Extra-Dyadic Sources of International Outcomes

Muhammet A. Bas, Omer F. Orsun, Robert J. Schub

Harvard University

Peace Science Society International 2016

Background

- Scholars have recognized that extra-dyadic considerations matter:
  - Every decision to wage war is influenced by how outside nations will affect the course of war.
  - The choice to form an alliance, even in its minimal form, is subject to multilateral dynamics.
- Prior research has struggled to integrate third-party considerations into statistical models.
- We introduce a new measure
  - motivated by and grounded in canonical theories of international politics.
  - flexible enough to allow different levels of analysis.

Modeling Outcome Uncertainty in a Dyadic Setup

- War is a stochastic process and its ultimate outcome is uncertain.
- State i wins with p and j wins with $1 - p$.
- War outcomes follow a Bernoulli process with mean p, and variance $p(1 - p)$.
- Uncertainty is maximized when $p = 0.5$ and minimized when $p = 1$ or $p = 0$.
- In a non-directed dyadic setup, $min(p, 1 - p)$ captures the relative amount of uncertainty.

Modeling Outcome Uncertainty in a k-adic Setup

- Moving from a dyadic framework to one that allows for third-party entrants muddies the picture.
  - "Complications accelerate as numbers grow because of the difficulty everyone has in coping with the uncertain behavior of many others." (Waltz 1979)
  - "The greater number of possible interveners, the greater the uncertainty." (Vasquez and Rundlett, forthcoming)

Modeling Outcome Uncertainty in a k-adic Setup

- Our uncertainty measure extends this intuition to a k-adic setting.

$$\Gamma = \begin{bmatrix} p_{11} & p_{12} & \cdots & p_{1K} \\ p_{21} & \cdots & \cdots & \cdots \\ \cdots & \cdots & \cdots & \cdots \\ p_{K1} & \cdots & \cdots & p_{KK} \end{bmatrix}$$

- λ_{Γ}^{max} summarizes the overall uncertainty from all possible dyadic conflict outcomes in the set (Bas and Schub 2016)
- **Uncertainty Max:** $p_{ij} = 0.5$ **vs. Uncertainty Min:** $p_{ij} = 0$

Flexibility

- **Flexible Weights:** distance, alliance portfolio similarity, UN voting, capability.
- **Flexible Levels of Analysis:**
  - Systemic Uncertainty
  - Fixed Regional Uncertainty
  - Dynamic Region Dyadic Uncertainty
  - Dynamic Region Monadic Uncertainty
  - We can also relax the bilateral constraint (e.g. k-ads vs. k-ads).

Strong Theoretical Foundations

- The measure captures theoretically-salient elements of international politics
  - Multipolarity produces greater uncertainty (Waltz, 1979).
  - More balanced power distributions produce greater uncertainty over outcomes (Blainey, 1988).
- The measure captures subtleties and gradations that a strict focus on either alone misses:
  - Uncertainty is maximized in a **multipolar balanced system.**
  - Uncertainty is minimized in a **unipolar hierarchical system.**
- The measure improves upon existing proxies
  - that are virtually time-invariant (e.g., polarity)
  - that lack strong theoretical foundations (e.g., system concentration (Ray and Singer, 1973; Ray and Bentley, 2010)).

Substantive Applications

Three Applications

- Alliance Formation (Crescenzi et al 2012): Systemic & Dynamic Region Dyadic Uncertainty
- Nuclear Proliferation (Way and Weeks 2014): Systemic & Fixed Regional Uncertainty
- Sanction Imposition (Spaniel and Smith 2016): Dynamic Dyadic and Dynamic Monadic Uncertainty

Uncertainty and Alliance Formation

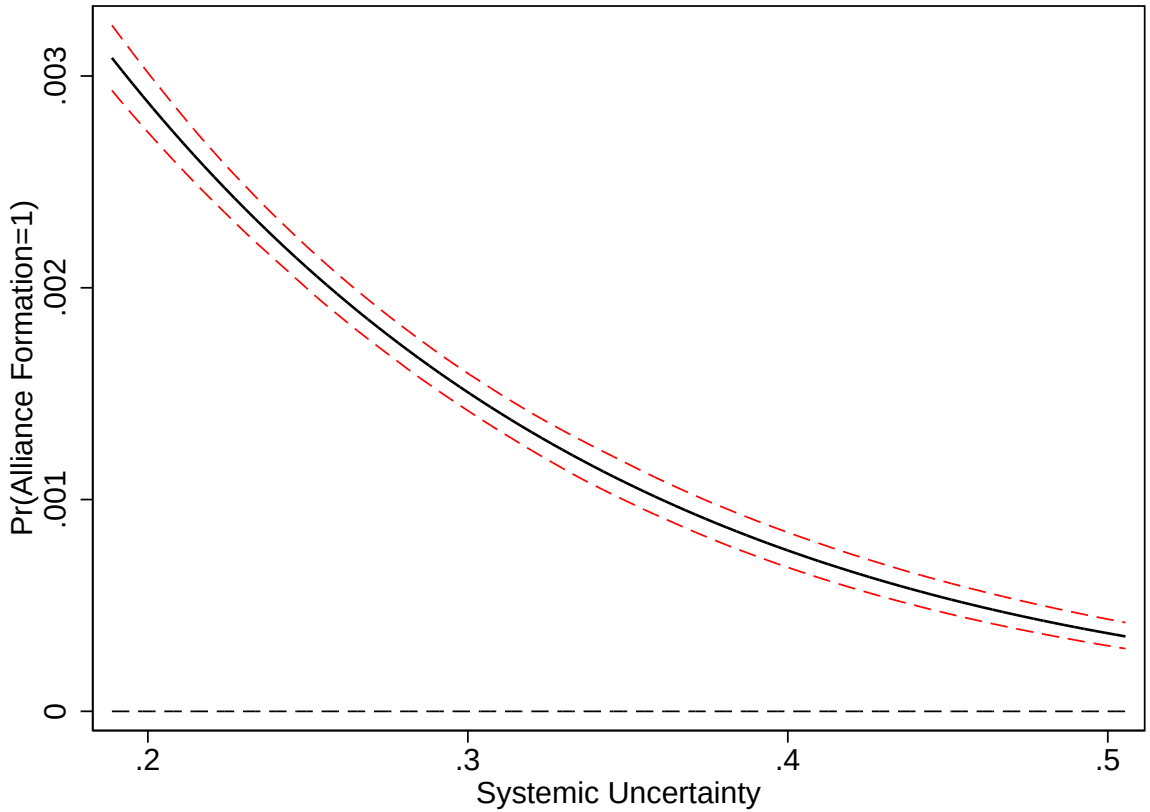
- Alliances often are responses to specific third-party threats (Walt, 1987; Leeds, Long and Mitchell, 2000),
- Alliances are frequently multilateral (Fordham and Poast, 2014), and
- Alliances are a necessary condition for war expansion. (Vasquez and Rundlett, forthcoming).

Uncertainty and Alliance Formation,1816-2001

	Model A1	**Model A2**	**Model A3**	**Model A4**	**Model A5**
	Null	*System*	*Region*	*Null*	*System*
Uncertainty		-2.05***	-3.09***		-1.86***
		(0.09)	(0.11)		(0.12)
Alliance Reputation	1.44***	1.71***	1.62***	0.02	0.31
	(0.20)	(0.20)	(0.20)	(0.33)	(0.31)
Alliance History	0.62	0.76	0.83	0.86	0.92
	(0.61)	(0.63)	(0.63)	(0.55)	(0.58)
Portfolio Similarity	0.62***	0.64***	0.77***	0.59***	0.62***
	(0.04)	(0.04)	(0.04)	(0.07)	(0.07)
Interaction Score (IIS)	0.20***	0.17***	0.18***	-0.08	-0.09*
	(0.06)	(0.06)	(0.06)	(0.05)	(0.05)
Observations	1,045,707	1,045,707	1,045,707	162,456	162,456
Sample	Full	Full	Full	PR	PR

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Uncertainty and Alliance Formation,1816-2001



Average Case: Reduction from the baseline 0.3% to 0.03%.

Most Alliance Prone Case: Reduction from the baseline 77% to 54%.

Conclusions

- Quantitative studies often struggle to capture the broader international landscape and its implications on foreign policy choices.
- We offer and illustrate a solution for these frequently omitted factors.
- Our measure improves upon existing time-invariant and atheoretical proxies.
- Fruitful research avenues:
  - Joining and forming international organizations
  - providing foreign aid
  - engaging in mediation efforts
  - issuing compellent or deterrent threats
  - arms races

Uncertainty and Nuclear Proliferation

Proliferation choices are shaped by multilateral considerations:

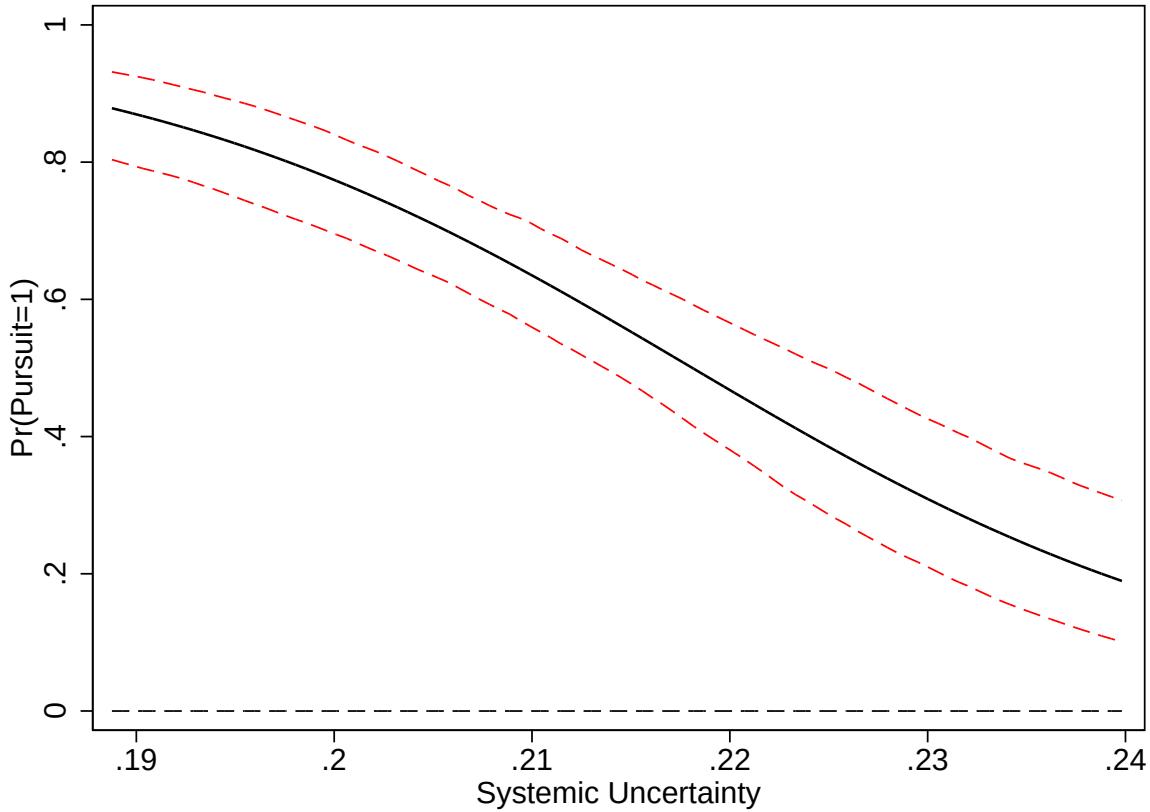
- whether a state faces a rival and lacks a nuclear guarantor (Monteiro and Debs, 2014),
- whether proliferation could initiate a regional "cascade" (Allison, 2010),
- whether proliferation is subject to preventive strikes (Fuhrmann and Kreps, 2010).

Uncertainty and Nuclear Proliferation, 1946-2000

	Singh and Way 2004			Jo and Gartkze 2004		
	Null	*System*	*Region*	*Null*	*System*	*Region*
Uncertainty		-50.17***	-10.01*		-55.48***	-12.03**
		(14.63)	(5.59)		(15.57)	(5.46)
Personalism	2.96***	2.77***	3.11***	3.30***	2.97***	3.26***
	(0.64)	(0.62)	(0.68)	(0.65)	(0.65)	(0.68)
Land	0.86***	0.95***	0.91***	1.06***	1.07***	1.05***
	(0.20)	(0.19)	(0.23)	(0.23)	(0.23)	(0.24)
Constant	-10.35***	-0.72	-7.63***	-10.25***	2.10	-5.80**
	(1.50)	(3.32)	(2.23)	(1.59)	(3.67)	(2.40)
$\ln\left(\sigma_v^2\right)$	3.10***	3.31***	3.41***	3.03***	2.93***	3.17***
	(0.27)	(0.22)	(0.30)	(0.28)	(0.29)	(0.27)
Observations	5,338	5,338	5,324	5,337	5,335	5,321

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Uncertainty and Nuclear Proliferation, 1946-2000



Systemic Uncertainty: Reduction from the baseline 82% to 41%.
Fixed Regional Uncertainty: Reduction from the baseline 77% to 25%.

Uncertainty and Sanction Imposition

Sanction imposition decisions are shaped by factors beyond the dyad:

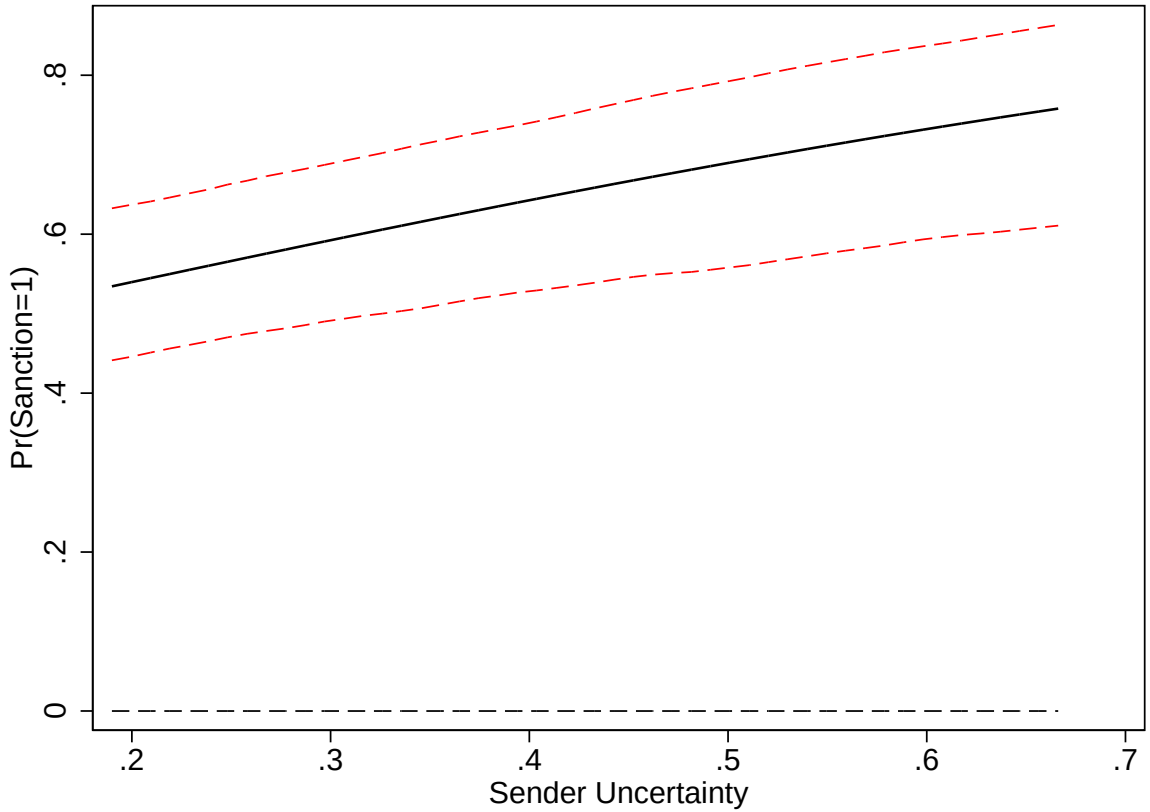
- Sanctions may contain regional conflicts (Rogers, 1996).
- Sanctions resolve smoothe shifts in relative power that might lead to preventive wars (McCormack and Pascoe, 2015).
- multiple actors often simultaneously impose sanctions against a common target (Bapat and Morgan, 2009).

Uncertainty and Sanction Imposition, 1946-2000

	Model S1	**Model S2**	**Model S3**	**Model S4**
		Region	*Sender*	*Target*
Uncertainty		2.91***	2.16***	-0.36
		(0.97)	(0.59)	(0.69)
Tenure	-0.35***	-0.34***	-0.36***	-0.35***
	(0.12)	(0.12)	(0.12)	(0.12)
Institution	-1.40***	-1.49***	-1.46***	-1.39***
	(0.28)	(0.28)	(0.28)	(0.28)
Polity	-0.62**	-0.56**	-0.62**	-0.63**
	(0.27)	(0.27)	(0.27)	(0.27)
Observations	873	873	873	873

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Uncertainty and Sanction Imposition, 1946-2000



Dynamic Dyadic Uncertainty: Increase from the baseline 28% to 52%.
Dynamic Sender Uncertainty: Reduction from the baseline 23% to 53%.