Participation and cooperation in global climate governance: new evidence from the regime level

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IPES 2017
Paris Agreement 2015
Motivation

• Existing work is equivocal on whether participation in international institutions changes states’ behavior

• Selection bias is not the only problem that hinders the study of how institutions affect state behavior

1. Insufficient variation in participation
   • Universal membership of many IOs
   • Binary indicator of membership/ratification

2. Difficulty measuring cooperative behavior
   • Common institutional obligations
   • Compliant, non-compliant, not a member
PARTICIPATION in climate governance institutions

COOPERATION in reducing greenhouse gas emissions
Two conceptual shifts

1. Participation conceptualized at the regime level
   - Patterns of institutional memberships
   - Scaling models to score participation

2. Cooperation conceptualized as a level of cooperative adjustment
   - Situations where states express their willingness to cooperate
   - Novel treaty designs

• Do states that participate more extensively in climate governance set more ambitious targets subsequently?
Participation

- Standard approach: binary indicator of membership
- My approach: continuous participation scores

- 60 different climate governance institutions with state members
- UNFCCC as most important institution, but not the only forum in climate governance
- Operationalizing participation with Bayesian item response theory (IRT)
  - Spatial model of political behavior
  - Legislative and judicial politics
    - Martin and Quinn PA 2002; Clinton et al. APSR 2004
    - In IR: Bailey et al. JCR 2017; Lupu JCR 2016
Two images of climate governance

Keohane and Victor PoP 2011

My new dataset
Membership in Partnership for Market Readiness

Unlikely to join

 Likely to join

Members = 31
Discrimination, beta = 2.
Difficulty, alpha = 2.2

CASE: Hit rate = 63.4%

\[ \Pr(y_{ij} = 1) = \Phi(\alpha_j + \beta_j x_i) \]
State ideal points in climate governance

<table>
<thead>
<tr>
<th>Bahamas</th>
<th>Brunei</th>
<th>Bahrain</th>
<th>Latvia</th>
<th>Qatar</th>
<th>Saudi Arabia</th>
<th>New Zealand</th>
<th>Denmark</th>
<th>US</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nauru</td>
<td>Seychelles</td>
<td>Venezuela</td>
<td>Iran</td>
<td>Czech Republic</td>
<td>Turkey</td>
<td>Costa Rica</td>
<td>Brazil</td>
<td>UK</td>
</tr>
<tr>
<td>Timor-Leste</td>
<td>Eritrea</td>
<td>Namibia</td>
<td>Sierra Leone</td>
<td>Bolivia</td>
<td>Nepal</td>
<td>Morocco</td>
<td>India</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>GDP --</th>
<th>IGOs --</th>
<th>Renewables -</th>
<th>Fossil rents +</th>
<th>GDP ++</th>
<th>IGOs ++</th>
<th>Renewables +</th>
<th>Fossil rents -</th>
</tr>
</thead>
</table>
Cooperation

• Institutions often set common policy levels that all members must adopt
  – Tariff at 5%, cut emissions by 7%, end child labor, etc.
  – Skews membership (especially around the treaty level) since meeting these standards is more costly for some states than others
  – Truncates and censors: compliant, non-compliant, not a member
  – Broader-deeper tradeoff, lowest common denominator

• Want instances where states consider different levels of cooperation explicitly
Paris targets: “bottom-up”

• States selected their own GHG emissions reductions targets before meeting at COP21 in Paris in 2015
  – Intended Nationally Determined Contributions
  – Conscious treaty design to maximize participation
• Targets are expressed in really different formats
• Comparing effort of countries with different historical and current emissions and capabilities to contribute
• Ambition: the distance between a country’s Paris target and 5 equity quotas
  – Assigning emissions quotas as a function of different combinations of GHG emissions per capita and GDP per capita
  – Robiou du Pont et al. NCC 2017; www.paris-equity-check.org
Morocco's GHG emissions and 2030 targets
Data

• Main outcome variable: ambition of Paris target
  – Operationalized as distance from median of equity quotas
  – Range: (-94.6, 684.9), mean: 23.4, meaningful 0 (INDC=median)
  – Data from Robiou du Pont et al. NCC 2017

• Main explanatory variable: participation in climate governance
  – Operationalized with IRT
  – Range: (-2.5, 2.3), mean: 0

• Estimation: OLS and 2SLS regressions
  – Regional IRT score as instrument
## OLS and 2SLS regressions of INDC target depth

<table>
<thead>
<tr>
<th></th>
<th>(1) Median</th>
<th>(2) Mean</th>
<th>(3) Median</th>
</tr>
</thead>
<tbody>
<tr>
<td>IRT ideal point</td>
<td>-26.663**</td>
<td>-25.026**</td>
<td>-92.098*</td>
</tr>
<tr>
<td></td>
<td>(6.952)</td>
<td>(7.464)</td>
<td>(37.853)</td>
</tr>
<tr>
<td>Sum of IGO memberships</td>
<td>-0.994*</td>
<td>-0.863*</td>
<td>0.136</td>
</tr>
<tr>
<td></td>
<td>(0.389)</td>
<td>(0.418)</td>
<td>(0.809)</td>
</tr>
<tr>
<td>GDP per capita (logged)</td>
<td>30.429**</td>
<td>34.818**</td>
<td>26.993**</td>
</tr>
<tr>
<td></td>
<td>(6.461)</td>
<td>(6.937)</td>
<td>(7.376)</td>
</tr>
<tr>
<td>GHG emissions (logged)</td>
<td>18.023**</td>
<td>16.238**</td>
<td>33.510**</td>
</tr>
<tr>
<td></td>
<td>(3.452)</td>
<td>(3.707)</td>
<td>(9.393)</td>
</tr>
<tr>
<td>Environmental Performance Index</td>
<td>-0.09</td>
<td>0.337</td>
<td>-0.633</td>
</tr>
<tr>
<td></td>
<td>(0.657)</td>
<td>(0.706)</td>
<td>(0.862)</td>
</tr>
<tr>
<td>Vulnerability</td>
<td>-73.255</td>
<td>-83.903</td>
<td>-79.482</td>
</tr>
<tr>
<td></td>
<td>(99.95)</td>
<td>(107.31)</td>
<td>(110.888)</td>
</tr>
<tr>
<td>Fossil fuel rents</td>
<td>7.612</td>
<td>2.807</td>
<td>-0.455</td>
</tr>
<tr>
<td></td>
<td>(4.062)</td>
<td>(4.361)</td>
<td>(8.034)</td>
</tr>
<tr>
<td>Constant</td>
<td>-364.09**</td>
<td>-444.91**</td>
<td>-483.012**</td>
</tr>
<tr>
<td></td>
<td>(107.64)</td>
<td>(115.57)</td>
<td>(169.983)</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.63</td>
<td>0.60</td>
<td>0.37</td>
</tr>
<tr>
<td>N</td>
<td>161</td>
<td>161</td>
<td>161</td>
</tr>
<tr>
<td>Region dummies</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
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<tr>
<td>Instrumented</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
</tr>
</tbody>
</table>

* = p < 0.05  
** = p < 0.01
OLS marginal effects

IRT ideal point

GDP per capita
Conclusion

• The effect of participation in international institutions on cooperation is difficult to study
  – Selection bias
  – Limited variation in membership in headline institutions
  – Common treaty levels censor and truncate observations of cooperativeness

• Variation in participation at the regime level is meaningful and can be scored

• Cooperativeness can be revealed by different types of targets

• States that participate more accept more costly and ambitious targets than states that participate less
Thank you!
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Five equity quotas

- **Capabilities (CAP)**
  - Countries with high GDP reduce more
- **Cumulative per capita (CPC)**
  - Countries with high historical GHG reduce more
- **Equality (EPC)**
  - Per capita emissions converge in 2100
- **Greenhouse dev.t rights (GDR)**
  - Countries with high GDP and GHG reduce more
- **Constant emissions ratio (CER)**
  - All reduce by same percentage from 2010 levels

<table>
<thead>
<tr>
<th>GDP per capita</th>
<th>GHG per capita</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>No</td>
<td>EPC (present GHG)</td>
</tr>
<tr>
<td>Yes</td>
<td>CAP (historical GHG)</td>
</tr>
</tbody>
</table>

Robiou du Pont et al. NCC 2017
www.paris-equity-check.org
State membership in climate governance

Number of state members

UNFCCC
Kyoto Protocol
Paris Agreement

Year established

UNFCCC
Kyoto Protocol
Paris Agreement

CDM
IRENA
Doha Amendment
Petersberg
CCAC
PMR
GGERP
CEM
## Participation in climate governance

<table>
<thead>
<tr>
<th>Country</th>
<th>Year</th>
<th>FCCC</th>
<th>Kyoto</th>
<th>PMR</th>
<th>CPLC</th>
<th>PCD</th>
<th>IRENA</th>
<th>GGFRP</th>
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<tr>
<td>Bangladesh</td>
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<td>1</td>
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<tr>
<td>Georgia</td>
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<td>1</td>
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<td>0</td>
<td>0</td>
<td>0</td>
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<tr>
<td>Germany</td>
<td>2015</td>
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<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0</td>
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<tr>
<td>Ghana</td>
<td>2015</td>
<td>1</td>
<td>1</td>
<td>0</td>
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<tr>
<td>Mexico</td>
<td>2015</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
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<tr>
<td>Morocco</td>
<td>2015</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0</td>
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<tr>
<td>USA</td>
<td>2015</td>
<td>1</td>
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<td>1</td>
<td>0</td>
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<td>1</td>
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\[
\Pr(y_{ij} = 1) = \Phi(\alpha_j + \beta_j x_i)
\]

probit regression with unobserved regressors
Scaling participation with item response theory

- Membership decisions are substantive choices
- Spatial theory of political behavior
- States join institutions whose goals are nearer their own and don’t join institutions whose goals diverge from their own
- Bayesian item response theory (IRT) estimates state ideal points and the characteristics of institutions