

Date: January 1, 2012
Word count: 4,903

Data Appendices: Nuclear Superiority and the Balance of Resolve: Explaining Nuclear Crisis Outcomes¹

Appendix A: Nuclear Arsenal Size

To assess a country's nuclear arsenal size, I measure all nuclear warheads in the state's arsenal, including both tactical and strategic weapons.² Data on nuclear arsenal size were drawn from a number of sources. Detailed annual information on the arsenals of the five countries recognized as nuclear weapon states by the Nuclear Nonproliferation Treaty (the United States, Russia, Great Britain, France, and China) is available from the National Resource Defense Council's online nuclear database.³ After disabling its nuclear arsenal in 1990, the South African government released detailed information on the size of its nuclear arsenal. Data on the size of South Africa's nuclear arsenal from 1979 to 1990 were gathered from a variety of sources. There is less information available on the size of the nuclear arsenals in Israel, India, and Pakistan. Estimates of Israel's arsenal size from the mid 1980s until the present vary anywhere from seventy to four hundred weapons. I used data from the Federation of American Scientists that estimates the size of Israel's arsenal in every year from 1967 to the present based on the capacity of Israel's nuclear facilities to produce weapons-grade fissile material.⁴ According to these

¹ Upon publication, this document will be posted online at the author's professional website.

² Data distinguishing between tactical and strategic weapons, or between deployed and non-deployed weapons, are not available for each nuclear weapon state in each year.

³ NRDC Nuclear Data.

⁴ Federation of American Scientists.

estimates, Israel currently possesses roughly two hundred nuclear weapons. India and Pakistan are thought to maintain nuclear warheads de-mated from delivery systems. Estimates of the size of these countries' arsenals, therefore, are denominated in nuclear weapon equivalents (NWEs). Estimates of India and Pakistan's NWEs are available from a variety of sources and are based on the weapons-grade fissile material production capacity of the countries' nuclear facilities. When sources provide an estimated range for a given year, or when multiple sources provide different point estimates, I take the mean of these estimates as the size of the countries' arsenal in that year. For years in which no estimate is available, I assume that the arsenal changed at a steady rate between the years for which point estimates are available, calculating the difference in arsenal size, divided by the number of years between estimates. While these estimates may not be exact, they provide a more than adequate foundation for measuring whether a country has a larger nuclear arsenal than its opponent for the creation of the *Superiority* variable and for gauging the rough size of that advantage for generating the *Nuclear ratio* variable. I do not code North Korea as a nuclear weapon state. Pyongyang possessed enough separated plutonium to produce one or two nuclear weapons in the early 1990s, but after two inconclusive tests in 2006 and 2009 experts doubt whether North Korea possesses the ability to produce a deliverable nuclear weapon to this day.⁵

Appendix B: Second-Strike Capability

I code a country as possessing a secure, second-strike capability if it possesses either submarine launched ballistic missiles (SLBMs), mobile missiles, or maintains nuclear-

⁵ See, for example, Shanker and Broad 2009.

armed aircraft on continuous airborne alert. To code this variable, information was taken from a variety of sources, including *The Bulletin of the Atomic Scientists*, the Federation of American Scientists, the National Resources Defense Council, and the Nuclear Threat Initiative. Countries to have developed a secure, second-strike capability between 1945 and 2001, according to this definition, include: the Soviet Union, 1956;⁶ the United States, 1960;⁷ Great Britain, 1968;⁸ Israel, 1970;⁹ France, 1973;¹⁰ China 1986;¹¹ Pakistan, 1995;¹² and India 1995.¹³ I also coded an alternate variable that measured whether a country possessed SLBMs only. Countries to have developed SLBMs between 1945 and 2001 include: Russia, 1958; the United States, 1960; Great Britain, 1968; France, 1973; and China 1986.¹⁴

⁶ The Soviet Union's R-5 missile reached initial operational capability (IOC) in 1956. It was road mobile and capable of reaching strategic targets in Western Europe. The Soviet Union first developed SLBMs in 1958.

⁷ The United States first developed SLBMs in 1960. The Pershing I, the U.S.'s first mobile missiles capable of reaching the Soviet Union when deployed in West Germany, reached IOC in 1962. The United States, from 1961 to 1968, was the only country to have ever maintained a continuous airborne alert.

⁸ Great Britain developed SLBMs in 1968. It never developed mobile missiles capable of reaching a rival.

⁹ The Jericho I is a mobile missile with a range capable of reaching several rivals in the Middle East, including Egypt. It first reached IOC in 1970. It is possible that Israel deployed nuclear-armed cruise missiles on its Dolphin-class submarines beginning in 2000. Israel does not possess SLBMs.

¹⁰ France developed SLBMs in 1973. It never developed mobile missiles capable of reaching a rival.

¹¹ The DF-21 can be launched from a transporter-erector-launcher (TEL). It reached IOC in 1986. China deployed SLBMs on a single submarine in 1986, but there is some question as to whether the missiles are fully operational. The Pentagon characterizes China's SLBMs as experimental.

¹² The Hatf-III is a mobile missile capable of reaching Indian territory. It entered IOC in 1995.

¹³ The Prithvi I is a road-mobile missile capable of reaching Pakistani territory. It reached IOC in 1995. India is in the process of testing, but has not yet deployed, SLBMs.

¹⁴ See footnotes 6-13.

Appendix C: Revisions to the International Crisis Behavior Dataset Coding

I made three revisions to the ICB coding of crisis outcomes.¹⁵ The revisions were motivated solely by a desire to achieve historical accuracy. The core statistical results are robust to the employment of the original ICB coding.¹⁶ The revisions are as follows:

(1) I exclude the Anglo-Icelandic Cod War of 1973 from my list of nuclear crises.

According to the ICB, the Soviet Union deployed naval forces on behalf of Iceland and against Great Britain in the Cod War, thereby becoming an active participant in the crisis.

If true, the Cod War would warrant inclusion in my analysis, as both Great Britain and the Soviet Union possessed nuclear weapons during the crisis. A thorough study of the crisis, however, including a review of the sources cited by the ICB codebook, revealed no evidence of a significant military intervention by the Soviet Union in the crisis. I, therefore, exclude the crisis from my analysis.

(2) ICB codes the Korean War as a victory for the Soviet Union. This coding is based on peculiar interpretations of which stage of the Korean War was a “crisis” for the Soviet Union and of Moscow’s goals in the crisis. Following a more widespread historical interpretation, I code the Korean War as a stalemate between the United States and the Soviet Union.¹⁷

(3) ICB codes the Sino-Soviet Border War of 1969 as a stalemate. This clash is commonly viewed, however, as having been a victory for the Soviet Union and a loss for

¹⁵ Brecher and Wilkenfeld 2000.

¹⁶ A description of each crisis can be found online at <http://www.cidcm.umd.edu/icb/dataviewer>.

¹⁷ Gaddis 2005, 40-60. ICB does not code China or the Soviet Union as direct participants in the Vietnam War. I follow this coding decision and exclude Vietnam from my study of nuclear crises.

China.¹⁸ As Henry Kissinger writes of the Border War in his memoirs, “in the war of nerves, China had backed down.”¹⁹ Consistent with this perspective, I code the Soviet Union as winning and China as losing the Sino-Soviet Border War.

Appendix D: Robustness Tests

This section presents the results of a number of robustness tests to examine whether the observed relationship between nuclear superiority and nuclear crisis outcome is the result of a selection effect, the results are sensitive to modeling decisions due to the intermediate number of nuclear crises, or the findings are dependent on the character of the nuclear balance between the states.

I first examine whether the results are being driven by a selection effect. It is possible that states that enjoy nuclear superiority are more likely to win nuclear crises because nuclear superior states are more likely to initiate crises that they expect to win. It is also possible that leaders account for readily observable factors, such as military power, when deciding to initiate a crisis, which could neutralize the effect of nuclear superiority on crisis outcomes.²⁰ To test for possible selection effects, I begin by controlling for which state in the dyad initiated the nuclear crisis and which state was the target. If nuclear superior states are more likely to win crises because they select into crises they expect to win, we should find that the targets of nuclear crises are less likely to win nuclear crises and that *Superiority* is no longer statistically significant after controlling for crisis initiation. And, if observable factors, such as the nuclear balance, have an effect only at the crisis initiation stage we should also expect that *Superiority*

¹⁸ Kissinger 1979, 171-194; Yang 2000, 49.

¹⁹ Kissinger 1979, 186.

²⁰ Fearon 1994.

would not be statistically significant after controlling for selection in to the crisis. Drawing from Beardsley and Asal, I code a dichotomous variable, *Target*, which assesses whether State A was the target of the crisis.²¹ Turning to Model 7 of Table 4, we find that *Nuclear ratio* remains statistically significant and the sign on the coefficient is positive.²² Nuclear superiority provides states an advantage in nuclear crises even after controlling for which state initiated the crisis. Moreover, the sign on the coefficient for *Target* is positive and statistically significant, suggesting that, in nuclear crises, targeted states – not initiators – are more likely to emerge victorious. This finding casts doubt on the existence of a selection effect and is consistent with much of the research on nuclear coercion, which claims that deterrence, defined as a threat aimed at defending the status quo, is easier than compellence, defined as a threat designed to change the status quo.²³ The idea that nuclear superior states are more likely to win crises because they initiate crises they expect to win, or that selection effects should bias the relationship between superiority and crisis outcomes toward zero, does not find empirical support.

(Insert Table 4 here)

To further investigate for possible selection effects, I employ a Heckman probit model to examine the determinants of nuclear crises outcomes conditional on selection into nuclear crises.²⁴ I begin by estimating a first-stage model of the onset of nuclear crises. The universe of cases is all dyads in which both states possess nuclear arms from

²¹ Beardsley and Asal 2009.

²² Using *Superiority* instead of *Nuclear ratio* produced similar results.

²³ Schelling 1966, 69-78.

²⁴ Heckman 1979.

1945 to 2001. Drawing on previous research on the causes of militarized interstate disputes and interstate crises, I specify crisis onset as a function of relative military capabilities, security environment, geographic distance between states, preference similarity, regime type, and trade dependence.²⁵ Military capabilities and security environment are measured using *Capabilities* and *Security*, respectively. Geographic distance between states is measured as the number of miles between capital cities. Similarity of preferences is measured using “S” scores.²⁶ I code dyads as jointly democratic if both states in the dyad have Polity scores of six or higher.²⁷ Data on trade dependence are from Oneal and Russett.²⁸ All data are extracted using EUGene.²⁹ I also include *Nuclear ratio*. It is not possible to include *Proximity* or *Gravity* in the selection model because they are characteristics of nuclear crises and are unobservable for dyad-years that do not experience a nuclear crisis. I include t , t^2 , and t^3 to control for temporal dependence.³⁰ Robust standard errors are adjusted for clustering by dyad. I then estimate a second-stage regression model of nuclear crises outcomes, conditional on selection into nuclear crises. I specify victory in nuclear crises as a function of *Nuclear ratio*, *Proximity*, 2^{nd} *Strike*, and *Violence*. This model specification satisfies the necessary exclusion restriction because at least one determinant of whether a dyad is likely to enter into a crisis (geographic distance and preference similarity) does not influence which state within the dyad will win the crisis.³¹ Geographical distance between states may

²⁵ Russett 1993.

²⁶ Signorino and Ritter 1999.

²⁷ Jagers and Gurr 1995.

²⁸ Oneal and Russett 1997.

²⁹ Bennett and Stam 2000.

³⁰ Carter and Signorino 2010.

³¹ Sartori 2003.

make states more likely to become engaged in a crisis with one another, but because distance between the crisis participants is symmetrical, it does not affect which state within the dyad will win the crisis. A similar logic operates for preference similarity.

The results are presented in Table 4, Model 8. Turning first to the selection models, we see that states with larger nuclear arsenals are not more likely to select into nuclear crises. *Nuclear ratio* does not reach statistical significance in the first-stage model. The evidence does not support the idea that states with greater levels of nuclear superiority are more likely to begin nuclear crises because they expect to emerge victorious from them. Commenting briefly on the control variables, we see that dyads with a history of past conflict, dissimilar preferences, and greater geographical proximity are more likely to experience nuclear crises. In contrast, military power, joint democracy, and trade dependence do not affect selection into nuclear crises.

Turning to the second-stage models, we see that nuclear superiority remains an important determinant of victory even after controlling for selection into nuclear crises. *Nuclear ratio* remains statistically significant and positive.³² In addition, the rho statistic is not statistically significant indicating that the errors in the selection and regression equations are uncorrelated. In sum, the evidence again suggests that nuclear superior states are more likely to win nuclear crises and that this relationship is not the result of a selection effect.

Critics of the Heckman model argue that it has several important weaknesses, including sensitivity to specification, possible problems of collinearity, and a heavy

³² Using *Superiority* instead of *Nuclear ratio* produced similar results.

reliance on distributional assumptions.³³ Ignoring selection effects altogether, however, results in a special case of omitted variable bias.³⁴ An alternative to the Heckman model, therefore, that also addresses the possibility of omitted variable bias resulting from selection effects is the incorporation of all observable factors that may influence selection into a single equation that models the outcome of interest only.³⁵ Table 4, Model 9 presents a probit model of nuclear crises outcomes, which includes the factors that may affect selection into nuclear crises. In this model, we again see that *Nuclear ratio* is statistically significant and in the expected direction even after accounting for variables that may affect selection into nuclear crises.³⁶ In sum, a variety of tests demonstrate that the relationship between nuclear superiority and nuclear crisis outcomes does not appear to be the result of a selection effect.

Next, the intermediate number of nuclear crises raises the possibility that the results may be sensitive to coding and modeling decisions. To assess the sensitivity of the findings, I conducted a number of additional tests. First, to examine whether the inclusion or coding of any individual crisis was driving the results, I sequentially removed each crisis from the data set and reestimated the statistical models. Next, to assess whether the results were contingent on the behavior of any particular country, I removed each country in turn from the first position within the directed dyad and reran the analysis.³⁷ In both sets of tests, the core results were unaltered. *Superiority* and *Nuclear ratio* remained statistically significant and positive in every model. In sum, the

³³ Simmons and Hopkins 2005; Sartori 2003; Puhani 2000.

³⁴ Heckman 1979.

³⁵ Puhani 2000, Simmons and Hopkins 2005.

³⁶ Using *Superiority* produced similar results.

³⁷ There are 38 observations that do not contain the United States and 31 observations that do not contain the Soviet Union.

core results are not sensitive to the removal of particular crises, or even entire countries from the data set.

In addition, one may wonder whether the findings of this analysis extend to dyads between nuclear states and nonnuclear opponents. If nuclear superiority provides a strategic advantage against other nuclear-armed states, then it is reasonable to expect that this logic should extend to competitions between nuclear and nonnuclear states. While this is a reasonable expectation, an analysis of all (nuclear and nonnuclear) international crisis dyads did not form the core of the analysis for two reasons. First, scholars have already demonstrated that countries that possess nuclear weapons are more likely to win international crises than their nonnuclear opponents.³⁸ These scholars have not, however, studied the effect of nuclear superiority on crises between nuclear-armed states. Second, and more importantly, nuclear brinkmanship is a theory about conflict between nuclear-armed states. It begins from the theoretical starting point that the “nuclear revolution” transformed international politics and that crises between nuclear-armed states are fundamentally different from other forms of international conflict. This study, therefore, is designed to evaluate the theoretical propositions of the nuclear brinkmanship literature in its proper empirical context. Nevertheless, as an additional test, I examined the relationship between nuclear superiority and the outcomes of all (nuclear and nonnuclear) international crises. To begin, I compiled data on 709 international crisis dyads from 1945 to 2001. Repeating the above tests, I again found support for the idea that nuclear superiority improves a state’s performance in a crisis. Turning to Table 5, we see that *Superiority* and *Nuclear ratio* are positive and statistically significant in each and every

³⁸ Beardsley and Asal 2009.

test. Nuclear superiority provides countries with a strategic advantage, not only against other nuclear-armed states, but against nonnuclear weapon states as well. It is also interesting to note that *Capabilities* is also positive and statistically significant in every model in which it is included. We saw above that *Capabilities* did not influence the outcomes of crises between nuclear-armed states, but these tests demonstrate that conventional military power is an important arbiter of victory in crises that include nonnuclear states.

(Insert Table 5 here)

Finally, I assess whether the findings presented above hold only below a certain threshold of nuclear arsenal size and sophistication. It is possible that nuclear superiority may help states win nuclear crises when one or more of the countries involved possess small or unsophisticated arsenals that could be vulnerable to an opponent's first strike. Nuclear superiority may provide less of an advantage, however, once both states possess a secure second-strike capability. To examine this possibility, I included *Second strike* as a control variable in the above models. These tests demonstrated that the results do not depend on the sophistication of states' nuclear arsenals. I found that nuclear superior states enjoyed an advantage in nuclear crises even after accounting for second-strike capabilities. In addition, I found a strong relationship between the nuclear balance and crisis outcomes in crises between the United States and the Soviet Union, superpowers that possessed large and sophisticated nuclear arsenals throughout much of the Cold War. Nevertheless, to further examine this idea, I create a subsample of data of the thirty-two

crisis dyads in which both states possessed a secure second-strike capability. Analyzing this subsample of data, I find that nuclear superiority provides an advantage even among dyads with sophisticated nuclear arsenals. In the subsample of states that possess secure second-strike capabilities, nuclear superior states won 9 of the 16 crises in which they are involved, compared to a mere 2 of 16 for states in a position of nuclear inferiority. A chi-square test demonstrates that the probability of observing this difference between nuclear superior and nuclear inferior states, if nuclear superiority has no bearing on crisis outcomes, is 0.009. This test permits me to reject the null hypothesis that there is no relationship between nuclear superiority and nuclear crisis outcomes among countries with a secure, second-strike capability. In addition, regression analysis performed on the subsample of countries with second-strike capabilities and trimmed to account for available degrees of freedom provide further support for the hypothesis. *Superiority* remained positive and statistically significant in each test.³⁹ Next, I examined whether there is a threshold of nuclear arsenal size beyond which nuclear superiority no longer provides a coercive advantage. For example, among the nuclear crisis dyads in which both states possess at least 200 nuclear weapons, nuclear superior states won 8 of 13 crises compared to only 3 of 13 crises for nuclear inferior states. A chi-square test demonstrates that the probability of observing this difference between nuclear superior and nuclear inferior states, if nuclear superiority has no bearing on crisis outcomes, is 0.047, allowing me to reject the null hypothesis that there is no relationship between nuclear superiority and nuclear crisis outcomes. Again, in regression analysis performed

³⁹ For example, in a simple bivariate regression with robust standard errors adjusted for clustering by dyad, the coefficients, standard errors, and *p* values for *Superiority* were 1.308, 0.510, and 0.010, respectively.

on this subsample of data and trimmed to take into account available degrees of freedom, *Superiority* remained positive and statistically significant.⁴⁰ At the next threshold examined, I found that among the nuclear crisis dyads in which both states possess at least 1,000 nuclear weapons, the records of victory were 6 of 10 for nuclear superior states and 2 of 10 for nuclear inferior states. Finally, considering the dyads in which both states possessed at least 10,000 nuclear weapons, I discovered that the records for superior and inferior states were 3 of 6 and 1 of 6, respectively. Although the small n in these tests do not permit me to perform definitive chi-square tests or regression analysis, the results are suggestive that superiority provides an advantage even among states with large nuclear arsenals.⁴¹ In sum, there is no evidence to suggest that the observed relationship between nuclear superiority and nuclear crisis outcomes holds only beneath a certain threshold of nuclear arsenal size and sophistication.

Appendix E: Explaining ICB's Coding of Selected Crisis Outcomes

This research project draws on the widely-used ICB data and relies on ICB's coding of crises, crisis participants, and crisis outcomes. An exceptionally-detailed codebook describing the coding of each crisis can be found in the ICB Data View, available online at <http://www.cidcm.umd.edu/icb/dataviewer/>.⁴² Employing this widely-used dataset

⁴⁰ For example, in a simple bivariate regression with robust standard errors adjusted for clustering by dyad, the coefficients, standard errors, and p values for *Superiority* were 1.0297, 0.522, and 0.048, respectively.

⁴¹ There are only 20 and 12 observations of crisis dyads in which both states possess at least 1,000 and 10,000 nuclear weapons, respectively.

⁴² Brecher and Wilkenfeld 2000. I made three revisions to the ICB coding of crisis outcomes, which are detailed in Appendix C. The revisions were motivated solely by a desire to achieve historical accuracy. The core statistical results are robust to the employment of the original ICB coding.

allows for greater standardization, replication, and aggregation of research findings and helps to insulate the research from biases toward a particular set of findings. Still, some of ICB's coding decisions could be questioned. This appendix examines some of these questionable codings.

1. ICB codes the Berlin Wall Crisis of 1961 as a victory for the Soviet Union, a compromise for the United States, and a defeat for France and the United Kingdom.

Given that Khrushchev withdrew his threat to negotiate a separate peace treaty with the East Germans, however, one could argue that the crisis was a defeat for the Soviet Union and a victory for the West. According to ICB, the crisis was a victory for the Soviet Union because it succeeded in erecting the wall and stemming the flow of refugees to West Berlin. Moreover, it successfully prevented the Western Allies from demolishing or penetrating the wall during the standoff.

2. The 1998 nuclear tests are coded by ICB as a crisis for India and Pakistan. One might question whether these tests were a crisis rather than a cause for national celebration.

According to ICB, India's nuclear tests on May 11 and 13 threatened Pakistan, triggering a crisis for both states. Tensions rose further on May 18 when India announced it would adopt a "proactive" policy toward any Pakistani interference in Kashmir. Pakistan's nuclear tests in response also raised tensions. The crisis for the two nations was compounded by overwhelming international condemnation of both countries. The crisis ended on June 11 when the participants agreed to a moratorium on further nuclear testing. ICB codes the outcome as a compromise for both states.

3. ICB codes India as victorious in the 1999 Kargil Crisis and the 2001 Indian Parliament Attack. One might question this coding given that India was attacked and responded with

remarkable restraint in both cases. In Kargil, ICB codes India as achieving its basic goals because Pakistan gave in to Indian demands to implement a ceasefire and withdraw all irregular Pakistani fighters to its side of the Line of Control. Similarly, according to ICB, the Parliament Attack Crisis ended when Pakistan again made concessions to India. In this case, President Musharraf gave a televised speech promising that Pakistan would crack down on terrorists in the country and condemn sectarian fighting.

References

- Beardsley, Kyle, and Victor Asal. 2009. "Winning with the Bomb." *Journal of Conflict Resolution* 53, 2: 278-301.
- Bennett, Scott D., and Allan Stam. 2000. "EUGene: A Conceptual Manual." *International Interactions* 26, 2: 179-204.
- Brecher, Michael and Jonathan Wilkenfeld. 2000. *A Study of Crisis*. University of Michigan Press (June).
- Carter, David B. and Curtis S. Signorino. 2010. "Back to the Future: Modeling Time Dependence in Binary Data." *Political Analysis* 18, 3: 271-292.
- Diehl, Paul F. 1998. *The Dynamics of Enduring Rivalries*. Urbana: University of Illinois Press.
- Fearon, James D. 1994. "Domestic Political Audiences and the Escalation of International Disputes." *American Political Science Review*, 88, 3: 577-592.
- Federation of American Scientists. "Weapons of Mass Destruction around the World: Israel." Available at <http://www.fas.org/index.html>.
- Gaddis, John Lewis. 2005. *The Cold War*. London: Penguin Books.
- Heckman, James J. 1979. "Sample Selection Bias as a Specification Error." *Econometrica* 47, 1: 153-161.
- Jaggers, Keith and Ted Robert Gurr. 1995. "Tracking Democracy's Third Wave with the Polity III Data." *Journal of Peace Research* 32, 4: 469-82.

- Kissinger, Henry. 1979. *The White House Years*. New York: Little, Brown, & Co.
- National Resources Defense Council. "Table of Global Nuclear Weapon Stockpiles, 1945-2001." Available at <http://www.nrdc.org/nuclear/nudb/datab19.asp>.
- Nuclear Threat Initiative. "Country Profiles." Available at http://www.nti.org/e_research/profiles/index.html.
- Oneal, John and Bruce Russett. 1997. "The Classical Liberals Were Right: Democracy, Interdependence, and Conflict, 1950-85." *International Studies Quarterly* 41, 2: 267-93.
- Puhani, Patrick, A. 2000. "The Heckman Correction for Sample Selection and its Critique." *Journal of Economic Surveys* 14, 1: 53-68.
- Russett, Bruce. 1993. *Grasping the Democratic Peace*. Princeton, NJ: Princeton University Press.
- Sartori, Anne. 2003. "An Estimator for Some Binary-Outcome Selection Models Without Exclusion Restrictions." *Political Analysis* 11, 2: 111-138.
- Schelling, Thomas. 1966. *Arms and Influence*. New Haven: Yale University Press.
- Shanker, Thom and William J. Broad, "Seismic Readings Point to a Small Nuclear Test," *New York Times*, May 26, 2009, A1.
- Signorino, Curt S. and Jeffrey Ritter. 1999. "Tau-b or Not Tau-b: Measuring the Similarity of Foreign Policy Positions." *International Studies Quarterly* 43, 1: 115-144.
- Simmons, Beth A. and Daniel J. Hopkins. 2005. "The Constraining Power of International Treaties: Theory and Methods." *American Political Science Review* 99, 4: 623-631.
- Yang Gongsu. 2000. "The Sino-Soviet Border Clash of 1969: From Zhenbao Island to Sino-American Rapprochement." *Cold War History* 1, 1: 21-52.

Table 4. Selection Models, 1945-2001					
	Independent Variables	Model 7	Model 8	Model 9	
OUTCOME	Nuclear ratio	2.229*** (0.565)	2.315*** (0.637)	4.168*** (0.977)	
	Proximity	1.055*** (0.254)	1.206*** (0.295)	2.169*** (0.419)	
	2 nd strike	0.638 (0.510)	0.131 (0.478)	1.975*** (0.559)	
	Violence	0.249* (0.124)	0.247 (0.148)	0.351* (0.149)	
	Capabilities			-1.168 (1.170)	
	Security			-5.681 (3.137)	
	Distance			0.00002 (0.00006)	
	Preferences			-0.147* (0.073)	
	Joint democracy			0.023 (0.020)	
	Trade			-0.036 (0.066)	
	Target	0.946*** (0.173)			
	Constant	-3.647*** (1.065)	-2.804*** (0.764)	-4.477*** (1.299)	
	CRISIS	Nuclear ratio		-0.611 (0.518)	
		Capabilities		-0.073 (0.633)	
		Security		30.774* (12.909)	
		Distance		-0.0002*** (0.00007)	
		Preferences		-0.281** (0.108)	
Joint democracy			0.006 (0.017)		
Trade			0.014 (0.039)		
Constant			-0.988 (0.522)		
<i>N</i>		52	1,698	52	
<i>Wald chi²</i>		53.66	21.21	1804.24	
<i>Log pseudolikelihood</i>	-23.480	-59.087	-22.612		
<i>Pseudo R²</i>	0.300		0.326		
<i>Rho</i>		-0.267 (0.283)			
Note: Robust standard errors adjusted for clustering (by crisis dyad in Models 7 and 9 and by dyad in Model 10) in parentheses. *significant at 5%, **significant at 1%, ***significant at 0.1%. All tests are two-tailed. Model 12 is estimated after including t , t^2 , and t^3 to control for temporal dependence as recommended by Carter and Signorino (2009).					

Table 5. Nuclear Superiority and Crisis Outcomes, Nuclear and Nonnuclear Dyads, 1945-2001						
Variables	Model 10	Model 11	Model 12	Model 13	Model 14	Model 15
Superiority	0.595*** (0.128)	0.589** (0.192)	0.404** (0.143)			
Nuclear ratio				0.584*** (0.130)	0.554** (0.195)	0.382** (0.144)
Proximity		0.115 (0.130)			0.112 (0.130)	
Gravity		-0.037 (0.116)			-0.035 (0.116)	
Regime		-0.0002 (0.004)			-1.44e-06 (0.004)	
Capabilities		0.635** (0.208)	0.492** (0.187)		0.642** (0.208)	0.508** (0.187)
2 ND strike		-0.232 (0.194)			-0.213 (0.195)	
Population		-4.34e-07 (3.39e-07)			-3.95e-07 (3.36e-07)	
Violence		-0.033 (0.037)			-0.033 (0.037)	
Security		0.344 (0.535)			0.352 (0.531)	
Constant	-0.477*** (0.049)	0- .695*** (0.175)	-0.693*** (0.097)	-0.475*** (0.049)	-0.696*** (0.174)	-0.697*** (0.097)
<i>N</i>	709	709	709	709	709	709
<i>Wald chi</i> ²	21.63	29.68	25.87	20.24	28.18	24.77
<i>Log pseudolikelihood</i>	-450.909	-444.516	-446.715	-451.801	-445.377	-447.322
<i>Pseudo R</i> ²	0.025	0.039	0.0342	0.023	0.037	0.033
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.						