How do International Organizations Foster Horizontal Cooperation?
Developing Countries, Regional Networks, and the International Atomic Energy Agency

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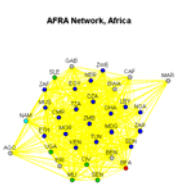
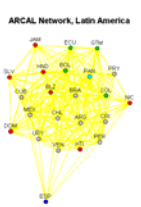
There is considerable consensus among scholars that international organizations (IOs) foster inter-state cooperation (Keohane 1984; Hawkins, Lake, Nielson, and Tierney 2006; Montoya 2008). There is still much discrepancy, however, on how this is to be measured and how IO membership affects cooperation among developing countries. Here, I focus on how one IO, the International Atomic Energy Agency (IAEA), promotes collaboration in nuclear science and technology among developing countries. Using network analysis on cross-sectional panel data from all countries in Africa, Asia, and Latin America, I measure cooperation among developing countries within IAEA and explore what factors facilitate or hinder the adoption of IAEA-sponsored cross-national R&D projects.

Study results show that a Bottom-Up approach (IO sponsors, but members manage) is more effective in promoting cooperation than a Top-Down approach (IO sponsors and manages). Findings have theoretical implications for the study of IOs and policy implications for current UN system-wide management reforms.



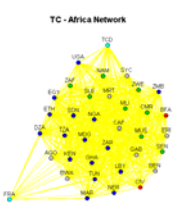
1991-2007



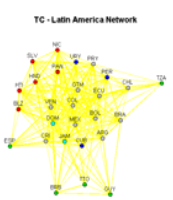
1984-2007

1979-2007

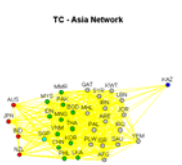
To estimate group proximity within each of the networks I ran six blockmodels in R, arbitrarily setting the number of blocks to five and distance relaxation equal to eight. A block model is a data reduction technique that finds similarities among network nodes, implementing a network clustering algorithm on a set of G network graphs. Different colors in the network graphs describe group membership which is directly estimated from the data.



1980-2007



1977-2007



1978-2007

The top row of networks share a **BOTTOM-UP** approach to cooperation; the bottom row, a **TOP-DOWN** approach. All promote horizontal cooperation, but the regional initiatives seek to pool resources and transfer technology and know-how from the more advanced to the less advanced countries in the region outside of IAEA.

Data and Software: The data for this project was obtained from IAEA. A total of six databases collect information on country level participation in IAEA sponsored projects on Nuclear Science and Technology. Networks generated using UCINET and R 2.6, *Library (SNA).*

Density coefficients, calculated by dividing the number of ties among members by the number of possible ties of a network, reveal (1) Bottom-Up networks are more dense than Top-Down; (2) Greater regional income disparity correlates with lower density networks.

Regional	Density	IAEA	Density
AFRA	0.56	TC-AFRICA	0.40
ARCAL	0.47	TC-LA	0.35
RCA	0.40	TC-ASIA	0.36

Is Horizontal Cooperation Country-Driven? The Case of the ARCAL.

ARCAL Centrality

To analyze the relative position of countries within the ARCAL network, I provide centrality measures. Centrality reveals how active participants are in a network by counting the number of ties each actor has with other members.

	Centrality (Degree)	Centrality (Num Degree)	Centrality (Share)
Brazil	684	54.545	0.078
Argentina	682	54.386	0.077
Chile	645	51.435	0.073
Mexico	633	50.478	0.072
Cuba	622	49.601	0.071
Peru	588	46.89	0.067
Uruguay	548	43.7	0.062
Costa Rica	536	42.743	0.061
Guatemala	480	38.278	0.054
Ecuador	462	36.842	0.052
Colombia	461	36.762	0.052
Venezuela	457	36.443	0.052
Bolivia	444	35.407	0.05
Paraguay	411	32.775	0.047
Panama	328	26.156	0.037
Nicaragua	248	19.777	0.028
D. Republic	238	18.979	0.027
El Salvador	229	18.262	0.026
Haiti	63	5.024	0.007
Jamaica	55	4.386	0.006

Explaining Centrality

Model results show that variation in government spending explains members' level of participation (centrality) in the network. As government spending decreases, country centrality in the network increases. **This reveals a paradox of international cooperation: scarce, rather than abundant, resources drive incentive to collaborate.**

	Centrality (Share)	Centrality (Degree)
Consumption	-0.53	2.97
	(2.53)	(15.47)
Gov. Spending	-1.76*	-11.55*
	(1.03)	(6.34)
Investment	2.31**	14.22**
	(0.96)	(5.91)
Population (ln)	0.27	2.17
	(0.41)	(2.45)
GDP (LN)	-1.05	2.09
	(0.76)	(4.66)
Openness	-0.024	-0.078
	(0.016)	(0.097)
Constant	14.618	-11.77
	(15.00)	(91.97)
Wald (Chi^2)	16.36	26.99
Sigma_U	1.399	8.808
Sigma_E	1.290	8.4797
Rho	0.5403	0.519
R-Sq: Within	0.152	0.238
R-Sq: Between	0.418	0.533
R-Sq: Overall	0.332	0.437
N	64	64

Panel-Corrected OLS Estimates