The Benefits and Burdens of Nuclear Latency by Mehta and Whitlark

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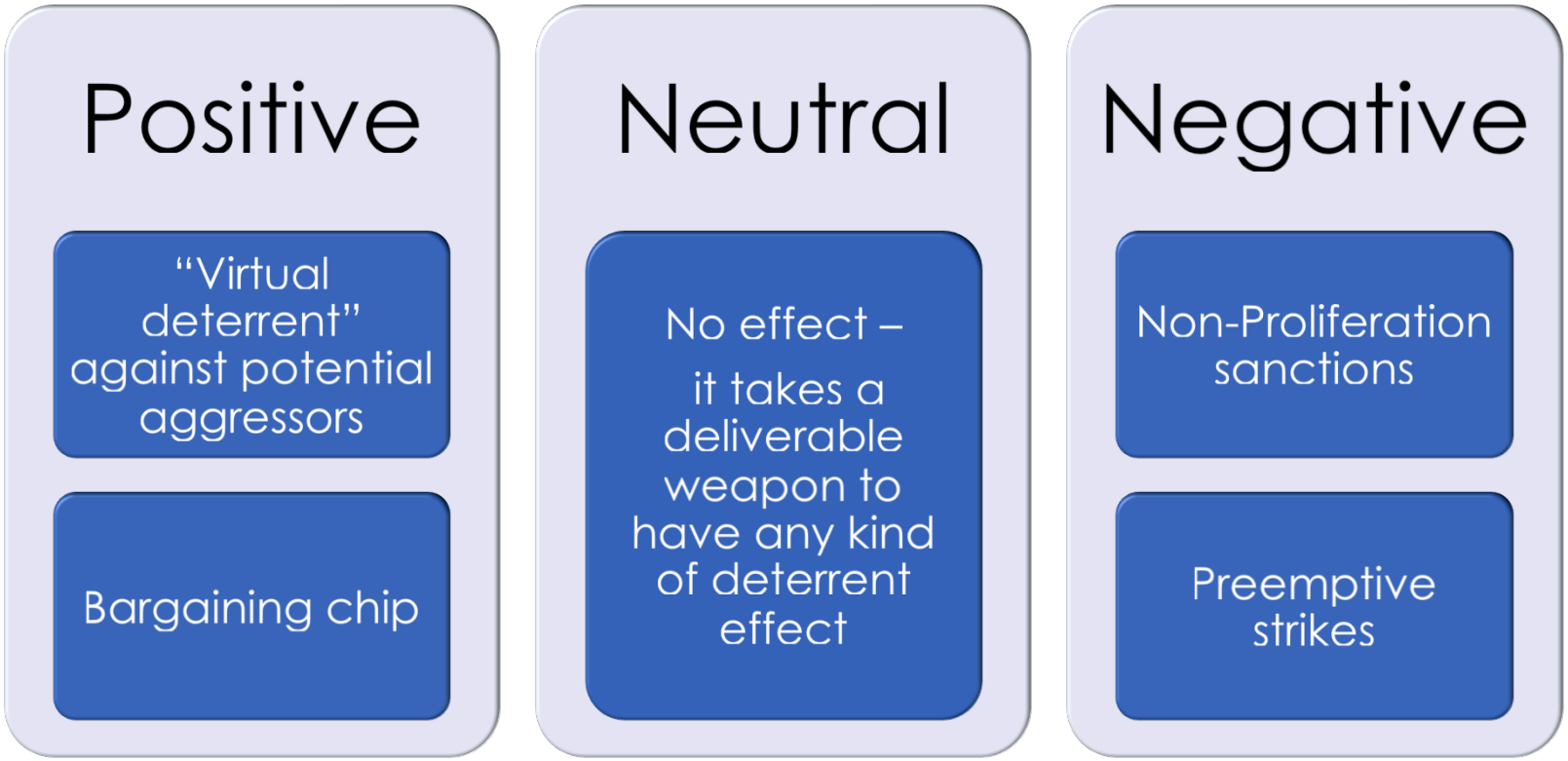
Possible Effects of Latency



The Background

Virtual Deterrence Theory

- Essentially it's the same as having the bomb
- Latency functions both as a deterrent to aggression and as leverage in negotiation
- Hypotheses 1-5

Latency Provocation Theory

- You can't deter challengers without an operational and deliverable weapon
- Latency welcomes non-proliferation sanctions and preemptive attacks
- Both a threat to security and economic prosperity
- Hypotheses 6 & 7

Hypotheses

H1 -- Virtual Deterrence Theory

- States that acquire nuclear latency are less likely to be the target of militarized interstate disputes.

H2 -- Virtual Deterrence Theory

- States that acquire nuclear latency are more likely to initiate militarized interstate disputes.

H3 -- Virtual Deterrence Theory

- States that acquire nuclear latency are more likely to receive military assistance from the United States

H4 -- Virtual Deterrence Theory

- States that acquire nuclear latency are more likely to receive economic assistance from the United States.

Hypotheses (Cont.)

H5 -- Virtual Deterrence Theory

- States that acquire nuclear latency are more likely to experience success in the issuance of compellent threats against target states.

H6 -- Latency Provocation Theory

- States that acquire latency are more likely to be the target of militarized interstate disputes.

H7 -- Latency Provocation Theory

- States that acquire nuclear latency are more likely to be the target of US-imposed economic sanctions.

Independent Variable

Measuring Latency (ENR)

- Focus on enrichment and reprocessing (ENR) facilities
- Use an expanded dataset of ENR capabilities based on Fuhrmann and Tkach's 2015 paper
- Focus on a dichotomous variable: either a state has ENR capabilities beyond a laboratory scale or a state does not

Coding Latency

In order to be coded as latent in a given year a state must operate ENR facilities that are:

- Functional
- Non-laboratory-level (Pilot-scale)
- On their own soil

Further, states must not have nuclear weapons

Table 1. States with pilot-scale ENR facilities: 1945-2012

22 states are identified as operating pilot-scale ENR facilities in the given 67 years

Country	*Pilot*
Argentina	1987–94
Belgium	1966–74
Brazil	1979–1994, 1998–2012
Canada	1944–56
China	1963–64
France	1954–60
Germany	1967–2012
India	1964–73, 1977–88
Iran	2002–2012
Iraq	1990–91
Israel	1963–67
Italy	1966–90
Japan	1975–2012
The Netherlands	1973–2012
North Korea	1983–93, 2003–06
Norway	1961–68
Pakistan	1973–87
Russia	1948–49
South Africa	1975–79, 1991–2012
Spain	1967–71
United Kingdom	1952
USA	1943–45

Dependent Variables

3 Categories -- Capturing Latency's Effect on:

1
military and coercive bargaining power

2
political and economic outcomes

3
how states interact with potential adversaries

Category 1: military and coercive bargaining

- Target of a Militarized Interstate Dispute (MID)
  - 1 if yes; 0 if not (in a given year)
- Initiator of a MID
  - 1 if yes; 0 if not (in a given year)

Note: focus solely on fatal MIDs in order to "capture how nuclear latency impacts state behavior in truly threatening security environments"

Category 2: political and economic outcomes

- Military assistance from the United States
  - 1 if the state received military assistance from the US; 0 if not (in a given year)
- Economic assistance from the United States
  - 1 if the state received economic assistance from the US; 0 if not (in a given year)

Note: variables from the US Agency for International Development (USAID)

Category 3: how states interact with potential adversaries

- Compellent threat success
  - From Sechser's Militarized Compellent Threat data
  - 1 if a state is successful in having their demands met by a target; 0 if not (in a given year)
- Imposition of US sanctions
  - From Hufbauer et al. 2007
  - 1 if the US imposed sanctions on a state; 0 if not (in a given year)

Control Variables

Control Variables

- US ally
  - 1 if state has an operating defense pact with the US; 0 if not
- US Nuclear Assistance (US NCA)
  - As defined by the Atomic Energy Act
- Military Capability
  - Measured using Correlates of War's Composite Index of National Capability (CINC)
- Rivalry
  - Whether a state has lasting regional rivalries
- Borders
  - Codes an ordinal measure of contiguity in order to account for a state's regional security environment

Control Variables (cont.)

- Regime Type
  - Measured using Polity IV scores
- Polity Change
  - Measures a 5-year change in Polity scores
- GPD per capita
- Economic openness
- NPT Signatory
- NPT Era
  - To account for a possible non-proliferation norm

Results

Table 2: Summary

Table 2. Results summary (rare events)

Dependent variable	*Direction*	*Significance ($p>\|z\|$)*
Violent MIDs–target (Model 1)	Positive	Not significant
Violent MIDs–initiator (Model 2)	Positive	Significant (*)
US military aid (Model 3)	Negative	Significant (***)
US economic aid (Model 4)	Negative	Not significant
Compellent threat success (Model 5)	Positive	Not significant
Violent MIDs–target (Model 6)	Positive	Not significant
US-imposed economic sanctions (Model 7)	Positive	Significant (***)

Statistical significance: $***p<0.01$, $**p<0.05$, $*p<0.1$.

Table 2 includes a summary of the main coefficient estimates from the analyses, where controls are included but not presented.

Note: Models 1-7 relate to hypotheses 1-7 respectively

Table 3: Full Regression

Table 3. Effect of latency on dispute and bargaining outcomes (RELOGIT)

	Model 1/6 (MIDsTarg)	*Model 2 (MIDsInit)*	*Model 3 (Mil Aid)*	*Model 4 (Econ Aid)*	*Model 5 (Threat Success)*	*Model 7 (US Sanctions)*
Latency (no NWS)	**0.055**	**0.390***	**–0.685*****	**–0.167**	**0.974**	**1.150*****
	(0.195)	(0.203)	(0.234)	(0.173)	(0.792)	(0.217)
US NCA/123	0.193*	0.443***	1.007***	–0.178*	0.252	–0.285
	(0.101)	(0.109)	(0.118)	(0.104)	(0.653)	(0.180)
Econ. openness	–0.004***	–0.008***	0.001	0.004***	–0.002	–0.0013***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.005)	(0.002)
NPT era	0.056	0.035	0.676***	0.618***	–0.840	0.916***
	(0.116)	(0.126)	(0.124)	(0.092)	(0.559)	(0.149)
Regime type	0.020***	0.005	–0.037***	–0.006	0.034	–0.014
	(0.007)	(0.007)	(0.007)	(0.006)	(0.031)	(0.009)
NPT signatory	–0.011	0.247**	0.496***	0.556***	0.366	–0.007
	(0.106)	(0.114)	(0.125)	(0.085)	(0.544)	(0.123)
GDP per capita	0.000	–0.000***	–0.000*	–0.000***	–0.000	–0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.002)	(0.000)
Polity change	–0.03	0.022**	–0.008	–0.017	–0.096*	0.078***
	(0.010)	(0.010)	(0.010)	(0.010)	(0.056)	(0.014)
Rivalry	0.730***	1.110***	0.178***	0.002	0.471	1.022***
	(0.085)	(0.092)	(0.086)	(0.073)	(0.438)	(0.117)
CINC	14.837***	4.174	5.382*	–6.176	15.677	5.210*
	(3.937)	(3.153)	(2.842)	(4.279)	(9.572)	(3.001)
US ally	–0.447***	0.053	1.004***	0.939***	0.005	0.416***
	(0.094)	(0.103)	(0.095)	(0.094)	(0.522)	(0.153)
Borders	0.067***	0.081***	0.067***	0.048***	0.031	0.055***
	(0.014)	(0.016)	(0.017)	(0.014)	(0.091)	(0.019)
Time	–0.049***	0.035*	–1.416***	–0.264***	–0.034**	0.201***
	(0.020)	(0.020)	(0.220)	(0.019)	(0.158)	(0.024)
$Time^2$	0.002*	–0.002	1.142***	0.010	0.020*	–0.012***
	(0.001)	(0.001)	(0.131)	(0.001)	(0.010)	(0.001)
$Time^3$	–0.000*	0.000	–0.202***	–0.000***	–0.000*	0.000***
	(0.000)	(0.000)	(0.019)	(0.000)	(0.000)	(0.000)
Observations	6,514	6,514	6,510	6,510	6,510	6,510

(1) Standard errors in parentheses. (2) Statistical significance: ***$p<0.01$, **$p<0.05$, *$p<0.1$.

Table 4: US ally status' effect on Models 3, 4 and 7 (Here 1, 2 and 3)

Table 4. Conditional effects of nuclear latency on allies versus nonallies

	Allies			*Non-allies*		
	Model 1 (Mil aid)	*Model 2 (Econ aid)*	*Model 3 (Sanctions)*	*Model 1 (Mil aid)*	*Model 2 (Econ aid)*	*Model 3 (Sanctions)*
Latency (no NWS)	**–0.512*****	**0.003**	**–0.169**	**–0.165**	**0.380****	**1.042*****
	(0.183)	(0.148)	(0.245)	(0.245)	(0.192)	(0.186)
US NCA/123	0.923***	0.033	–0.687***	0.243**	–0.106	0.287***
	(0.107)	(0.105)	(0.157)	(0.099)	(0.075)	(0.094)
Econ. openness	–0.002	0.001	–0.011***	0.001	0.002***	–0.007***
	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
NPT era	0.544**	0.343***	1.665***	0.373***	0.480***	0.086
	(0.154)	(0.129)	(0.186)	(0.096)	(0.068)	(0.095)
Regime type	–0.023***	0.004	–0.016*	–0.021***	–0.001	0.001
	(0.007)	(0.007)	(0.009)	(0.005)	(0.004)	(0.006)
NPT signatory	0.390**	0.330**	–0.279*	0.290***	0.344***	0.001
	(0.164)	(0.133)	(0.159)	(0.089)	(0.060)	(0.083)
GDP per capita	–0.000	–0.000***	–0.000***	–0.000	–0.000***	–0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Polity change	–0.021**	–0.012**	0.044***	0.005	–0.014**	0.023***
	(0.010)	(0.010)	(0.010)	(0.007)	(0.006)	(0.009)
Borders	0.046***	0.005	–0.117	0.040***	0.034***	0.068***
	(0.017)	(0.014)	(0.021)	(0.013)	(0.009)	(0.013)
Rivalry	0.124	0.305***	0.361***	0.084	–0.123**	0.498***
	(0.086)	(0.088)	(0.109)	(0.066)	(0.050)	(0.069)
CINC	–4.184	8.968**	14.945**	4.501*	–4.471*	–1.021
	(5.496)	(4.281)	(7.570)	(2.647)	(1.783)	(2.191)
Time	–1.081***	–0.286***	0.146***	–0.814***	–0.133***	0.081***
	(0.271)	(0.029)	(0.059)	(0.059)	(0.011)	(0.015)
$Time^2$	0.799***	0.024***	–0.007	0.664***	0.004***	–0.005***
	(0.168)	(0.003)	(0.009)	(0.099)	(0.001)	(0.001)
$Time^3$	–0.140***	–0.000***	0.000	–0.116***	–0.000***	0.000***
	(0.026)	(0.000)	(0.001)	(0.015)	(0.000)	(0.000)
Constant	0.118	1.790***	–1.682***	–0.404***	0.555***	–2.062***
	(0.122)	(0.116)	(0.175)	(0.088)	(0.065)	(0.092)
Observations	2,158	2,158	2,158	4,352	4,352	4,352

What does this mean for Iran (and the world)?

No Idea!

Backing Down

- Given the likelihood of sanctions for continued efforts to bolster the state's nuclear capacity it may be that Iran will not pursue further nuclear development and be content to maintain their latency

Note: the article does say the pursuit of latency may be shown to be halted by the evident costs and further research should focus on why states pursue latency

Producing an arsenal

- Given the findings that latency is both correlated with aggressive behavior and unsatisfactory in deterrence a mix of regional tensions enflamed by Iranian aggression and an inability to protect itself from retaliation to that aggression with a latent arsenal may lead Iran to develop nuclear weapons

Questions