

UPSCALING ELINOR OSTROM'S DESIGN PRINCIPLES ILLUSTRATED BY LONG- ENDURING COMMON-POOL RESOURCE INSTITUTIONS

A QUANTITATIVE ANALYSIS USING THE INTERNATIONAL REGIMES DATABASE



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Design Principles

Clearly Defined Boundaries

**Proportional equivalence
between benefits and costs**

**Collective-choice
arrangements**

Monitoring

Graduated Sanctions

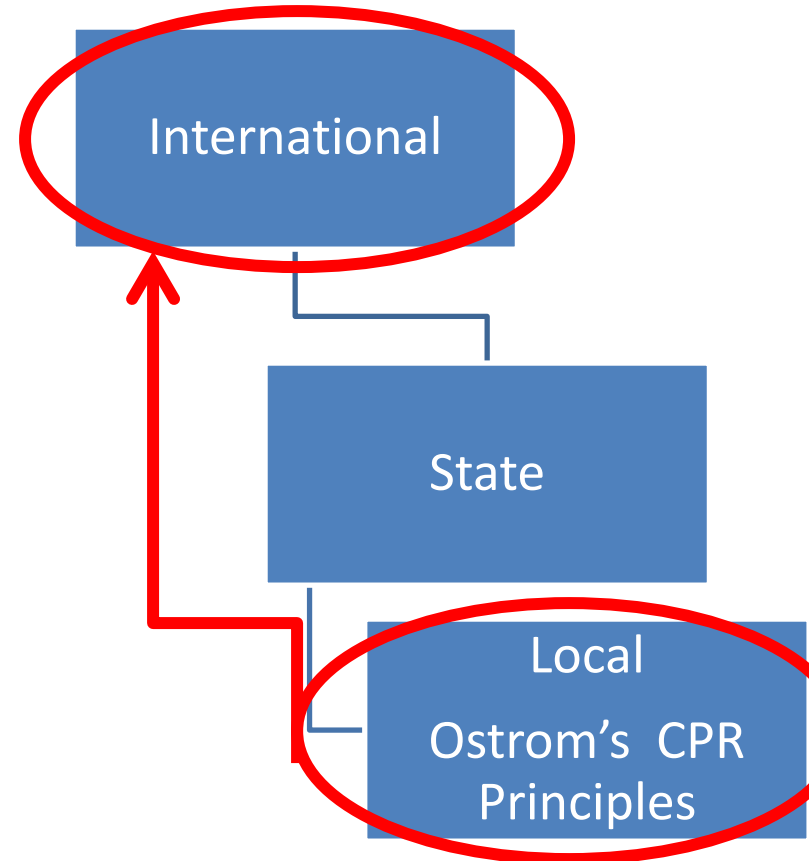
**Conflict-resolution
mechanisms**

**Minimal recognition of rights
to organize**

Nested enterprises



Do International Institutions also demonstrate Elinor Ostrom's "Design Principles Illustrated by Long-Enduring Common-Pool Resource Institutions"?





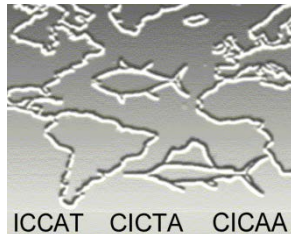
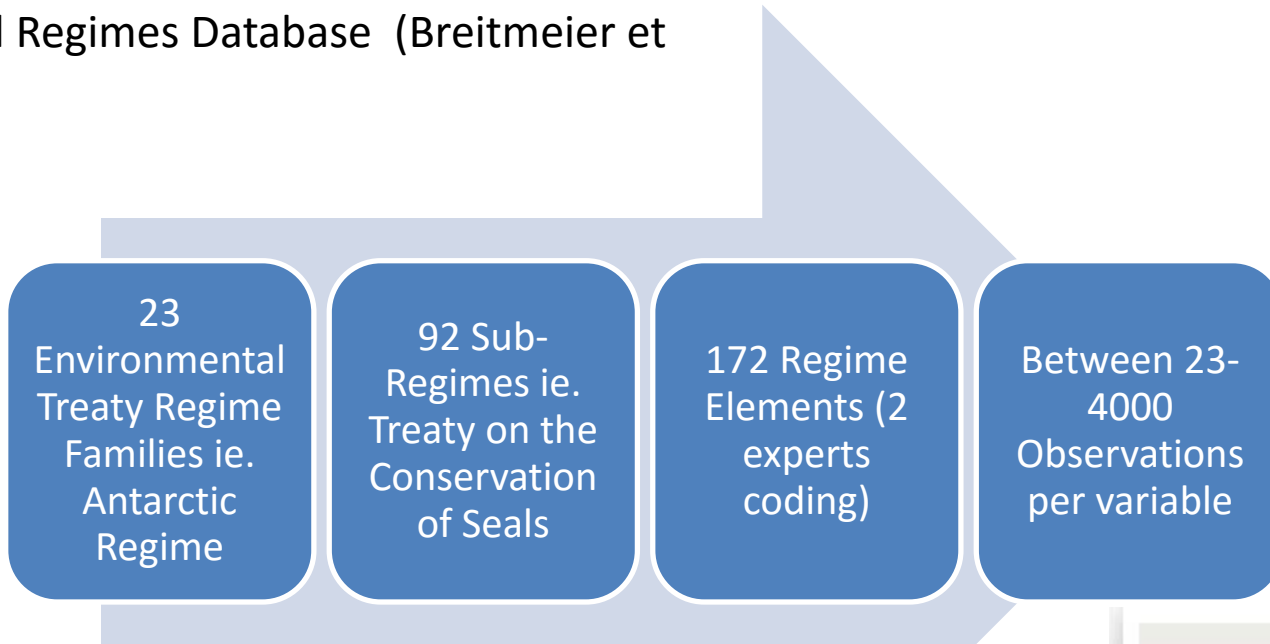
Challenges

- Nature of the Problem
 - CPR vs Public Good
 - Uncertainty
- Actors
 - Type
 - Quantity
- Variables
 - ‘Upscalability’
 - Long – enduring



Int. Reg. Database

International Regimes Database (Breitmeier et al, 2006)





Sprinz and Kaan (2007)

Effectiveness Variable

		<i>Causality of Problem Change attributed to the Regime (PCC)</i>				
		1	2	3	4	5
<i>Problem Change (PC)</i>	--	0	-2	-3	-4	-5
	-	0	-1	-2	-3	-4
	0	0	0	0	0	0
	+	0	1	2	3	4
	++	0	2	3	4	5

Problem Change: How did the state of the world change during this period with respect to the problems addressed by the regime? Did the regime exert a causal influence on these developments?

Causality: Indicate whether the regime exerted a causal influence on the change of the world with regard to the problem.

Ordinal output converted to continuous through aggregation: Given the multiple observations per sub-regime which were the form of Likert scale, they have been aggregated by taking the mean. Consequently, the Effectiveness variable is continuous



Independent Var.

Principle	Description and IRD Variable
Clearly defined boundaries	<p>The boundaries of the resource system (e.g. irrigation system or fishery) and the individuals or households with rights to harvest resource units are clearly defined.</p> <p>“Boundaries” - Is the problem addressed by the regime relatively self-contained or closely linked to surrounding issues?</p>
Proportional equivalence between benefits and costs	<p>Rules specifying the amount of resource products that a user is allocated are related to local conditions and to rules requiring labor, materials, and/or money inputs.</p> <p>“Rule Precision” - Are the regime’s substantive rules generally precise and easy to interpret in the sense that they call for well-defined actions, or are they ambiguous and indeterminate?</p>
Collective-choice arrangements	<p>Many of the individuals affected by the harvesting and protection rules are included in the group who can modify these rules.</p> <p>“Rule Differentiation” - Does the regime have substantive rules that differentiate among its members in terms of requirements, prohibitions, or permissions?</p> <p>“Agenda State Determined” - Was the inclusion of issues on the agenda determined by a single state or a small group of potential regime members?</p>



Independent Var.

Principle	Description and IRD Variable
Monitoring	<p>Monitors, who actively audit biophysical conditions and user behavior, are accountable to the users and/or are the users themselves.</p> <p>“Compliance Reporting” - Are there reporting procedures requiring the submission of information by individual members pertaining to regime implementation?</p>
Graduated Sanctions	<p>Users who violate rules-in-use are likely to receive graduated sanctions (depending on the seriousness and context of the offense) from other users, from officials accountable to these users, or from both.</p> <p>“Compliance Provided” - What formal compliance mechanisms are provided for in the regime’s constitutive provisions to achieve compliance?</p>
Nested Enterprises	<p>Appropriation, provision, monitoring, enforcement, conflict resolution, and governance activities are organized in multiple layers of nested enterprises.</p> <p>“Translation Steps” - Have the important members taken steps to translate the international commitments of the agreements into domestic obligations?</p>



Independent Var.

Concept	IRD Variable
Scale of the Problem	“Number of Causers” - How many nations were regarded as being important because of their role in causing the problem?
Time Trends	“Formation Year” - What year did the treaty come into effect
Institution	“Sub-Regime” – is the observation related to the same treaty at an earlier or later time?



1. Effectiveness variable was generated replicating Sprinz and Kaan (2007)
2. Proxies for Ostrom's principles identified
3. Independent variables aggregated into one observation per international treaty (sub-regime) (aggregation of ordinal values utilized median operation, rounding up; categorical variables converted to binary values; lists of options converted to quantity of options)
4. Panel variables coded: year, decade, sub-regime and regime
5. Models Analyzed: OLS, cross-sectional; fixed-effects, panel

Note: "Translation steps" and "Agenda State Determined" dropped due to lack of observations (23 and 60 respectively)



Hypotheses

Effectiveness_i

$$= \beta_0 + \beta_1 \text{ProblemContainment}_i + \beta_2 \text{RulePrecision}_i + \beta_3 \text{RuleDifferentiation}_i \\ + \beta_4 \text{AgendaStateDetermined}_i + \beta_5 \text{ComplianceReporting}_i + \beta_6 \text{ComplianceProvided}_i \\ + \beta_7 \text{TranslationSteps}_i + \beta_8 \text{NumCausers}_i + \varepsilon_i$$

1 – The design Principles have an limited effect on effectiveness

1A – Problem Containment increases effectiveness

1B – Rule Precision increases effectiveness

1C – Inequality in Rules decreases effectiveness

1D – Unequal access to agenda-setting decreases effectiveness

1E – Reporting Procedures increase effectiveness

1F – Increases in the quantity of compliance mechanisms increase effectiveness

1G – The more steps members take to translate international treaties domestically, the higher the effectiveness

2— The higher the number of states contributing to the problem, the lower the effectiveness.



OLS models

	(1) effectiveness	(2) effectiveness	(3) effectiveness
boundaries	0.599 (1.24)	1.420 (1.15)	-0.130 (-0.38)
complianceprovided	-0.0310 (-0.25)	0.255 (0.97)	-1.800** (-5.02)
compliancereporting	0.130 (0.15)	0.130 (0.10)	1.400 (1.47)
numberofcausers	-0.384* (-2.35)	0.0137 (0.03)	-3.050** (-4.67)
ruledifferentiation	-0.0616 (-0.12)	-1.130 (-1.06)	5.983** (4.32)
ruleprecision	0.487* (2.20)	0.770 (2.03)	-2.54e-13 (-0.00)
<i>N</i>	79	79	79



Fixed Effects

	(1) effectiveness
boundaries	-0.130 (-0.38)
complianceprovided	-1.800* (-5.02)
compliancereporting	3.600* (4.79)
numberofcausers	-3.050* (-4.67)
ruledifferentiation	5.983* (4.32)
ruleprecision	2.53e-15 (0.00)
_cons	5.338* (2.77)
<i>N</i>	79

t statistics in parentheses

+ $p < 0.10$, * $p < 0.05$



Conclusions

Hypotheses	Result
1 – Ostrom’s CPR design principles have an effect on effectiveness	Mixed
1A – Problem Containment increases effectiveness	No evidence
1B – Rule Precision increases effectiveness	Mixed
1C – Inequality in Rules decreases effectiveness	Rejected
1D – Unequal access to agenda-setting decreases effectiveness	No evidence
1E – Reporting Procedures increase effectiveness	Supported
1F – Increases in the quantity of compliance mechanisms increase effectiveness	Rejected
1G – The more steps members take to translate international treaties domestically, the higher the effectiveness	No evidence
2— The higher the number of states contributing to the problem, the lower the effectiveness.	Supported



Robustness

- Conclusions supported by Version 1 which examined regime families
- Results similar across models OLS, FE, Clustered SE, etc.



- Use of DV drawn from Qualitative Assessments
- Ordinal Data
- Magnitude
- Omitted variable(s) / Heterogeneity of Institutions
- Effectiveness vs. Long-Enduring
- CPR vs pure/impure public good institutions
- Non-Regimes



Next Steps

- Code a DV based on metrics (ie. Mitchell (2004), Annual Percentage Change x Per Unit Effort)
- Check for robustness of findings by applying similar methods to other Regime Datasets.
 - Environmental Regimes Dataset, Underdal (2002)
 - Bernauer et al. (2011) dataset
 - IEA, Mitchell (2008)