Winning with the bomb

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Introduction

- Authors argue that states can improve their allotment of a good or convince an opponent to back down and have shorter crises if their opponents have greater expected costs of crisis
- This article considers whether nuclear proliferators actually reap benefits from their weapons
- We are interested in how states benefit from the bomb even when they do not actually use it

Hypothesis 1 & 2

- Nuclear-weapon states are more likely to prevail in either gaining concessions or convincing an opponent to back down in their crises than are non–nuclear-weapon states.
- Opponents of nuclear-weapon states are more likely to end crises sooner than opponents of non-nuclear-weapon states.

Hypothesis 3-5

- Nuclear-weapon states in symmetric dyads are less likely to prevail in their crises than those in asymmetric dyads.
- Opponents of nuclear-weapon states in symmetric dyads are less likely to end their crises sooner than those in asymmetric dyads.
- Nuclear-weapon states will be more prone to prevail and to face shorter crises when saliency is high.

Data

- Data used mainly from ICB Dataset in conjunction with numerous other sources
- The first and last days of crisis are rarely the same for both actors in a dyad, as the crisis is usually perceived first by one actor, and the other actor only perceives a crisis after the first responds

Table 1
Dates of Weapon States

	Nuclear Weapons	
Country	Start	End
United States	1945	>2001
Soviet Union/Russia	1949	>2001
United Kingdom	1952	>2001
France	1960	>2001
China	1964	>2001
Israel	1967	>2001
India	1988	>2001
South Africa	1982	1990
Pakistan	1990	>2001
North Korea	>2001	>2001

Crisis Outcomes

- Derive some predictions about the impact of nuclear weapons, given different levels of intensity and holding all control variables at their median values
- Table 2 presents the probit results of whether crisis actors are effectively able to succeed in gaining concessions, or at least, in not yielding to demands
- From the results of this model, nonnuclear opponents of nuclear states are more likely to face defeat, while nuclear states are less likely to realize defeat in their crises against nonnuclear states

Table 2
Probit Models of Crisis Outcomes

	(1) Victory	(2) Victory (Restrictive)	(3) Victory	(4) Victory (Restrictive)	(5) Defeat	(6) Defeat
Nuclear A	0.346**	0.247*	0.052	−0.008	−0.560**	−0.475*
	(0.141)	(0.142)	(0.162)	(0.167)	(0.186)	(0.205)
Nuclear B	−0.150	−0.288*	−0.056	−0.260*	0.575**	0.366**
	(0.121)	(0.133)	(0.149)	(0.156)	(0.122)	(0.151)
Nuclear A & B	−0.166	−0.362*	−0.181	−0.346*	−0.292	−0.246
	(0.222)	(0.207)	(0.223)	(0.205)	(0.228)	(0.231)
Salience			0.030	−0.252**		−0.225*
			(0.092)	(0.096)		(0.104)
Nuclear A × salience			0.807**	0.645**		−0.320
			(0.231)	(0.214)		(0.284)
Nuclear B × salience			−0.245	−0.078		0.529**
			(0.217)	(0.236)		(0.216)
Capability share	0.239	−0.001	0.290*	0.052	0.106	0.066
	(0.147)	(0.154)	(0.149)	(0.157)	(0.161)	(0.164)
Superpower A	0.102	0.481**	0.109	0.490**	0.300	0.317
	(0.155)	(0.156)	(0.161)	(0.157)	(0.202)	(0.208)
Target A	0.436**	0.516**	0.426**	0.473**	−0.322**	−0.335**
	(0.078)	(0.084)	(0.081)	(0.085)	(0.096)	(0.098)
Previous crisis A	0.233	0.245	0.271	0.281	−0.434*	−0.468*
	(0.201)	(0.219)	(0.203)	(0.219)	(0.217)	(0.219)
Violence	0.070*	0.007	0.037	0.007	−0.025	0.014
	(0.050)	(0.052)	(0.038)	(0.057)	(0.033)	(0.039)
Constant	−0.643**	−0.855**	−0.592**	−0.851**	−0.606**	−0.593**
	(0.140)	(0.148)	(0.144)	(0.151)	(0.154)	(0.157)
Observations	1,218	1,218	1,218	1,218	1,218	1,218

Note: Robust standard errors in parentheses, clustered on each non-directed dyad
* Significant at 5%; ** significant at 1% in a one-tailed test

Selection Models

- The censored probit models, which adjust for nonrandom selection into a crisis, are given in Table 3
- When accounting for the nonrandom selection into mediation, nuclear states still are more likely to succeed in achieving their demands and getting the opponent to back down against nonnuclear states
  - Moreover, that relationship is much stronger in high-salience cases than in ones without a substantial threat involved

Table 3
Selection Models

	(7) Victory	(8) Victory	(9) Duration	(10) Duration
Nuclear A	0.326*	0.023	0.301*	0.130
	(0.154)	(0.167)	(0.148)	(0.173)
Nuclear B	-0.131	-0.059	0.331**	0.129
	(0.133)	(0.166)	(0.126)	(0.140)
Nuclear A & B	-0.122	-0.129	-0.389	-0.393
	(0.206)	(0.201)	(0.300)	(0.295)
Salience		0.012		-0.444**
		(0.302)		(0.116)
Nuclear A × salience		0.832**		0.465**
		(0.273)		(0.157)
Nuclear B × salience		-0.250		0.559**
		(0.257)		(0.162)
Capability share	0.224	0.275	0.016	0.007
	(0.169)	(0.171)	(0.045)	(0.041)
Superpower A	0.077	0.0780	-0.045	-0.025
	(0.159)	(0.167)	(0.151)	(0.146)
Target A	0.350	0.395*	-0.015	-0.017
	(0.224)	(0.219)	(0.178)	(0.176)
Previous crisis A	0.479**	0.470**	0.062	2.10e-04
	(0.095)	(0.093)	(0.074)	(0.072)
Violence	0.069*	0.058	-0.175**	-0.109*
	(0.037)	(0.046)	(0.045)	(0.050)
Constant	-0.832**	-0.796**	-4.282**	-4.288**
	(0.174)	(0.180)	(0.222)	(0.212)
Selection equations				
Nuclear A	0.159*	0.159*	0.111**	0.111**
	(0.074)	(0.074)	(0.044)	(0.044)
Nuclear B	0.537**	0.537**	0.343**	0.343**
	(0.072)	(0.072)	(0.046)	(0.046)
Nuclear A & B	-0.272*	-0.272*	-0.215*	-0.217*
	(0.163)	(0.163)	(0.130)	(0.131)
Capability share	-0.439**	-0.439**	-0.248**	-0.248**
	(0.019)	(0.020)	(0.010)	(0.010)
Superpower A	0.224**	0.224**	0.125*	0.125*
	(0.092)	(0.092)	(0.059)	(0.059)
Previous crisis A	-0.637**	-0.637**	-0.376**	-0.376**
	(0.085)	(0.085)	(0.052)	(0.052)
Contiguity	1.263**	1.263**	0.864**	0.865**
	(0.072)	(0.072)	(0.053)	(0.053)
S-score	0.0181	0.0180	0.0141	0.0141
	(0.023)	(0.023)	(0.013)	(0.013)
Enduring rivalry	1.717**	1.716**	1.664**	1.670**
	(0.120)	(0.120)	(0.114)	(0.114)

Table 3 (continued)

	(7) Victory	(8) Victory	(9) Duration	(10) Duration
Peace years	-0.111**	-0.111**	-0.067**	-0.067**
	(0.012)	(0.012)	(0.007)	(0.007)
Peace years^2	0.004**	0.004**	0.002**	0.002**
	(0.001)	(0.001)	(3.30e-04)	(3.30e-04)
Peace years^3	-3.32e-05**	-3.32e-05**	-2.01e-05**	-2.01e-05**
	(7.40e-06)	(7.40e-06)	(4.32e-06)	(4.32e-06)
Constant	-1.533**	-1.532**	-1.058**	-1.058**
	(0.079)	(0.079)	(0.049)	(0.049)
Rho	0.090*	0.098*	-0.136**	-0.124**
	(0.042)	(0.044)	(0.028)	(0.031)
Observations	98,522	98,522	98,522	98,522

Note: Robust standard errors in parentheses, clustered on each nondirected dyad.
*significant at 5%; **significant at 1% in a one-tailed test.

Probabilities of an Actor Reaching a Beneficial Outcome

- Table 4 presents the predicted probabilities of an actor reaching a beneficial outcome, calculated using CLARIFY
- When evaluating all crises, non-weapon states have about a 40 percent probability of prevailing in their crises.
  - This probability increases to 54 percent for nuclear states in asymmetric dyads and drops back to 41 percent in a symmetric dyad
- The starker effects of nuclear status in the third column of Table 4 compared to the second one again confirm the conditioning effect of salience
- In the high-intensity crises in which nuclear-weapon status matters most, nuclear-weapon states are expected to last only 116 days in crisis against a non-nuclear state.
  - Substantially less than the 246 days that a nonnuclear state is expected to last against a nonnuclear opponent.

Table 4
Probability of Victory and Expected Crisis Duration

	All Crises	Low Salience	High Salience
Probability of victory			
Nonweapon state	0.399	0.369	0.443
	(0.018)	(0.028)	(0.024)
Asymmetric dyad	0.535	0.418	0.736
	(0.053)	(0.070)	(0.077)
Symmetric dyad	0.411	0.282	0.658
	(0.082)	(0.086)	(0.154)
Expected crisis duration, in days			
Nonweapon state	163.38	120.64	246.07
	(12.05)	(11.53)	(25.27)
Asymmetric dyad	111.39	105.42	115.69
	(14.94)	(19.66)	(18.46)
Symmetric dyad	147.79	145.86	114.49
	(33.14)	(41.35)	(36.30)

Crisis Length

- Table 5 presents the duration models
- Positive coefficients indicate a higher likelihood of early termination
- We find that nuclear states and opponents of nuclear states face significantly shorter crises.
- The interaction between a severe threat and the nuclear status of the opponent is positive and statistically significant in model 12.
- This provides further evidence in support of Hypothesis 5, as crises are even shorter when actors face nuclear opponents and there is both a threat of great damage and some violence

Table 5
Duration Models of Crisis Length

	(11) Cox	(12) Cox
Nuclear A	0.302**	0.149
	(0.112)	(0.137)
Nuclear B	0.311**	0.145
	(0.099)	(0.119)
Nuclear A & B	-0.525*	-0.499*
	(0.241)	(0.228)
Salience		-0.369**
		(0.097)
Nuclear A × salience		0.395**
		(0.136)
Nuclear B × salience		0.450**
		(0.137)
Capability share	0.016	0.001
	(0.037)	(0.037)
Superpower A	-0.020	-4.08e-04
	(0.133)	(0.132)
Target A	0.019	-0.026
	(0.060)	(0.058)
Previous crisis A	-0.107	-0.082
	(0.142)	(0.142)
Violence	-0.142**	-0.087*
	(0.037)	(0.043)
Observations	1,218	1,218

Note: Robust standard errors in parentheses, clustered on each nondirected dyad.
*significant at 5%. **significant at 1% in a one-tailed test.

Alternative Explanations

- Many of the nuclear states tend to be allies of the United States or permanent members of the UN Security Council
- Such states represent the status-quo arrangement of power in the international system, as they have better access to leverage by which they can shape the system in their favor peacefully
- Ran a model that controls for whether a state has a defense pact with the United States
  - In models 13 and 14 of Table 6, we observe that the relationship between nuclear status and gaining concessions remains relatively unchanged

Table 6
Robustness Checks

	(13) Victory	(14) Victory (Restrictive)	(15) Victory	(16) Victory (Restrictive)
Nuclear A	0.523**	0.298*		
	(0.154)	(0.151)		
Nuclear B	-0.149	-0.271*	-0.152	-0.289*
	(0.122)	(0.133)	(0.121)	(0.133)
Nuclear A & B	-0.193	-0.378*	-0.168	-0.366*
	(0.223)	(0.207)	(0.222)	(0.208)
Capability share	0.275*	0.012	0.234	-0.006
	(0.147)	(0.154)	(0.148)	(0.155)
Superpower A	0.398*	0.644**	0.082	0.469**
	(0.208)	(0.215)	(0.157)	(0.159)
Target A	0.438**	0.520**	0.432**	0.512**
	(0.078)	(0.084)	(0.079)	(0.085)
Previous crisis A	0.347	0.325	0.230	0.242
	(0.213)	(0.230)	(0.201)	(0.219)
Violence	0.063*	0.006	0.070*	0.007
	(0.031)	(0.032)	(0.030)	(0.032)
P-5 State	-0.501**	-0.205		
	(0.192)	(0.198)		
U.S. defensive ally	0.003	0.143		
	(0.105)	(0.107)		
New nuclear state			0.295*	0.202
			(0.168)	(0.170)
Mature nuclear state			0.396**	0.285*
			(0.168)	(0.168)
Constant	-0.653**	-0.914**	-0.638**	-0.850**
	(0.149)	(0.160)	(0.141)	(0.149)
Observations	1,218	1,218	1,218	1,218

Note: Robust standard errors in parentheses, clustered on each nondirected dyad.
*significant at 5%. **significant at 1% in a one-tailed test.

Conclusion

- This article has explored the incentives that make nuclear weapons attractive to a wide range of states despite their costly and dangerous nature
- Found that nuclear weapons provide more than prestige, they provide leverage.
- They are useful in coercive diplomacy, and this must be central to any explanation of why states acquire them.

Nuclear Superiority and the Balance of Resolve: Explaining Nuclear Crisis Outcomes

Author: Matthew Kroenig

Introduction

- Develops from a nuclear brinkmanship theory framework
- According to this nuclear-brinkmanship-theory approach, the state that is willing to run the greatest risk of nuclear war before submitting will be most likely to win a nuclear crisis
- Therefore, it is the balance of resolve, not the balance of nuclear forces, that determines the out-come of conflict between nuclear powers

Advantages of Nuclear Superiority

- By incorporating the nuclear balance into the model, I demonstrate that nuclear superiority increases a state's level of resolve, improving its prospects for victory in nuclear crises
- For each state, the game can end in one of three ways: The state can win, lose, or suffer a disaster
- Leaders in nuclear superior states still badly want to avoid a nuclear exchange, but because the costs of a nuclear exchange are relatively lower, one should expect that they will be willing, on average, to hazard a higher risk of disaster than their nuclear inferior opponents
  - making them more likely to ultimately win nuclear crises

Hypothesis 1 & 2

- *H1: States that enjoy nuclear superiority will be more likely to win nuclear crises*
- *H2: The greater a state's level of nuclear superiority, the more likely it is to win nuclear crises*
  - The strongest challenge to these hypotheses is that the nuclear balance is largely irrelevant to nuclear crisis outcomes because political stakes so greatly shape the probability of victory in nuclear crises

Nuclear Crises Data

- Drawn from the International Crisis Behavior Project's (ICB) list of international crises

TABLE 1. *Nuclear crises, 1945–2001*

Crisis name	*Year*	*Nuclear-armed participants*
Korean War	1950	Soviet Union, United States
Suez crisis	1956	Great Britain, Soviet Union,* United States*
Berlin deadline	1958	Great Britain, Soviet Union, United States
Berlin wall	1961	France, Great Britain, Soviet Union,* United States
Cuban Missile Crisis	1962	Soviet Union, United States*
Congo crisis	1964	Soviet Union, United States*
Six-Day War	1967	Israel,* Soviet Union, United States*
Sino-Soviet border war	1969	China, Soviet Union*
War of attrition	1970	Israel, Soviet Union
Cienfuegos submarine base	1970	Soviet Union, United States*
Yom Kippur War	1973	Israel, Soviet Union, United States*
War in Angola	1975	Soviet Union,* United States
Afghanistan invasion	1979	Soviet Union,* United States
Able Archer exercise	1983	Soviet Union, United States
Nicaragua, MIG-21S	1984	Soviet Union, United States
Kashmir	1990	India, Pakistan
Taiwan Strait crisis	1995	China, United States*
India/Pakistan nuclear tests	1998	India, Pakistan
Kargil crisis	1999	India,* Pakistan
India Parliament attack	2001	India,* Pakistan

Note: A state's victory in a crisis is denoted by an asterisk. Not all crises have victors and some crises have multiple victors. For a list of when countries acquired nuclear weapons, see Gartzke and Kroenig 2009.

Nuclear Crises Outcomes

- Table 2 demonstrates that states are unlikely to achieve victory in nuclear crises
- States have achieved a clear victory in only 35 percent of nuclear crises
- The table also shows, however, that the possession of nuclear superiority greatly improves a state's chances of victory in nuclear crises

TABLE 2. *Cross tabulations of nuclear crisis outcomes, 1945–2001*

		Outcome		
		Win	*Loss*	*Total*
SUPERIORITY	*Yes*	14 (54%)	12 (46%)	26 (100%)
	No	4 (15%)	22 (85%)	26 (100%)
	Total	18 (35%)	34 (65%)	52 (100%)

Note: $X^2 = 8.497$ ($p = 0.004$).

Regression Analysis

- Employ probit models to test claims about the correlates of nuclear crisis outcomes
- Superiority is found to be statistically significant and positively correlated with victory in nuclear crises when considered alone, when nested within a fully specified model, and when included in a trimmed model
- The analy- sis reveals a strong empirical link between nuclear superiority and victory in nuclear crises
- Nuclear superiority has a substantively important effect on the outcomes of nuclear crises

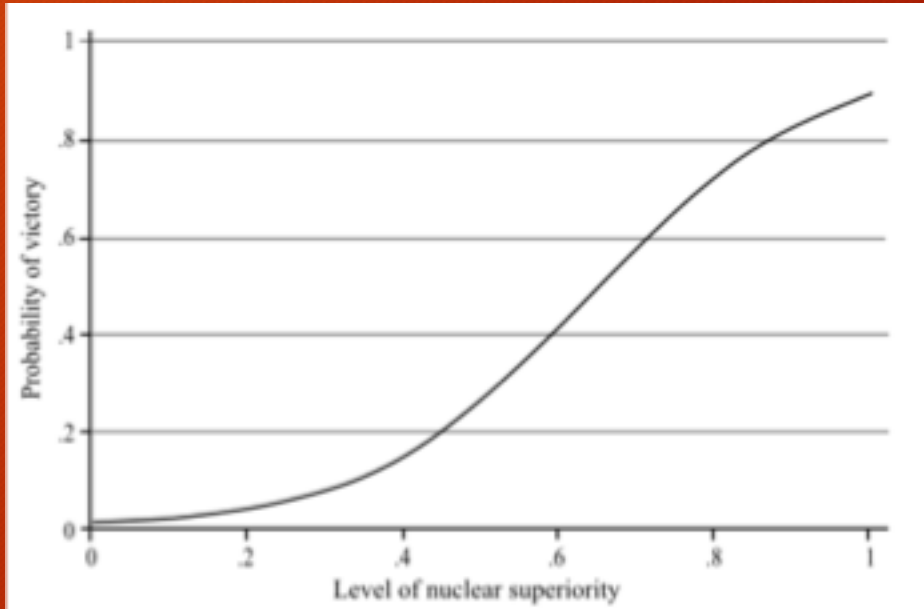
TABLE 3. *Nuclear superiority and nuclear crisis outcomes, 1945–2001*

Variables	*Model 1*	*Model 2*	*Model 3*	*Model 4*	*Model 5*	*Model 6*
SUPERIORITY	1.117**	2.005**	1.877***			
	(0.413)	(0.676)	(0.459)			
NUCLEAR RATIO				1.294*	4.252***	2.479***
				(0.509)	(1.306)	(0.622)
PROXIMITY		1.666***	1.196***		2.323***	1.283***
		(0.409)	(0.238)		(0.551)	(0.284)
GRAVITY		−0.760			−0.952	
		(0.755)			(0.875)	
REGIME		0.032			0.056	
		(0.038)			(0.053)	
CAPABILITIES		0.451			−1.602	
		(1.667)			(1.713)	
2ND STRIKE		2.296*	0.566		2.328	
		(1.096)	(0.501)		(1.315)	
POPULATION		−9.54e-07			2.52e-07	
		(1.44e-06)			(1.59e-06)	
VIOLENCE		0.299**	0.239*		0.333**	0.205*
		(0.104)	(0.097)		(0.119)	(0.087)
SECURITY		−7.320			−7.611	
		(5.911)			(6.719)	
Constant	−1.020**	−3.159***	−3.025***	−1.091***	−3.883***	−2.786***
	(0.277)	(0.844)	(0.898)	(0.313)	(1.050)	(0.561)
N	52	52	52	52	52	52
Wald chi^2	7.32	303.70	40.28	6.47	797.25	22.88
Log pseudolikelihood	−29.107	−22.663	−24.818	−30.240	−22.572	−26.456
Pseudo R^2	0.1322	0.324	0.260	0.098	0.327	0.211

Note: Robust standard errors adjusted for clustering by crisis dyad in parentheses. *significant at 5%; **significant at 1%; ***significant at 0.1%. All tests are two-tailed.

Nuclear Superiority and Probability of Victory

- The results support the claim that greater levels of nuclear superiority are positively associated with victory in nuclear crises
- In substantive terms, a shift from the least to the most favorable nuclear balance is associated with an 88 percent increase in the probability of victory
- Moving to the right, the figure shows that an increase in the proportion of nuclear weapons that a state possesses within a crisis dyad results in a corresponding increase in the probability of victory

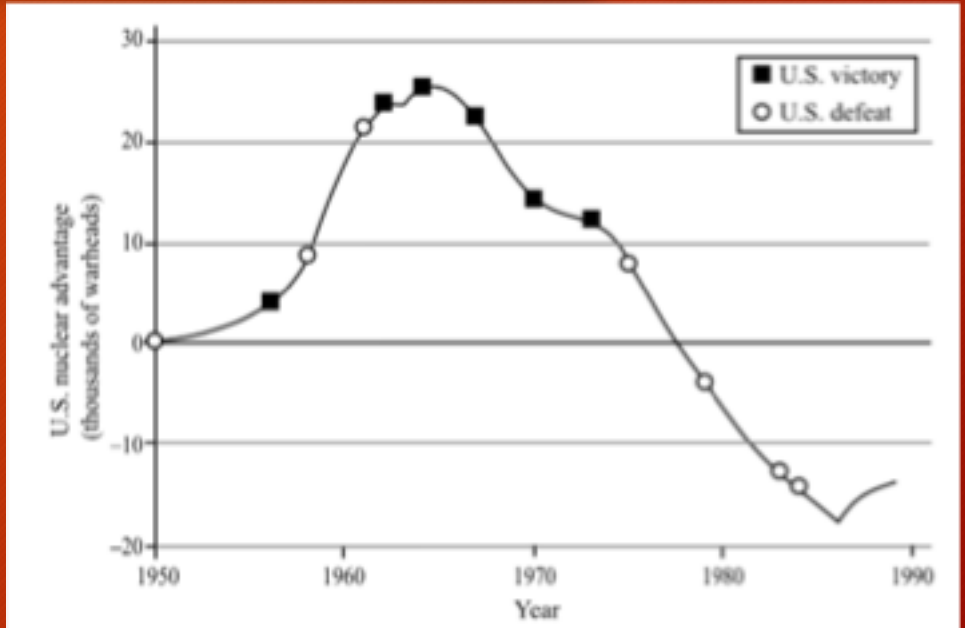


Note: Estimates obtained from Model 5. Level of nuclear superiority is from lowest (0) to highest (1).

FIGURE 1. *Conditional effect of the degree of nuclear superiority on the probability of victory in nuclear crises, 1945–2001*

U.S. Nuclear Advantage

- Figure 2 depicts the size of the U.S. nuclear advantage relative to the Soviet Union, measured in numbers of nuclear warheads over the course of the Cold War period
- Figure 2 shows that the United States enjoyed nuclear superiority over the Soviet Union at the beginning of the Cold War
- The figure shows that the United States was more likely to win nuclear crises when it possessed nuclear superiority over the Soviet Union
- In sum, this evidence suggests that the positive relationship between a nuclear advantage and nuclear crisis outcomes is also evident within a single dyad over time



Note: The y-axis depicts the U.S. nuclear advantage relative to the Soviet Union measured in numbers of nuclear warheads.

FIGURE 2. *U.S.–Soviet Union nuclear balance and crisis outcomes, 1949–1989*

Discussion & Conclusion

- Article examined the outcomes of nuclear crises
- Kroenig derived a new theoretical implication of nuclear brinkmanship theory to account for the observed relationship between nuclear superiority and victory in nuclear crises
- Argued that nuclear crises are competitions in risk taking, and that nuclear superior states are willing to run greater risks than their nuclear inferior opponents
- Nuclear superiority aids states in games of nuclear brinkmanship by increasing their levels of effective resolve
- Article also provides some support for the idea that political stakes shape crisis outcomes