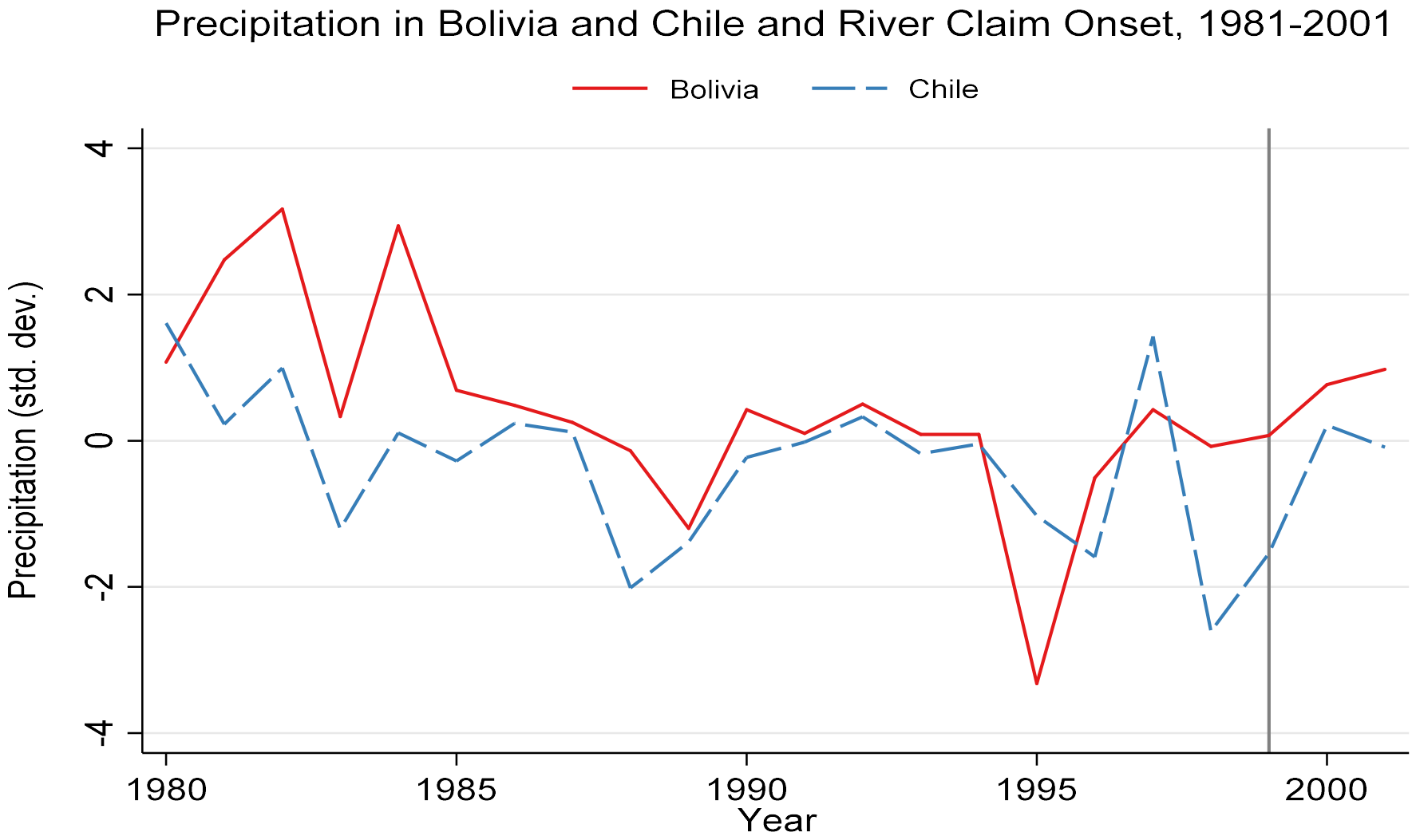
Theoretical Approach

- We focus on two broad effects of climate change on interstate conflict (issue claim onset & MID onset)
  - Scarcity: increased competition for resources affected by climate change
  - Uncertainty: climate change increases uncertainty about future resources
- Scarcity
  - Climate change can reduce the strategic and economic value of territory, maritime areas, and cross-border rivers
    - Examples: desertification, displacement from droughts/flooding, changes in agricultural productivity
  - This may motivate states to contest the ownership of areas that are not experiencing this reduction in strategic value (lateral pressure)
    - Challengers influenced more by climate changes (e.g. downstream states experiencing increased water scarcity)
  - ↑ in mean temp/precip. increases risks for diplomatic/militarized conflict
    - Example: Bolivia's declining precipitation levels prior to challenging Chile's diversion of river waters in the Mauri & Lauca rivers


Precipitation in Bolivia and Chile and River Claim Onset, 1901-1940
Bolivia
Chile
Precipitation (std. dev.)
2
1
0
-1
-2
1900
1910
1920
1930
1940
Year

Theoretical Approach

- Uncertainty
  - Climate change increases uncertainty about future resource stocks, especially when climate changes are highly volatile
  - Diplomatic conflict more likely when states experience greater deviations in mean temperatures/precipitation (curvilinear effect)
  - Examples
    - Bolivia experiencing greater variance in its precipitation prior to initiating a river claim against Chile in 1939 (Lauca River)
    - Chile experiencing greater variance in precipitation prior to initiating a river claim against Bolivia in 1999 (Silala River)


Precipitation in Bolivia and Chile and River Claim Onset, 1981-2001
Bolivia
Chile
Precipitation (std. dev.)
4
2
0
-2
-4
1980
1985
1990
1995
2000
Year

Variation Across Issues

- Territory: climate change can influence the value of territory (e.g. desertification, flooding/displacement of people) relative to non-affected territories, which can increase diplomatic claims. Border location can also be affected by climate change (e.g. rivers changing course), which could create new territorial claims.
- Rivers: water scarcity increases risks of militarization, although there are few water wars. River literature suggests a curvilinear relationship between water scarcity and cooperation (Dinar), which suggests climate induced conflict most likely at very high or low precipitation values.
- Maritime: increasing temperatures making areas of the ocean more accessible (e.g. arctic) which could create new claims; climate change can alter existing EEZ/territorial sea boundaries, creating new maritime claims.

Key Independent Variables

- Climate Variables (Climate Research Unit, University of East Anglia), 1901-2001 (monthly, aggregated)
  - Temperature (degrees Celsius)
  - Precipitation (millimeters)
- Measure
  - Standardized deviations from the long-run mean for that country (Hendrix and Salehyan 2012)
  - $(X_{it} - \bar{X}_i)/\sigma_i$, where $\bar{X}_i$ is the panel mean for country i, X_{it} is the current precipitation in time t for country i, and σ_i is the standard deviation for country i.
- We include squared terms to test for curvilinear effects

Research Design

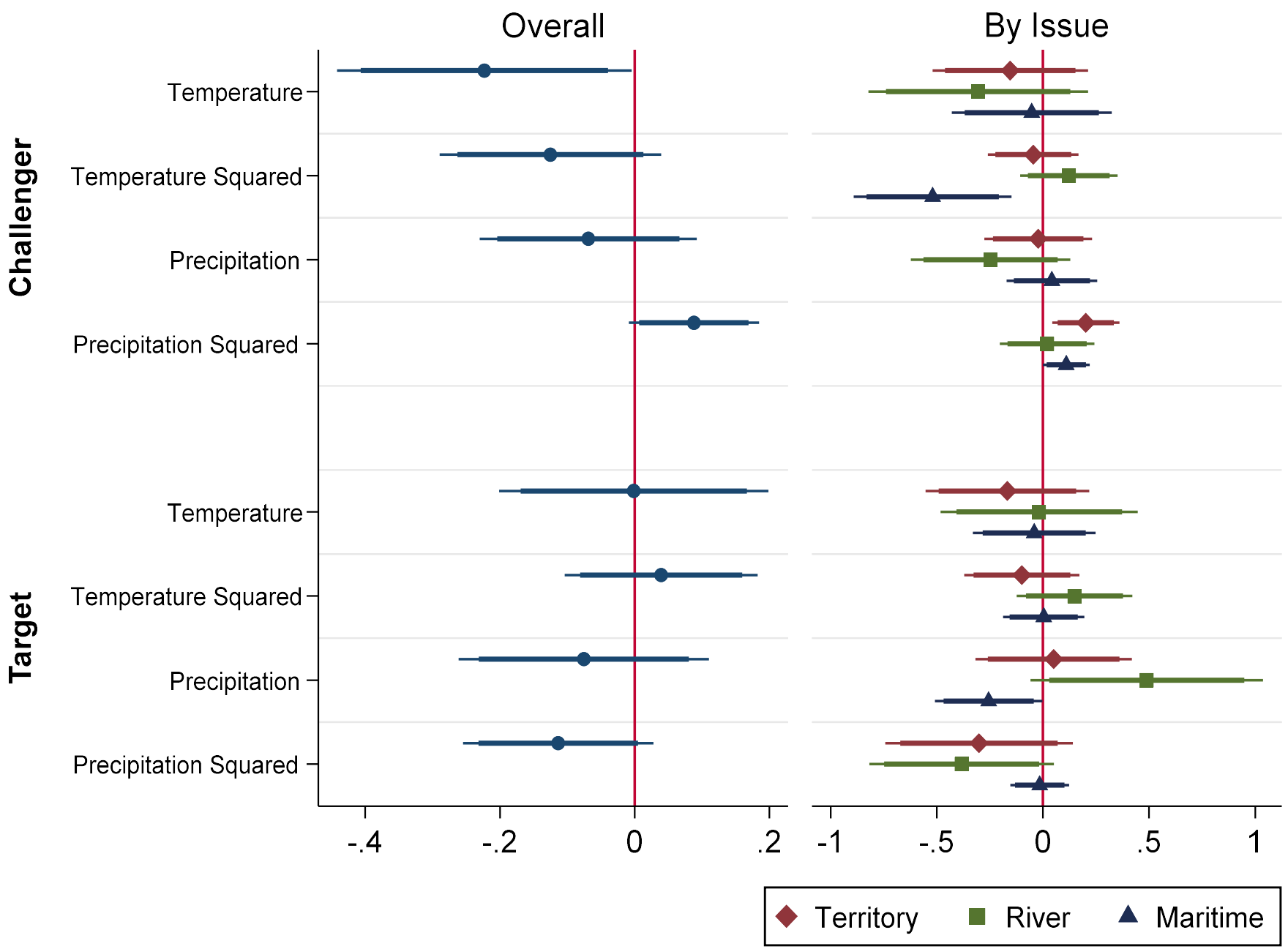
- Unit of analysis: politically relevant dyad years in Americas & Europe (N=68,708)
  - DV #1: Issue claim onset (ICOW dataset)
  - DV #2: Militarization of ICOW claim (N=6,679 claim dyad years)
  - Data are coded by challenger (revisionist) and target (SQ defender) distinction in ICOW
- Controls
  - Issue Salience, Population, Relative Capabilities, Alliance, Major power status, Distance, Diplomatic (or MID) Peace Years
- Model: Logistic Regression with robust SE's

Analyses in Two Stages

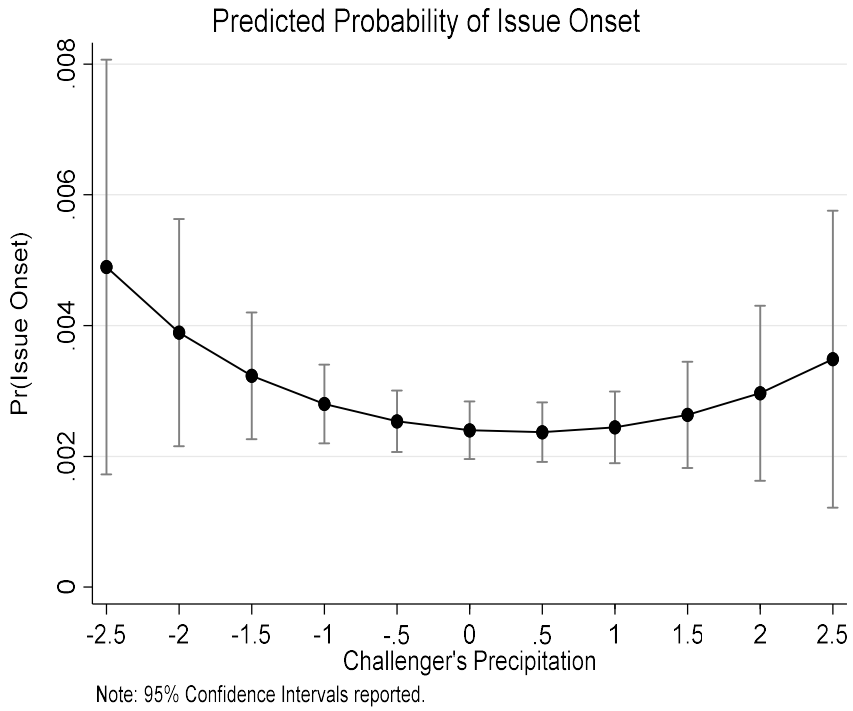
- Analysis 1 considers the onset of diplomatic issue claims in PRD.
  - Less than half of all ICOW claims experience any MIDs, thus this analysis captures interstate conflict more generally.
- Analysis 2 focuses on dyads that experience a territorial, river, or maritime claim and codes whether a MID occurs in a given claim dyad year.
  - Captures whether changing climate conditions during a diplomatic conflict alter conflict risks.

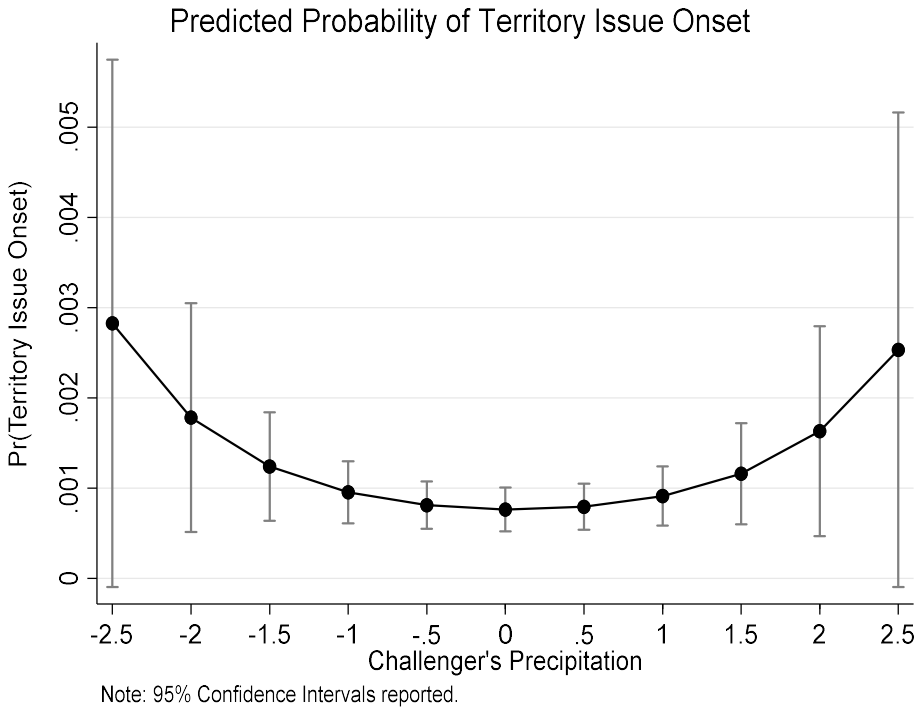
Finding #1: Climate change has a weak effect on issue claim onset (Analysis 1)

	Model 1: Territory	Model 2: River	Model 3: Maritime	Model 4: All
Potential Challenger				
Precipitation	-0.022	-0.247	0.042	-0.069
	(0.130)	(0.192)	(0.109)	(0.082)
Precipitation Squared	0.202**	0.020	0.110*	0.088*
	(0.081)	(0.114)	(0.056)	(0.049)
Temperature	-0.154	-0.305	-0.053	-0.223**
	(0.187)	(0.264)	(0.192)	(0.112)
Temperature Squared	-0.046	0.122	-0.520***	-0.125
	(0.109)	(0.117)	(0.190)	(0.084)
Potential Target				
Precipitation	0.050	0.489*	-0.256**	-0.075
	(0.188)	(0.279)	(0.129)	(0.095)
Precipitation Squared	-0.301	-0.383*	-0.015	-0.113
	(0.225)	(0.222)	(0.071)	(0.072)
Temperature	-0.167	-0.018	-0.041	-0.001
	(0.197)	(0.237)	(0.148)	(0.102)
Temperature Squared	-0.099	0.149	0.004	0.039
	(0.139)	(0.139)	(0.098)	(0.073)

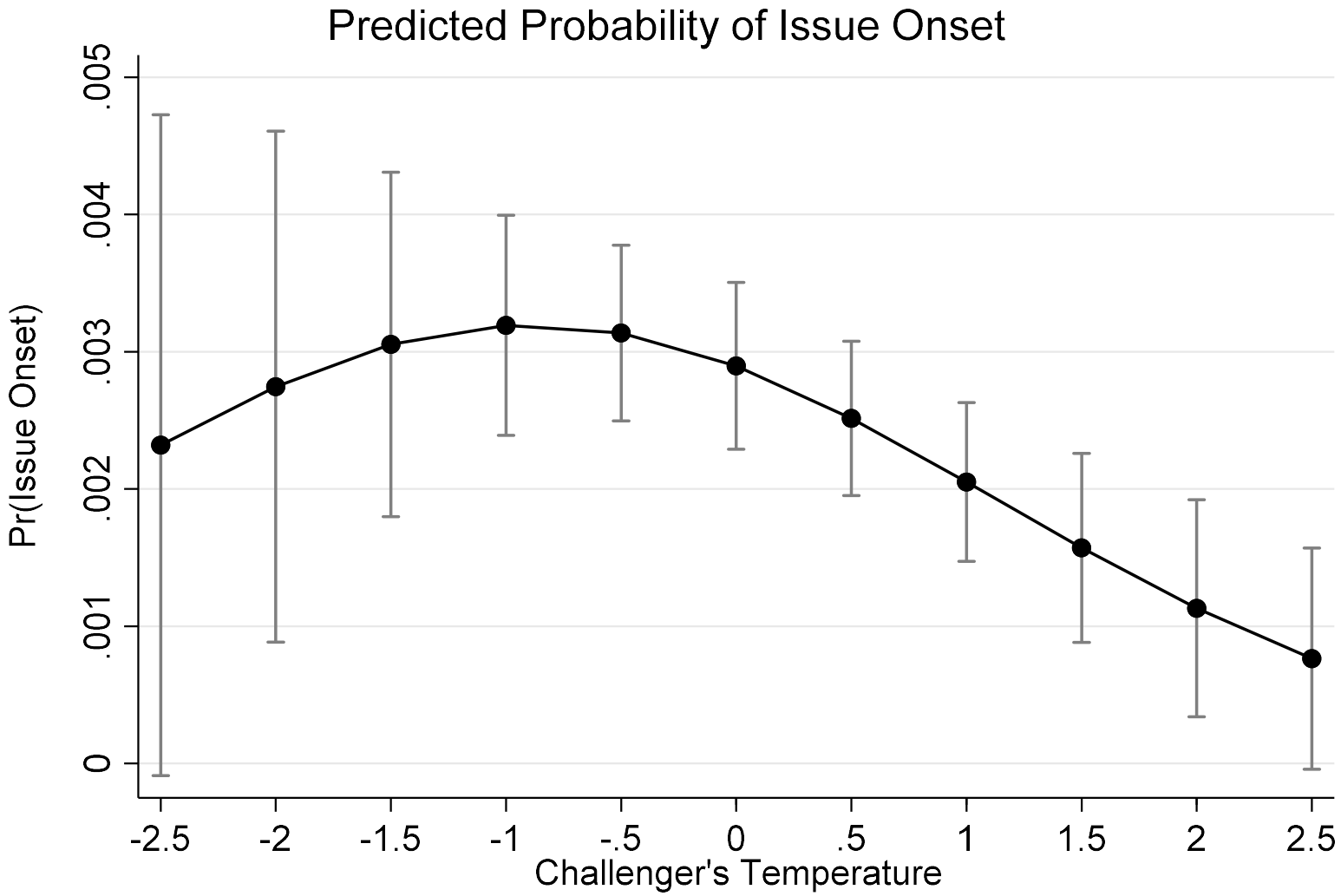

Overall
By Issue
Challenger
Temperature
Temperature Squared
Precipitation
Precipitation Squared
Target
Temperature
Temperature Squared
Precipitation
Precipitation Squared
-.4
-.2
0
.2
-1
-.5
0
.5
1
Territory
River
Maritime

Finding #2: Challengers initiate more issue claims (esp. territory) as precip. deviation ↑





Finding #3: Contrary to expectations, ↑ temperature deviations reduce issue claim risks

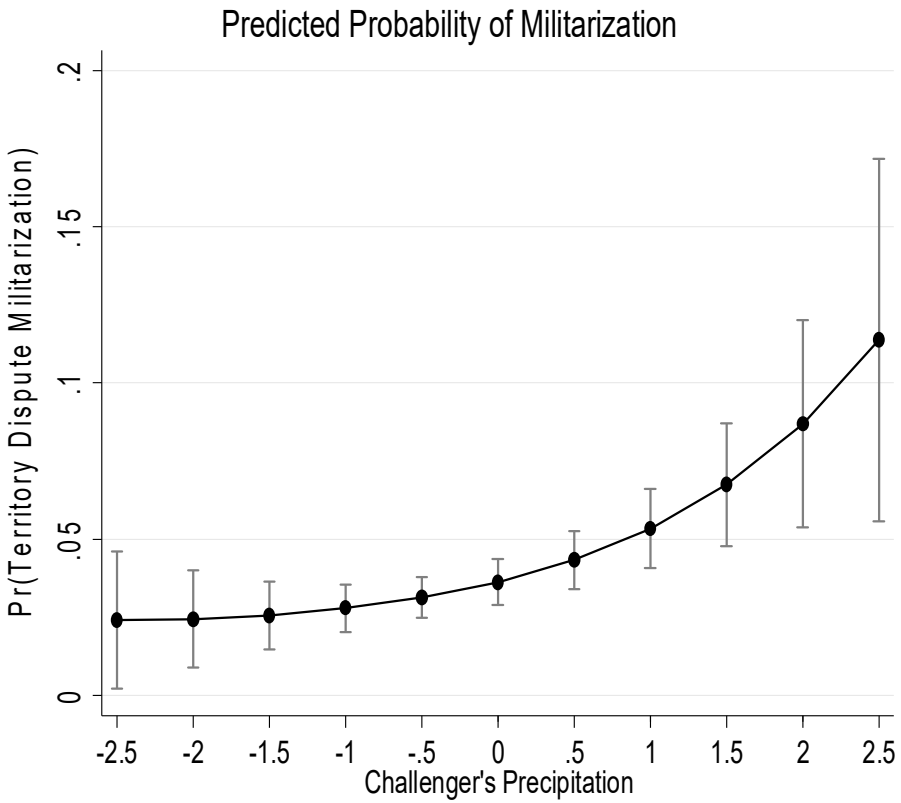


Note: 95% Confidence Intervals reported.

Finding #4: MIDs ↑ when challengers experience ↑ precip. deviations (esp. for territory) (Analysis 2)

	Model 1: Territory	Model 2: River	Model 3: Maritime	Model 4: All
Potential Challenger				
Precipitation	0.361***	1.293	-0.056	0.173**
	(0.111)	(1.310)	(0.118)	(0.081)
Precipitation Squared	0.073	0.821	0.067	0.073*
	(0.059)	(0.611)	(0.078)	(0.044)
Temperature	0.204	-1.400	0.129	0.098
	(0.133)	(1.062)	(0.159)	(0.104)
Temperature Squared	-0.041	0.116	-0.048	-0.026
	(0.081)	(0.451)	(0.095)	(0.049)
Potential Target				
Precipitation	-0.260**	-1.635	0.009	-0.146*
	(0.115)	(1.254)	(0.124)	(0.082)
Precipitation Squared	-0.021	0.006	-0.052	-0.031
	(0.072)	(0.595)	(0.089)	(0.053)
Temperature	-0.112	1.505	0.139	0.038
	(0.135)	(1.213)	(0.149)	(0.099)
Temperature Squared	0.035	0.468	-0.029	0.026
	(0.084)	(0.525)	(0.093)	(0.050)

Finding #5: Target states are more likely to militarize claims in times of drought (no curvilinear effect).



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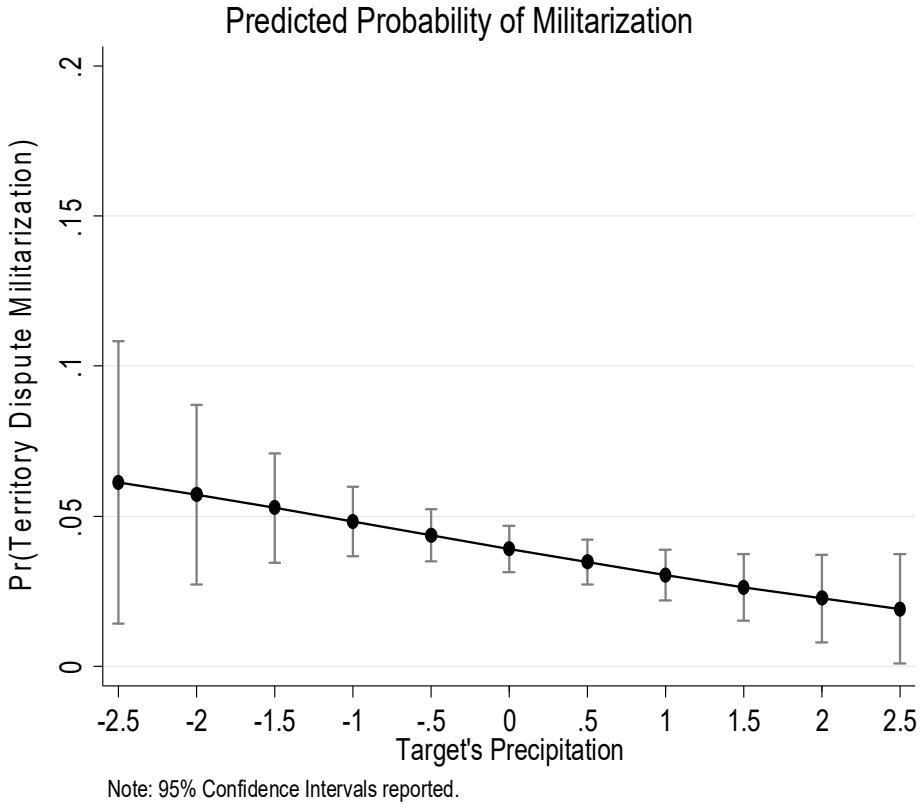

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Conclusions

- Much like the climate change and civil conflict literature, our findings testing the relationship between climate change and interstate conflict are mixed.
  - Relationship depends on *what* is changing about the climate (temperature vs precipitation)
  - Effects depend on *what* issue is at stake (territorial claims most influenced by climate variables)
  - Effects are different for revisionist and target states; uncertainty matters more for potential revisionists.
- Future Work
  - Look at causal mechanisms in more detail & consider how scarcity & uncertainty interact
  - Capture longer trends in global warming, territorial integrity norms, etc.

Thank You!

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Findings: Issue Militarization