Nuclear (De)Proliferation:

Intended vs. Inadvertent Policy Outcomes

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Risks and Rewards of Engagement

Research and Methods

- Analysis drawn from original cross-national country-year dataset covering 8,000+ obs and 200+ variables, collected from 14 existing datasets covering 350,000+ obs from 1945-2012

First Order Effects

- Deproliferate by reducing demand, not capability. Consider implications for target security.
- Strongest determinant of effectiveness is signal effect on target security motives.
- Most common coercive tactics risk proliferation more than they incentivize reversal. Some cooperative inducements incentivize nuclear reversal more than they risk perverse proliferation.

Conditions for Effective Policy

- Sender conditions – using the right state for the job: Military power and economic leverage make little difference, but historical ties do. Effects – good and bad – are magnified from rival senders.
- Future credibility: threat / promise follow through, and multilateral oversight / enforcement.

Presentation Roadmap

- Outline Engagement Options
- Engagement Effect on Target Proliferation
- First Order Effects
- Role of Sender and Environment
- Second Order Effects
- Implications and Other Research

Deproliferation Policy Types

Coercive: Threaten punishments for proliferating

- Compellent Threats – Threat of force intended to induce a behavior change in the target, and backed by force display or mobilization.
- Use of force – Direct military action on the target. May have inanimate and/or human casualties
- Economic Sanctions – threat or imposition of trade or financial restrictions for explicit purpose of changing target behavior change. May be nuclear-specific or general sanctions.
- Diplomatic Sanctions – Reduction of formal diplomatic ties, including withdrawing diplomats or closing embassy.

Cooperative: Promise benefits for reversing

- Foreign Aid – direct transfer from sender to target government or beneficiaries
- Military Alliance – signed agreement to (at most) mutually defend or (at least) refrain from attack
- Diplomatic Recognition – Explicit recognition or increased formal government ties, including opening an embassy or increasing sender's diplomatic presence in target.
- Nuclear Agreements (NCA) – Nuclear-specific assistance in either material or technical expertise

Mechanism of Effect

Engagement affects target state proliferation incentives through several mechanisms. Combined, these mechanisms incentivize reversal or proliferation, occasionally both effects with a single engagement.

Capability

- Technical Expertise
  - Technical knowledge of fuel cycle and scientific processes
  - Access to funds necessary to train and pay technical experts.
- Material Access
  - Indigenous stores of physical components necessary
  - Access to external sources of components and funds to purchase

Motivation

- Direct Payout
  - Inducements promise explicit benefits in exchange for reversal
  - Coercion imposes explicit costs for proliferating
- Indirect Demand
  - Inducements implicitly signal reduced threat from the sender
  - Coercion implicitly signals greater threat from the sender

Policy First Order Effects

Engagement Type	Target Capability	Target Payout	Security Signal
Compellent Threat:	No effect	Costs to proliferate	Proliferation benefit
Use of Force:	Reduced capacity	Costs to proliferate	Proliferation benefit
Nuclear Sanctions	Reduced capacity	Costs to proliferate	Proliferation benefit
General Sanctions:	Little / no effect	Costs to proliferate	Proliferation benefit
Diplomatic Sanction:	No effect	Costs to proliferate	Proliferation benefit
Foreign Aid:	Little / no effect	Deprolif. benefit	Deprolif. benefit
Military Alliance:	No effect	Deprolif. benefit	Deprolif. benefit
Diplomatic Engage:	No effect	Deprolif. benefit	Deprolif. benefit
NCA:	Increased capacity	Deprolif. benefit	Deprolif. benefit

First Order Motivation Effects

	Payout	Signal	**Total**
Deproliferation	Coercion = 0 Cooperative = +	Coercion = -- Cooperative = +	**Coercion = --** **Cooperative = +**
Proliferation	Coercion = -- Cooperative = 0	Coercion = + Cooperative = 0	**Coercion = mixed** **Cooperative = 0**

- Coercion nets costs to to the target for reversal, cooperation nets benefits to the target for reversing.
- Coercion has mixed effects on target's utility for proliferating, inducements do not change target utility for proliferating.

Research Design

Data

- Original country-year dataset
- Draws from 14 existing datasets, covering 1945-2012
- 8,010 observations, 217 variables, covering 8 engagement types
- Built from data covering 300,000+ dyad-year observations

Methods

- Multinomial logistic regression
- DV: led year-over-year change in country-wide number and size of nuclear enrichment facilities
- Targets: states with an active nuclear weapons program excluding P5
- Senders: All states, uni- or multilaterally

Short Term Effects

Engagement Type	Deproliferation Odds Ratio		Proliferation Odds Ratio
Compellent Threat:	--	=	--
Use of Force:	2.7	<	3.4
Nuclear Sanctions	2.1	<	3.7
General Sanctions:	2.4	=	2.3
Diplomatic Sanction:	--	=	--
Foreign Aid:	--	=	--
Military Alliance:	--	=	--
Diplomatic Engage:	9.2	>	4.7
NCA:	6.4	>	5.4

Odds ratio = relative risk under treatment of outcome compared to no response.
Multinomial logit design with state clustered errors.

Sender Power and Relations

Engagement Type	Deproliferation Odds Ratio		Proliferation Odds Ratio
Power Sanctions:	2.9*	<	5.8
Weak Sanctions:	3.2*	<	3.8
Strong Threats:	--	=	--
Weak Alliance:	--	<	4.4
Rival Sanctions:	--	<	3.7
Allied Sanctions:	3.5	<	8.3
Rival NCA:	18.7	>	9.4
Allied NCA:	7.9	>	5.0

Odds ratio = relative risk under treatment of outcome compared to no response.
Multinomial logit design with state clustered errors.

Signal Dominates Effect

Capability versus motivation:

- Reducing motivation is more effective than reducing capability
- Capability barriers are eroding over time -- marginal costs and technical barriers are shrinking.

Cooperative inducements signal threat reduction:

- Coercion signals threat, but imposes costs and reduces capability -- signal effect is stronger than capability or payout
- Cooperative inducements signal reduced threat and offer benefits fro reversal, but risk increasing target nuclear capability – signal effect is still stronger.

Sender power and bilateral relationships:

- Signal also over-rides military power and economic leverage – coercion irrespective of leverage carries greater risk of proliferation than reversal.
- Greatest reversal in response to cooperation (NCA) from a rival

North Korea Case Evidence

Regime security and nuclear weapons

- Regime security dominates proliferation incentives – (inter)national security and domestic legitimacy. Cooperative signals reduces foreign demand but not domestic incentives.

North Korea is insulated from external leverage:

- Sanctions are especially ineffective in this case. Decision-makers perversely benefit from protected markets.
- Regional dynamics hinder military leverage. Regional fall-out make use of military force prohibitively costly.
- Historically, regime doubles down in response to threats, cooperates from position of strength.

Inducements from rivals, but delegate enforcement

- Offers from rivals (South Korea and United States) are particularly effective, but trust deficit complicates agreement and enforcement.
- Overcoming low trust environment – delegating oversight and enforcement to third-party.

Second Order Effects

Future Credibility:

- Institutional oversight – delegating enforcement to third party increases agreement *ex ante* viability and *ex post* durability
- Threat follow through – empty threats lead to future target resistance

Preventing Moral Hazard:

- Risking appeasement? The most effective cooperative inducements (NCAs and diplomatic recognition) are available to any NPT-abiders.
- Costs of proliferation do not buy otherwise unavailable concessions.

Implications and Further Research

Results: Near-term effects

- Inducements are more likely to result in roll-back, but still risk perverse proliferation.
- Coercion is more likely to lead to perverse proliferation.
- Cooperation from rivals is most effective. Little benefit from military or economic leverage.

Looking ahead: Longer-term effects

- Importance of duration – rate of coercing/inducing change.
- Risk of relapse – recidivism rates in past proliferators.

For More Information:

Petrovics, A. (2017) "Inducing Nuclear Deproliferation: Crafting effective foreign policy" prepared for presentation at APSA Annual Convention: San Francisco, CA

Petrovics, A. (2016) "Calling Their Bluff: Exploring the causes and consequences of empty sanction threat" prepared for presentation at ISA Annual Convention: Atlanta, GA

Petrovics, A. (n.d.) "Determining Sanction Success: State resistance to sanctioner demands" under review and presented at 2016 ISA Annual Convention: Atlanta GA

Petrovics, A. and S.Laderman (2018) "The Role of International Organizations in Nuclear Deproliferation Strategies" prepared for presentation at APSA Annual Convention: Boston, MA

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