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Balance of Threat, Balance of Mind: Nuclear Rivalry and Arms Control

Benjamin Joseph Bonin

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**BALANCE OF FORCE, BALANCE OF MIND:
NUCLEAR RIVALRY AND ARMS CONTROL**

by

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DISSERTATION

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ABSTRACT

Under what conditions will rivals choose to accept mutual constraints, limitations, and even reductions on their capabilities for waging war? Contemporary political science lacks a strong theoretical basis for understanding this behavior, despite the fact that states in the modern era continue to negotiate and enter into arms control arrangements. This study contributes a theoretical framework and empirical analysis identifying the conditions under which nuclear-armed rivals might choose to curb their deadly arsenals. Traditional theories grounded in classical deterrence theory suggest arms control serves to preserve a deterrent status quo and prevent expensive and destabilizing arms competition; it should therefore only be expected when rivals feel secure in the strength and effectiveness of their respective retaliatory capabilities. This study suggests a more

complicated (yet still predictive) causal logic in which this balance of force is dynamically interactive with militarized hostility and rivals' convergence or divergence in how they think – both normatively and instrumentally – about the role of nuclear weapons in their national security. The argument is illustrated through qualitative comparative analysis (QCA) of bilateral arms control interactions among nuclear-armed strategic rivals from 1949 to the present. Further analysis is provided through in-depth case studies of arms control dynamics between three pairs of contemporary nuclear rivals – the United States and Russia, India and Pakistan, and the United States and China.

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Chapter 1. Explaining Arms Control

On April 8, 2010, the executives of the United States and Russia signed the *Treaty between the United States of America and the Russian Federation on Measures for the Further Reduction and Limitation of Strategic Offensive Arms* (or “New START”), a legally binding agreement reducing the deployed strategic nuclear forces of both countries. New START is only the most recent product of a bilateral arms control process that dates back to at least the late 1960s when the Strategic Arms Limitation Talks (SALT) were first initiated, and arguably extends even further back to the immediate post-World War II period, when the United States first formally proposed the Baruch Plan for a phased approach to global control over nuclear weapons and materials. The U.S.-Soviet, and later U.S.-Russia arms control dialogue persisted throughout multiple eras of conflict and confrontation. Discussions on a limited test ban took place in the midst of dangerous confrontations between the superpowers in the 1950s and 1960s, including the Berlin Crisis and Cuban Missile Crisis. The SALT negotiations were initiated in the midst of the Vietnam War, even while both countries were engaged in a massive arms buildup (both nuclear and conventional), and continued into the 1970s while the two superpowers jockeyed for strategic influence around the world. Even following the Cold War, when militarized ideological confrontation was largely replaced by economic and diplomatic competition, successive leaders in the United States and Russia have elected to preserve the arms control process.

This arms control dynamic stands in contrast to other nuclear-armed dyads. Despite an escalating U.S.-China rivalry for economic, military, and regional influence in East Asia – a rivalry some argue is more conflict-prone than the current U.S.-Russia dynamic – there has been very little official exchange to date between the two countries regarding restraint measures on nuclear weapons. The same can be said of the Russia-China relationship, which has experienced tumultuous ups and downs (including armed conflict) over the past sixty years. What is so different about these relationships that nuclear arms control initiatives have failed to materialize? The question is not merely relevant to our understanding of Cold War legacy relationships. India and Pakistan are presently engaged in an alarming nuclear arms race, initiated well before their reciprocal nuclear tests in 1998. While other nuclear powers contemplate reductions, both India and Pakistan seek enhancements to both the quantity and quality of their nuclear arsenals. These countries have achieved some halting progress on confidence building measures designed to promote restraint, along with less formalized measures limiting testing and the ready deployment of delivery systems. Despite a rough parity in current nuclear capabilities, and clear diplomatic and economic incentives to curb the arms race, why have these two rivals not sought agreement on more ambitious proposals?

The field of political science has remarkably little to say in this regard, particularly in the contemporary era. Debates in the literature continue to focus on matters of proliferation and nonproliferation, seeking to understand the motivations underlying countries' pursuit of nuclear weapons. This tracks with a wider international policy discourse that in the post-Cold War era largely focused on the question of how to limit the further spread of nuclear weapons to new countries. Only recently – tracking

with evolutions in the NPT process, statements from influential retired politicians, the “Prague agenda” of Barack Obama, and troubling developments in the U.S.-Russia strategic relationship – has the conversation on arms control between powers *already possessing* nuclear weapons regained some momentum. It is clear, whether or not one believes in prospects for “global zero,” that arms control remains a phenomenon worthy of analysis – and more importantly that existing theoretical and empirical understandings are woefully insufficient for explaining observable variation.

Origins of Arms Control

If one assumes a fairly broad definition of “arms control,” to include any measures attempting to prevent or mitigate the outbreak or effects of war through regulation of armaments, then the idea of arms control (if not the term) is nearly as old as the recorded history of warfare. Preceding the 20th Century, most arms control accords were imposed by the victors of military conflict. Athens was compelled to take down its defensive wall following its defeat by Sparta. The Roman Empire imposed strict limitations on the size and disposition of military forces allowed to conquered nations. The victors of European wars in the 18th and 19th centuries demanded arms control concessions from their opponents, including limitations on the size of fielded armies and numbers of warships. In this pre-modern era, the idea of achieving arms control through cooperation and negotiation among strategic peers was mostly limited to short-lived diplomatic proposals like the Anglo-French Naval Limitation Pact of 1787.¹

¹ Burns, Richard Dean. *The Evolution of Arms Control*. New York: Roman and Littlefield, 2009.

It was only in the twentieth century that negotiated arms control emerged as a fixture of international relations, as nations sought to prevent and mitigate the consequences of increasingly destructive industrialized warfare. Participants in the Hague Conferences of 1899 and 1907 initially sought (among other goals) limitations to the buildup of certain armaments, hoping to temper the arms race and put national resources to more productive use. While these conferences did not result in such measures, they did contribute to the evolution of international legal commitments to refrain from certain types of warfare, including the use of poison gas and certain types of conventional armaments deemed especially inhumane – the so-called “Hague Conventions.”²

The First World War saw widespread violations of both the letter and spirit of the Hague Conventions, including the use of chemical weapons, aerial bombardment, and unrestricted submarine warfare. Following WWI, the great powers once again attempted to bring peace and stability to the international system by regulating armaments. The Treaty of Versailles contained detailed (albeit ill-fated) provisions limiting the capabilities of the postwar German military. Agreements were discussed or negotiated to regulate the arms trade, limit or abolish the use of certain weapons (including the submarine), and create dispute arbitration mechanisms as a substitute for warfare. The 1922 Washington Naval Treaty represented the first definitive example of an agreement to regulate armaments of true strategic value to the great powers – the expensive “capital ships” that fueled naval competition before and after World War I. The 1922 Treaty resulted in binding quantitative and qualitative limitations on the naval capabilities of its

² Goldblat, Jozef. *Arms Control: The New Guide to Negotiations and Agreements*. London: Sage Publications, 2002.
R. D. Burns 2009, 23-24.

signatories (France, Great Britain, Italy, Japan, and the United States). Naval arms control was revisited in 1930 and 1936, but the gradual deterioration of international politics in the 1930s, coupled with Japanese resentment regarding the Washington Treaty's inequities, doomed the agreement well before the decade ended.³

The 1932 First World Disarmament Conference – held under the auspices of the League of Nations – tackled an ambitious agenda that included limiting the full spectrum of conventional armaments, curbing defense expenditures, and even providing for verification and sanctions mechanisms to support enforcement of treaty provisions. Like the Naval Treaties, the Disarmament Conference ultimately succumbed to the geopolitics of the era. The only lasting agreement to come out of the interwar period was the 1925 Geneva Protocol prohibiting the use (though not production and stockpiling) of poison gas and bacteriological agents; that agreement remains in effect into the present day and served as a foundation for the later Biological and Chemical Weapons Conventions.⁴

Arms Control in the Nuclear Era

The modern era of arms control, including its theoretical underpinnings, was prompted by the massively destructive consequences of the Second World War and the emergence of the atomic bomb. World War II thoroughly obliterated the boundaries between battlefield and home front, particularly in the use of strategic bombing to destroy industrial infrastructure and break the will of civilian populations. The atomic bomb's creators recognized early in its development that nuclear warfare offered the

³ R. D. Burns 2009, 24-30.
Goldblat 2002, 173-175.

⁴ Goldblat 2002, 24-28.

potential for near-unlimited devastation well beyond any weapon system that had previously existed – to perhaps include the extinction of the human race in a large-scale exchange. Moreover, the United States was unlikely to maintain an indefinite monopoly over the technology and materials that facilitated production of nuclear weapons – a reality borne out by the Soviet Union’s surprise atomic test of 1949.

Early attempts at controlling atomic weapons focused on making the associated expertise, materials, and technology readily available for peaceful purposes, while bringing the bomb itself under international controls. The U.S. 1946 “Baruch Plan” was an early proposal to this end, advocating the creation of an international authority to police the atom, followed by cessation of atomic arms production – though the United States would have maintained a de facto nuclear monopoly for some time until the agreement went into full effect. Those terms (as well as the associated verification provisions required) were unsurprisingly rejected by the Soviet Union, which responded with its own proposal; the opposing “Gromyko Plan” called for the abolishment of atomic arsenals before international controls went into effect, essentially requiring the United States to unilaterally disarm. The irreconcilable demands of the two superpowers meant both proposals were essentially stillborn, and the nuclear arms race commenced in earnest. The United States began the race with an early lead that would not be matched by the Soviet Union until the early 1970s. Other powers followed suit with nuclear weapons development – the United Kingdom tested its first atomic bomb in 1952, followed by a French test in 1960, and a Chinese test in 1964.⁵

⁵ Goldblat 2002, 38-40.

Sims, Jennifer. *Icarus Restrained: An Intellectual History of Nuclear Arms Control, 1945-1960*. Boulder: Westview Press, 1990, 81-119.

It was against this backdrop of the early nuclear arms race that the lexicon and theoretical underpinning of modern arms control, particularly nuclear arms control, first emerged. Prior to the 1950s, scholars and politicians used the term “disarmament” as a blanket descriptor for the full spectrum of activities that might be undertaken to regulate armaments – from basic restrictions on the deployment and use of weapons, to reductions in the numbers of weapons held, to complete dismantlement of warmaking capabilities. It was only in the nuclear age that academics and practitioners (largely western) coined “arms control” as an alternative term to describe this spectrum, limiting disarmament to more specifically encompass those activities in which armaments are actually eliminated. This partly reflected a trend toward greater terminological precision, but also emerged from growing skepticism and cynicism regarding the prospects for actual disarmament given geopolitical circumstances at the height of the Cold War. It should be noted that this modern application of the two terms is not universally or consistently accepted and applied. Some scholars and activists would prefer to see the broader-based concept of disarmament resuscitated, viewing “arms control” as a concept that promotes institutionalization of the military-industrial status quo, while distracting from more ambitious and transformative goals. The United Nations’ primary negotiating body for arms treaties is notably still titled the “Conference on Disarmament,” despite the fact that agreements currently on its prospective agenda – such as a fissile material cutoff treaty – fall well short of committing states to the elimination of actual weapon systems.⁶

⁶ Burns R. D. 2009, 1-3.
Freedman, Lawrence. *Deterrence*. Oxford: Polity Press, 2004, 184-195.
Sims 1990.

This study uses the post-war conceptualization of arms control as its starting point, as this conforms to broader trends in the literature. Thomas Schelling and Morton Halperin defined arms control to include "...all the forms of military cooperation between potential enemies in the interest of reducing the likelihood of war, its scope and violence if it occurs, and the political and economic costs of being prepared for it." This widely cited 1961 definition contains implicit assumptions regarding the basic motivation of countries to pursue such cooperation in the first place. First and foremost is a certain fundamental strategic rationale that war (particularly nuclear war) is prohibitively costly and it is in the fundamental self-interest of countries (even rivals) to prevent or at least limit its outbreak. Schelling and Halperin (along with other contemporaries) suggested that the advent of nuclear weapons and their subsequent marriage with long-range delivery systems (especially intercontinental ballistic missiles) transformed the dynamics of conflict. The immense destructive power of such weapons – coupled with the speed at which they could be delivered – created dangerous incentives for preemptive war, in an attempt by one side to deliver a decisive and disarming first strike against the other. Assuming that complete disarmament was off the table, arms control measures could be used to prevent destabilizing imbalances in capability and prevent escalation of localized disputes into wider conflict. Importantly, these measures could be in the strategic self-interest of both parties, despite differences that may exist in other policy areas.⁷

⁷ Schelling, Thomas, and Morton Halperin. *Strategy and Arms Control*. New York: The Twentieth Century Fund, 1961.

For additional writings from the era see:

Brennan, D.G. "Setting and Goals of Arms Control." *Daedalus* 89, no. 4 (1960): 681-707.

Brodie, Bernard. *Strategy in the Missile Age*. Santa Monica: RAND Corporation, 1959.

Kahn, Herman. *On Thermonuclear War*. New York: Free Press, 1960.

Also implicit in this definition was the notion that nuclear competition was not only prospectively costly in terms of feared annihilation, but also that preparation for war – the arms race – yielded more immediate near term costs. In the absence of restraining measures, countries would engage in an endless action-reaction armament spiral in an attempt to maintain military advantage (or at least prevent a crippling disadvantage); money spent on arms would be money lost in other areas of national productivity. Schelling and Halperin were quick to caution that arms control should not be counted on to reduce military spending; indeed, the authors noted that some arrangements might actually lead to increased spending. However, the discussion clearly suggested an important economic – and fundamentally domestic – incentive for arms control. The assumptions and logic of Schelling and Halperin’s 1961 study on arms control pervade the theoretical literature on arms control. Indeed, there have been relatively few attempts to argue with the basic definition or underlying logic, particularly in political science. Relatedly, the question of why – and under what conditions – countries might actually seek arms control has received scant attention by comparison to other phenomena associated with international conflict. However, certain assumptions and drivers behind arms control can be at least inferred from some of this literature.

Deterrence Stability and Arms Control

Although the idea of deterrence is most often associated with the acquisition and buildup of nuclear arsenals, the intellectual foundations of modern deterrence theory also provided a fundamental rationale and logic for the pursuit of nuclear arms control – and are thus worth exploring in some detail. Robert Jervis famously described three “waves”

of intellectual development in the literature of nuclear deterrence; the first emerged in the immediate aftermath of World War II and the atomic bomb's introduction. Bernard Brodie was arguably the most influential contributor to this wave, which was largely speculative, historically informed, and lacking in the rigid mathematical systemization of later scholarship. Brodie quickly recognized the political-military implications of the atomic bomb, writing in 1946 that "Thus far the chief purpose of our military establishment has been to win wars. From now on its chief purpose must be to avert them." Assuming that no defensive technology on the foreseeable horizon could guarantee invulnerability to nuclear attack, warfare between nuclear-armed rivals would necessarily entail immense human, political, and economic costs – any conceivable "victory" would be pyrrhic at best, even if only a handful of the opponent's weapons reached their target. For that reason, the chief aim of military planners could only be war prevention, achieved through assurance of massively destructive nuclear retaliation in the event an opponent initiated hostilities – deterrence. Such deterrence would be achieved (in Brodie's calculation) through a mix of robust offensive capabilities (sufficiently protected/dispersed to survive a first strike) and defensive preparedness allowing some segment of the population to ride out the war – thus denying an adversary the prospect of quick victory at minimal cost.⁸

In terms of arms control, Brodie and his first wave contemporaries largely focused on the potential for international controls over nuclear technology and weapons, requiring novel mechanisms like onsite inspections and assured punishment in the event

⁸ Brodie, Bernard. "Implications for Military Policy." In *The Absolute Weapon: Atomic Power and World Order*, edited by Bernard Brodie, 57-89. New Haven: Yale Institute of International Studies, 1946.
Jervis, Robert. "Deterrence Theory Revisited." *World Politics* 31, no. 2 (1979): 289-324.

of violations – ideas for which some optimism still existed at that point in time. Nonetheless, the seeds of bilateral arms control were already evident in these early deterrence writings. Arnold Wolfers speculated that “It would not be surprising...if a high degree of Soviet-American ‘equality in deterring power’ would prove the best guarantee of peace.” Wolfers saw this equality arising from arms race dynamics if and when the Soviet Union broke the U.S. nuclear monopoly; the idea that such equality might be achieved through bilaterally negotiated limitations was still a bridge too far. These early contributions to deterrence theory could only speculate on future technical and political developments that would drastically alter the character of the arms race. Indeed, the postwar deterioration of the U.S.-Soviet relationship, evolving U.S. alliance commitments in Europe, the development of thermonuclear weapons, and the rapid diversification of delivery systems (including tactical nuclear weapons and intercontinental ballistic missiles) rendered first wave deterrence theory obsolete (or at least woefully inadequate) by the end of the 1950s. Albert Wohlstetter embodied this sense, writing in 1959 that “competent people have been led into critical error in evaluating the prospects for deterrence.”⁹

Second wave deterrence theory broadened the debate in terms of both analytical rigor and intellectual diversity, drawing especially from the growing econometric field of game theory. It also engaged with contentious U.S. policy debates regarding nuclear posture that emerged in response to the Eisenhower administration’s “massive retaliation” policy, articulated by John Dulles in 1954; massive retaliation suggested the

⁹ Wolfers, Arnold. "The Atomic Bomb and Soviet-American Relations." In *The Absolute Weapon: Atomic Power and World Order*, 90-123. New Haven: Yale Institute of International Studies, 1946.
Wohlstetter, Albert. "The Delicate Balance of Terror." *Foreign Affairs* 37, no. 2 (1959): 213.

United States might respond with large-scale nuclear force to even limited communist provocations (U.S. nuclear policy debates in the 1950s/60s will be discussed in greater detail in Chapter 4). Intellectual supporters and critics alike recognized that more sophisticated conceptions of deterrence and nuclear strategy were required to inform an increasingly complex and potentially unstable superpower nuclear relationship. Thomas Schelling remains the most cited scholar of the second wave, informing deterrence debates even into the present day. Schelling and his contemporaries conceptualized international interactions as a bargaining game in which the ordered preferences of actors, conveyed either explicitly (through statements of policy) or tacitly (through actions like military deployments and arms technology decisions), might be mathematically analyzed to determine equilibrium outcomes of cooperation or conflict. The nuclear arms race might be characterized as a “prisoner’s dilemma” game in which the mutual benefits of cooperation (i.e. mutual disarmament or restraint) are overridden by the risks associated with defection from cooperation by the other side (e.g. an armament breakout yielding strategic advantage); mutual defection (the arms race) is a logical outcome of this incentive structure. Military confrontations and war deterrence under the nuclear umbrella might be modeled as games of “chicken,” in which each opponent stands to gain if the other backs down or capitulates in the face of a military threat; the two sides court disaster, however, if neither capitulates and both commit to military force (i.e. a nuclear exchange). Interactions might even involve an evolving combination of games or – in particularly unstable situations – actors may misinterpret one another’s cues and behave as if playing completely different games.¹⁰

¹⁰ Schelling, Thomas. *Arms and Influence*. New Haven: Yale University Press, 1966, 116-125.

Second wave deterrence scholars, including Schelling, recognized that deterrence was in practice more complex than the abstractions suggested by game theory. Deterrence stability required credible threats backed up by some combination of capability and commitment to action – the latter particularly challenging given the immense consequences of nuclear warfare and the reluctance of the United States to employ nuclear weapons in response to provocations like the Korean War and the French collapse in Indochina. William Kaufmann, responding to the Eisenhower administration, noted “the means of deterrence...are, for the most part, extremely blunt in character. Even if we remit the threat of massive retaliation to contingencies of the last resort, we are left with weapons that we shall be reluctant to use except when confronted with quite critical conditions.”¹¹ Actors might take actions to enhance the credibility of their threats, like forward positioning forces as a “trip wire” in the event of conflict (a strategy that would ultimately inform NATO nuclear policies), or identifying explicit thresholds at which conflict escalation might result in a nuclear response. At the same time, Schelling acknowledged utility in the “threat that leaves something to chance” – i.e. maintaining ambiguity in the red lines so that an adversary must think twice before committing to actions that might at some indeterminate point invite a devastating response. Glenn Snyder similarly mused that “in the nuclear age when the eventual outcome of even the smallest border skirmish *might* be utter devastation, the aggressor’s uncertainty is an important deterring factor.” However, both scholars admitted discomfort with a policy

Snyder, Glenn. "Prisoner's Dilemma' and 'Chicken' Models in International Politics." *International Studies Quarterly*, 1971: 66-103.

Zagare, Frank, and D Kilgour. *Perfect Deterrence*. Cambridge: Cambridge University Press, 2000, 16-24.

¹¹ Kaufmann, William. *The Requirements of Deterrence*. Princeton: Princeton University Center of International Studies, 1954, 21.

completely predicated on uncertainty, preferring mechanisms conferring greater (if not absolute) predictability in the deterrent relationship.¹²

The second wave embarked on extensive analysis of how different policy and technology options might, through manipulation of incentives and payoff structures, serve to stabilize or destabilize deterrence. Whereas Brodie initially envisioned all atomic war as total war, second wave thinkers explored the implications of other strategy options, including “limited” war wherein opponents restrained their use of nuclear weapons to the achievement of specific objectives and “counterforce” strategies that limited targeting to an opponent’s military assets (in contrast to the “countervalue” approach of targeting cities and civilian industrial infrastructure). Writing in the aftermath of the domestically unpopular Korean War, in which heavy casualties and massive expenditure yielded a less-than-decisive battlefield outcome for the United States, Robert Osgood recognized that a “strategy of containment by limited war lacks the moral and emotional appeal that Americans have been accustomed to expect of foreign policy.” However, nuclear weapons no longer permitted complete domination of one’s opponent, particularly if that opponent was nuclear armed or allied with a nuclear power. Rather, the United States should embrace a “new strategy of limited war” requiring a “flexible weapons system and flexible military strategies and tactics capable of supporting limited objectives under a wide variety of conditions.” It might be possible,

¹² Schelling, Thomas. *The Strategy of Conflict*. Cambridge: Harvard University Press, 1960, 188-203. Snyder, Glenn. "Deterrence and Power." *The Journal of Conflict Resolution* 4, no. 2 (1960): 177.

through clearly limited objectives and discriminate targeting, to utilize nuclear weapons below a certain level of escalation.¹³

Bernard Brodie himself eventually came to argue, like Osgood, that U.S. decision-makers needed military nuclear options short of total war, given that it seemed extremely unlikely (in Brodie's estimation) that any rational sitting president would contemplate initiation of a full-scale nuclear war (per massive retaliation) – thereby nullifying the threat that leaves something to chance and encouraging limited-scale provocations on the part of America's adversaries. Henry Kissinger was similarly skeptical of strategies relying on ambiguous existential threats. Because of nuclear weapons, total war had “ceased to be a meaningful instrument of policy,” let alone a credible response to limited provocations. The United States required sub-strategic nuclear capabilities (and associated strategies) to reassure allies fearing Communist encroachment on the Eurasian periphery. These sentiments were reflected in the “flexible response” debate of the early 1960s, in which defense planners under the Kennedy and Johnson administrations vigorously debated the need for nuclear capabilities suited to more diverse circumstances of employment.¹⁴

Much like the U.S. nuclear policy establishment, deterrence theorists in the second wave never completely coalesced around an agreed strategy or set of capabilities facilitating stable deterrence. However, Frank Zagare and Marc Kilgour suggest that mainstream scholars of “classical deterrence theory” – like Schelling, Snyder, Brodie,

¹³ Osgood, Robert. *Limited War: The Challenge to American Strategy*. Chicago: University of Chicago Press, 1957, 279.

Ross, Andrew. "The Origins of Limited Nuclear War Theory." In *On Limited Nuclear War in the 21st Century*, edited by Jeffrey Larsen and Kerry Kartchner, 21-48. Stanford: Stanford University Press, 2014

¹⁴ Brodie, Strategy in the Missile Age 1959, 248-259.

Kissinger, Henry. *Nuclear Weapons and Foreign Policy*. New York: Doubleday Anchor Books, 1957, 111.

and Kissinger – did eventually converge around a handful of tenets, including belief that parity in nuclear capabilities facilitates stability (while asymmetry engenders crisis), that increases in the cost of war decrease its possibility (therefore arguing in favor of some level of quantitative arms racing to achieve the necessary “balance of terror”), that qualitative arms races and defensive acquisitions (like anti-ballistic missile systems) are generally destabilizing, and that accidental war is perhaps the greatest threat to deterrence stability.¹⁵ These tenets ultimately provided a deterrence-based rationale for arms control measures, informing in particular the observations proffered by Schelling and Halperin in *Strategy and Arms Control*. The authors conceptualized arms control as an exercise in achieving “stabilized deterrence,” in which measures sought to lock in a reassuring nuclear balance and remove destabilizing temptations to “use it or lose it” through preemptive surprise attack. By this logic, arms control measures might even include an allowance for arms *buildups* permitting both sides to achieve confidence in the invulnerability of their second strike capability. While potentially at odds with the goals of disarmament advocates, stabilized deterrence offered the potential to “tranquelize anxieties and decisions,” “strengthen the incentives towards deliberate rather than hasty action,” and “minimize the alarms and mistakes.”¹⁶

Even the most hawkish second wave scholars recognized value in stabilizing the deterrent relationship. Herman Kahn, perhaps the most controversial and ardent proponent of diverse and capable nuclear forces, posited that an effective deterrent posture must “not look or be too dangerous”; in particular, it should not be seen as either accident-prone or uncontrollable. While largely dismissive of disarmament or even

¹⁵ Zagare and Kilgour 2000, 12-16.

¹⁶ Schelling and Halperin, *Strategy and Arms Control* 1961, 58-60.

ambitious reductions, he could see value in negotiating certain stabilizing measures including limitations on antagonizing deployment patterns, direct communications channels to manage crises, no-first-use pledges, and even nuclear test limitations – assuming that any such measures did not undermine U.S. offensive capabilities. Kissinger proposed that the United States make its nuclear posture and doctrine more explicit to the Soviet Union (for both deterrence and confidence building purposes) and propose measures to “mitigate the horror of war” through agreed restraints on the conduct of atomic warfare.¹⁷

The second wave deterrence scholars shared a common purpose in advocating arms control – to stabilize the nuclear deterrent relationship between East and West by resolving insecurities and removing incentives for surprise attack or other destabilizing behavior. The relatively limited measures proposed reflected a shared confidence that stable nuclear deterrence, while perhaps unsettling, nonetheless offered the best prospects for a cold peace between two diametrically opposed superpowers. The theoretical foundations established by the second wave theorists proved more long-lasting than the first, and continue to inform nuclear strategy and arms control debates into the present. However, many of their contributions rested on abstractions – mathematical calculations and thought exercises that, while often informed by current events, fell well short of evidentiary substantiation. The “third wave” theorists of the late 1970s and onwards can be thought of then as empirically responsive to the second wave, seeking validation (or refutation) of deterrence theory through more rigorous testing. Third wave scholars offered challenges to the basic assumptions of classical deterrence theory, which had

¹⁷ Kahn 1960, 233-255.
Kissinger 1957, 186-196.

been grounded in unitary actor assumptions, limited (if any) constraints on the availability of information to decision-makers, and faith in the basic rationality of heads of state.

Robert Jervis himself offered one of the more strident critiques of perfect information and rationality, arguing that even rational individuals perceive the world through the limitations of their own perspective. Capabilities may be over or underestimated, signals of commitment or resolve may be misinterpreted, and even the ordering of basic preferences may be misread by an actor with limited information, cultural biases, or domestic political dynamics that cloud the lens of perception. Jervis also called attention to the fact that nuclear deterrence only seemed to hold across a relatively limited range of contingencies in which all-out war between the superpowers was a possibility; it failed to deter the more numerous limited-scale provocations that took place during the Cold War, primarily involving third party allies. Alexander George and Richard Smoke offered a rigorous empirical analysis of twelve such Cold War case studies, in which the authors noted a far more complex deterrence dynamic than that suggested by classical theory. Real-world deterrence reflected an iterated process of interaction between the actors – a process that often involved complex motivations, “images” of the other, and shifting strategies that included both inducements and threats in an attempt to achieve narrow (though not always well-communicated) objectives while studiously avoiding the tipping point toward all-out war. Classical deterrence theory offered scant predictive guidance in these situations. Across a range of quantitative time series studies, Paul Huth and Bruce Russett have summoned evidence suggesting that the success or failure of deterrence (particular in crisis situations involving “extended

deterrence” guarantees from nuclear allies) may be just as strongly influenced by previous conflict behavior, the durability of diplomatic relationships, and the bargaining strategies of the opponents, as by the presence or absence of nuclear weapons. In the case of long-term “enduring” rivalries (as opposed to episodic confrontation), deterrence may be further responsive to shifting military expenditures, domestic political factors, third party military disputes, and even psychological risk propensity.¹⁸

Formal models of deterrence also saw evolution in the third wave, partly in response to these empirical challenges and partly in response to an expanding methodological toolbox; much of this research attempts to account for the uncertainties and potential misperceptions associated with real-world interactions between states. Robert Powell introduced “autonomous risk” (Schelling’s threat that leaves something to chance) into modelling of crisis escalation, demonstrating how uncertainty and the potential consequences associated with massive retaliation might benefit even weakly resolute defenders in a crisis – contrary to the expectations of some second wave theorists. James Fearon also introduced uncertainties into the utility calculations of

¹⁸ Achen, Christopher, and Duncan Snidal. “Rational Deterrence Theory and Comparative Case Study Challenges.” *World Politics*, 36, no. 2 (1989): 143-169.

George, Alexander, and Richard Smoke. *Deterrence in American Foreign Policy: Theory and Practice*. New York: Columbia University Press, 1974.

Huth, Paul, and Bruce Russett. “What Makes Deterrence Work? Cases from 1900-1980.” *World Politics* 36, no. 4 (1984): 496-526.

Huth, Paul. “Extended Deterrence and the Outbreak of War.” *American Political Science Review* 82, no. 2 (1988): 423-443.

Huth, Paul, and Bruce Russett. “Deterrence Failure and Crisis Escalation.” *International Studies Quarterly* 32 (1988): 29-45.

Huth, Paul, and Bruce Russett. “General Deterrence between Enduring Rivals: Testing Three Competing Models.” *American Political Science Review* 87, no. 1 (1993): 61-73.

Huth, Paul. “Deterrence and International Conflict: Empirical Findings and Theoretical Debates.” *Annual Review of Political Science* 2 (1999): 25-48.

Jervis, Robert. *Perception and Misperception in International Politics*. Princeton: Princeton University Press, 1976.

Jervis, Robert. “Deterrence Theory Revisited 1979, 289-324.”

Jervis, Robert. *The Illogic of American Nuclear Strategy*. Ithaca: Cornell University Press, 1984, 150-153.

challengers and defenders in crisis bargaining situations, demonstrating mathematically that deterrence success or failure is strongly influenced by actors' expectations of resolve on the part of an opponent, either perceived ex ante or through "costly signals" broadcast during a crisis. The credibility of such signals may be judged differently depending on the resources committed and domestic "audience costs" associated with failure to follow through on a commitment – suggesting that accountable democratic governments may in fact hold an advantage in some situations. Michael Intriligator and Dagobert Brito identified regions of both instability and stable deterrence in the quantitative trajectory of arms races, lending mathematical credence to classical deterrence theories favoring a certain level of arms racing between rivals. Writing at the end of the 1990s (when deterrence theory was passing its academic prime), Zagare and Kilgore offered a comprehensive alternative to classical theorists; their theory of "perfect deterrence" introduces Bayesian logic into game theoretic calculations, allowing the actors to update expectations of one other's likely actions (namely the potential for further coercion or retaliation) in response to observed behavior. Through rigorous analysis of varying deterrence scenarios, the authors suggest that stable deterrence is particularly and consistently contingent on an actor's capability to follow through on a threat – though acquisition of capability (particularly nuclear capability) is a diminishing returns exercise; actors gain little leverage from overkill and unrestrained arms racing.¹⁹

¹⁹ Fearon, James. "Signaling Foreign Policy Interests: Tying Hands versus Sinking Costs." *The Journal of Conflict Resolution* 28, no. 1 (1984): 63-84.
Fearon, James. "Domestic Political Audiences and the Escalation of International Disputes." *The Journal of Conflict Resolution* 88, no. 3 (1997): 577-592.
Fearon, James. "Signaling versus the Balance of Power and Interests: An Empirical Test of a Crisis Bargaining Model." *The Journal of Conflict Resolution* 38, no. 2 (1997): 236-269.
Intriligator, Michael, and Dagobert Brito. "Can Arms Races Lead to the Outbreak of War?" *Journal of Conflict Resolution* 28, no. 1 (1984): 63-84.

These are only a sampling of the most prominent studies in third wave deterrence theory literature; related analysis (both qualitative and quantitative) continues into the present day. While this research offer compelling challenges to certain premises and conclusions of classical deterrence theory, most of the authors do little to expand upon or refute the merits of arms control as addressed in the second wave. The interactive complexity suggested by authors like Jervis, Fearon, Zagare, and Kilgore certainly seem to lend further credence to the stabilizing utility of measures that introduce greater predictability and transparency into deterrent relationships – yet these authors largely refrain from systematic investigation into what types of measures might prove most effective under certain conditions, or (more importantly from the standpoint of this study) when to expect arms control behavior between opponents. The field appears content to provide a theoretically-informed motive for arms control (enhancing deterrence stability), but less inclined to contribute to a more dynamic and predictive understanding of the phenomenon.

Some observers suggest (or at least advocate) the emergence of a “fourth wave” in deterrence literature, notable for more radical departures from the field’s intellectual past. This scholarship has emerged partly in response to geopolitical trends, particularly the increased salience of non-state actors, transnational terrorism, and asymmetric interstate conflict (embodied by confrontations between major powers and so-called “rogue states”). Classical deterrence theory and research was largely preoccupied by conflict among great power peers and their allies, mirroring the Cold War; it is an open

Powell, Robert. "Crisis Bargaining, Escalation, and MAD." *American Political Science Review* 81, no. 3 (1987): 717-736.

Zagare and Kilgour 2000.

question whether or not the same assumptions underlying those analyses are likely to hold in a confrontation involving a terrorist group, or even its middle-weight state sponsor.²⁰

More relevant to this study (which focuses on state actor relationships), the fourth wave of deterrence research is more apt to draw from the normatively oriented constructivist research program. Constructivism is apt to suggest (paraphrasing Alexander Wendt) that “deterrence is what states make of it.” The stability or instability of deterrence may owe as much to states’ shared, imagined social constructions of the concept as it does to the structural or rational influence of nuclear weapons. Constructivist scholars, while extremely heterodox in theory and approach, generally contend that no behavior should be assumed as given – rather, actors (including individuals, institutions, and even states) undertake actions in accordance with learned identities and socially reinforced norms of participation. By contrast, embedded in many classical deterrence theories is an assumption that once states acquire nuclear weapons (or reach a certain threshold of nuclear capability), behavior in accordance with deterrence precepts will naturally follow (on the part of both the nuclear-armed state and its potential adversaries). Emanuel Adler and Michael Williams note that these assumptions emerged in the East/West context partly out of necessity, given a lack of precedent in the history of war on which to conceptualize the role of nuclear weapons. Concepts were further refined and debated as individuals, institutions, and governments

²⁰ Knopf, Jeffrey. "The Fourth Wave in Deterrence Research." *Contemporary Security Policy* 1 (2010): 1-33.
Lupovich, Amir. "The Emerging Fourth Wave of Deterrence Theory -- Toward a New Research Agenda." *International Studies Quarterly* 54 (2010): 705-732.

attempted to operationalize deterrence and nuclear strategy, grappling with inherent contradictions and contending interpretations.²¹

Lawrence Freedman further posits that the operative process of deterrence itself (in so much as can it be considered an autonomous phenomenon) may in fact have itself engendered norms of behavior on the part of international actors – including conceptualizing arms control and other cooperation as an alternative to wars now rendered moot by nuclear weapons. Further teasing this thread, Adler suggests a process by which an “epistemic community” of experts (primarily in the United States) socialized arms control norms with domestic political actors who saw the concept as consistent with national interests, eventually resulting in further diffusion to other countries and becoming “the epistemic criteria on which a strategic relationship between two or more nations is based” (this narrative is also consistent with the normative “boomerang” effect described by Margaret Keck and Kathryn Sikkink in their research on the diffusion of international human rights norms). This interpretation comports with historically informed accounts of U.S.-Soviet arms control interactions during the Cold War, in which negotiations (especially at the outset) involved a substantial amount of conceptual dialog; both sides approached the negotiating table with very different perspectives on strategic stability and the means required for its achievement. Neoliberal scholar Joseph Nye famously described this knowledge transfer as “nuclear learning,” an often haphazard process that shaped Soviet thinking in particular and contributed to a

²¹ Adler, Emanuel. "The Emergence of Cooperation: National Epistemic Communities and the International Evolution of the Idea of Arms Control." *International Organization* 46, no. 1 (1992): 101-145.

Morgan, Patrick. "Taking the Long View of Deterrence." *Journal of Strategic Studies* 28, no. 5 (2006): 751-763.

Wendt, Alexander. "Anarchy is what States Make of It: The Social Construction of Power Politics." *International Organization* 46, no. 2 (1992): 391-426.

Williams, Michael. "Rethinking the 'Logic' of Deterrence." *Alternatives* 17, no. 1 (1992): 67-93.

patchwork of confidence building measures and treaties ultimately comprising the U.S.-Soviet security regime.²²

While fourth wave contributors do not (at least for the most part) seek to nullify five decades of classical deterrence theory, they do suggest the school perhaps took reductionism too far in its search for perfectly representative models. It is not enough to simply assume transitive preferences and utility calculations; scholars must gain a better understanding of why nuclear-armed actors reach the conclusions they do about deterrence – and by extension arms control. As this study further explores the role of the “balance of mind” in arms control, the interaction between strategic logic and normative belief will be demonstrated as crucial in understanding why rivals achieve (or fail to achieve) agreement on limits to their nuclear capabilities.

Arms Control and other Research Programs

Deterrence theory provides many of the foundations for the theoretical propositions laid out in the next chapter. However, it is worth touching upon the treatment of arms control in other political science research programs. Given several decades of dominance in postwar political science, and a general preoccupation with war and peace among states, it is not surprising that realism has engaged with deterrence and arms control debates from its inception. Realism begins with the premise of an anarchic

²² Adler 1992, 107.

Freedman, Lawrence. *Deterrence*. Oxford: Polity Press, 2004.

Keck, Margaret, and Kathryn Sikkink. *Activists beyond Borders: Advocacy Networks in International Politics*. Ithaca: Cornell University Press, 1998.

Nye, Joseph. "Nuclear Learning and U.S.-Soviet Security Regimes." *International Organization* 41, no. 3 (1987): 371-402.

world system in which states must above all prioritize the national interest and provide for their own defense. Structural realists in particular would suggest that nuclear competition is simply an outgrowth of this dynamic; states above all value their own security and will do whatever is necessary to maintain it. “Defensive” realists like Robert Jervis further emphasize the effect of the security dilemma, in which one state’s acquisition of military capabilities – even for ostensibly defensive purposes (many such realists divide the world into security-seeking and greedy or revisionist states) – is potentially a threat to competitors who inevitably arm in response, instigating the so-called “spiral model” of arms racing and insecurity. The back and forth dynamic of nuclear arms buildups was never terribly surprising to realists of either camp. Indeed, some even went as far as to argue that nuclear weapons were a net positive for international relations; through deterrence, their devastating power made war unwinnable and less likely between rivals. Not surprisingly, realists overwhelmingly accepted the premises of classical deterrence theory; Zagare and Kilgour even suggest that structural realism and the decision-theoretic models of the classical school represent essentially two sides of the same theoretic coin.²³

At first glance, the mere existence of arms control between rivals would seem to contradict the fundamental premise of realism. States seek to maximize their power and influence, so why would they seek limits on the ultimate means of waging (or deterring)

²³ Jervis, *Perception and Misperception in International Politics* 1976.

Mearsheimer, John. "Nuclear Weapons and Deterrence in Europe." *International Security* 9, no. 3 (1984/85): 19-46.

Sagan, Scott, and Kenneth Waltz. *The Spread of Nuclear Weapons: A Debate Renewed*. New York: W.W. Norton & Company, 2002.

Waltz, Kenneth. "Nuclear Myths and Political Realities." *American Political Science Review* 84, no. 3 (1990): 731-745.

Zagare and Kilgour 2000, 3-36.

war? Some realists (largely of the structural variety) point to arms control as an exercise in husbanding scarce resources. Kenneth Waltz, an ardent proponent of the war-limiting effects of nuclear weapons, argued that acquisition of large nuclear arsenals is meaningless beyond a certain point of strategic sufficiency and that arms control primarily benefits nations economically (by limiting the arms race), in addition to “improving relations.” States negotiate arms control agreements so that resources can be better spent on maximizing power in other ways. This of course does little to explain why nations engage in nuclear arms races exceeding strategic sufficiency in the first place, or why a negotiated agreement is necessary to curb further acquisitions. Among so-called “defensive” realists, arms control is a means for security-seeking states to ameliorate the security dilemma and maintain balance and stability. Evan Montgomery suggests that the acceptance of limitations on armaments is a costly signal intended to indicate non-aggression and a primarily defensive military posture. Others, like Steve Weber, have even gone as far as to suggest that the introduction of nuclear weapons fundamentally altered the world system, removing the incentives to engage in war through promise of mutual devastation. The existence of nuclear weapons encouraged major powers – particularly in a bipolar system – to pursue strategies of “joint custodianship” over the status quo, a relationship stabilized through arms control. While realist perspectives may differ in analytical substance, the key takeaway is that arms control is not necessarily incompatible with self-interested, security-seeking state behavior; it can serve as a means to solidify the balance of power and achieve security through means other than offensive war.²⁴

²⁴ Montgomery, Evan. "Breaking Out of the Security Dilemma: Realism, Reassurance, and the Problem of

Besides deterrence theory, realism has also long been in conversation with a theoretically broader and extensive literature addressing the phenomenon of arms races – defined by Colin Gray as “two or more parties perceiving themselves to be in an adversary relationship, who are increasing or improving their armaments at a rapid rate and structuring their respective military postures with a general attention to the past, current, and anticipated military and political behavior of the other parties.” This literature in large part addresses one or more of three fundamental questions: 1) why do states compete in the acquisition of armaments, 2) how can their strategies and decision-making processes be understood, and 3) what are the consequences of arms races for peace and war? If one conceptualizes arms control (at least in certain forms) as somehow the negation or tempering of an arms race, then answers to any of these three questions hold potential relevance for understanding the phenomenon.²⁵

Scholars examining the first question generally fall into one of two camps. The first emphasizes external, state-to-state security dynamics. Arms races are a rational reaction to threats (real or perceived); states will arm when threatened, either by the armament behavior of other states, or fear of their motives. Not surprisingly, this tracks well with realist perspectives; Hans Morgenthau stated that “The principal means... by which a nation endeavors with the power at its disposal to maintain or re-establish the balance of power are armaments” – though he also acknowledged arms races had the tendency to foster an “unstable, dynamic balance of power.” Subsequent scholarship,

Uncertainty." *International Security* 31, no. 2 (2006): 151-185.

Waltz 1990.

Weber, Steve. "Realism, Detente, and Nuclear Weapons." *International Organization* 44, no. 1 (1990): 55-82.

Whohlforth, William. "Realism and the End of the Cold War." *International Security*, 1994/95: 91-129.

²⁵ Gray, Colin. "The Arms Race Phenomenon." *World Politics* 24, no. 1 (1971): 40.

tracking with the rise of institutionalist and liberal international relations theory, suggested something more complex than the action-reaction dynamic of unitary states. Graham Allison and Frederic Morris, reflecting on U.S. arms acquisitions during the Cold War, noted that a complex mix of domestic political and bureaucratic interests strongly influenced the direction of U.S. weapons programs, sometimes contradicting the rational pursuit of strategic interest. Matthew Evangelista's comparative research on U.S. and Soviet arms acquisition programs provided evidence that the unique pathologies of decision-making processes in both countries not only contributed to variation in their respective acquisitions, but served to shape the overall direction of the superpower arms race. Evangelista's later analysis of institutional shifts during the Soviet-Russian transition suggests the empowerment of certain bureaucratic actors and transnational interest groups created both opportunities and complications for arms control at the outset of the 1990s.²⁶

In regards to understanding arms race decision-making processes, arguments unsurprisingly tend to lean on game theory and formal modelling. Lewis Fry Richardson presented one of the earliest mathematical approaches in the literature, modelling through differential equations the manner in which states ramp up defense spending in response to that of their rivals, while also managing the economic burden; Richardson posited that

²⁶ Allison, Graham, and Frederic Morris. "Armament and Arms Control: Exploring the Determinants of Military Weapons." *Daedalus* 104, no. 3 (1975): 99-129.

Evangelista, Matthew. *Innovation and the Arms Race: How the United States and the Soviet Union Develop New Military Technologies*. Ithaca: Cornell University Press, 1988.

Evangelista, Matthew. "The Paradox of State Strength: Transnational Relations, Domestic Structures, and Security Policy in Russia and the Soviet Union." *International Organization* 49, no. 1 (1995): 1-38.

Glaser, Charles. "The Causes and Consequences of Arms Races." *Annual Review of Political Science* 3 (2000), 251-276.

Morgenthau, Hans. *Politics Among Nations: The Struggle for Power and Peace*. New York: McGraw-Hill, 1985, 244.

Rider, Toby. "Understand Arms Race Onset: Rivalry, Threat, and Territorial Competition." *The Journal of Politics* 71, no. 2 (2009): 693-703.

conflict becomes likely when one side reaches spending exhaustion and lashes out at its opponent before it can seize the advantage. Richardson's model launched a number of research programs, including the previously noted work of Michael Intriligator examining the relationship between quantitative arms races and deterrence stability.²⁷

George Downs et al suggested that arms races might take the form of any number of potential games depending on the ordered preferences of the actors, including both the classic prisoner's dilemma previously cited and "deadlock" games in which the preference structure favors perpetual defection by at least one party. The authors further speculated as to how different cooperative strategies for arms race mitigation – including unilateral strategies (e.g. focusing on defensive measures or seeking alliance), tacit bargaining through demonstrated behavior, or negotiation (to include arms control) – might succeed or fail under these conditions. Not surprisingly, the results suggested the most promise for cooperation was to be found in prisoner's dilemma-type games, where states place a higher transitive value on cooperation. Engaging with the then-pioneering game theoretic research of Robert Axelrod, the authors posited that security dilemmas and distrust might be mitigated through iterated tit-for-tat cooperation and issue linkage (though such cooperation must overcome challenges associated with misrepresentation, imperfect information, and controlling confounding signals broadcast by unruly bureaucratic actors). Leveraging more sophisticated computing tools, Downs and David Locke further tested these propositions with a more dynamic decision-theoretic model in which the actors were capable of changing strategies in response to new information over

²⁷ Intriligator, Michael. "Strategic Considerations in the Richardson Model of Arms Races." *Journal of Political Economy* 83, no. 2 (1975): 339-354.
Richardson, Lewis Fry. *Arms and Insecurity*. Chicago: Boxwood/Quadrangle, 1960.

repeated rounds of play; the modeling suggested that only modest gains could be expected from tacit bargaining strategies relying on subjective interpretation of signals and trust in good intentions.²⁸

The idea of building confidence through repeated cooperation under the prisoner's dilemma spawned a number of empirical studies that seem to lend credence to the conclusions of Downs et al. Quantitative analyses by Lloyd Jensen and Joshua Goldstein suggest that cooperative reciprocity (or the lack thereof) plays an important (though sometimes understated) role in tempering adversarial relations, including historical arms control interactions between the United States and the Soviet Union, though cooperative patterns tend to fluctuate over time (sometimes making it difficult to observe whether or not reciprocity is actually taking place). In his analysis of U.S.-Soviet arms control successes and failures, Steve Weber posits that reciprocity itself may take different strategic forms, and that not all strategies facilitate successful outcomes. Weber suggests that reciprocity strategies of "enhanced contingent restraint" – in which an actor takes highly visible steps to demonstrate the availability of its options other than cooperation (e.g. conducting R&D and infrastructure development on new strategic weapons), but refrains from pursuing those options on condition of its adversary similarly exercising restraint – were most successful in achieving arms control cooperation between the superpowers.²⁹

²⁸ Axelrod, Robert. *The Evolution of Cooperation*. New York: Basic Books, 2006.

Downs, George, David Rocke, and Randolph Siverson. "Arms Races and Cooperation." *World Politics* 38, no. 1 (1985): 118-146.

Downs, George, and David Rocke. *Tacit Bargaining, Arms Races, and Arms Control*. Ann Arbor: University of Michigan Press, 1990.

²⁹ Goldstein, Joshua. "Reciprocity in Superpower Relations: An Empirical Analysis." *International Studies Quarterly* 35, no. 2 (1991): 195-209.

On the issue of consequences, the literature remains divided on the relationship between arms races and peace/war; this research is particularly diverse in methods and empirics. As already noted, Schelling and his classical deterrence contemporaries suggested that an arms buildup might be beneficial for strategic stability, in so much as it makes adversaries feel more secure; however, certain types of qualitative arms racing (e.g. acquiring defensive systems or counterforce capabilities) might destabilize the balance and create incentives for preemptive war. In conversation with this school of thought, Intriligator and Brito identified a mathematical “region of initiation” in which arms acquisitions (or disarmament) falling below a certain threshold of retaliatory capability might prove intensely destabilizing owing to the first strike incentives potentially created (the authors were non-committal on whether or not quantitative acquisitions can be taken too far). Andrew Kydd similarly contends, by way of formal modelling, that arms races are not inherently destabilizing – rather it is conflicts of interest and uncertainties in the ability to sustain competition that create incentives for conflict. His results further suggest that overt arms racing can prevent war by reducing uncertainties in the balance of power between two actors (and thus the temptation to exploit a perceived advantage).³⁰

Empirical studies suggest reason for skepticism in accepting these mathematical abstractions, though the evidence is far from conclusive. Michael Wallace’s examination

Jensen, Lloyd. "Negotiating Strategic Arms Control, 1969-1979." *Journal of Conflict Resolution* 28, no. 3 (1984): 535-559.

Weber, Stephen. *Cooperation and Discord in U.S.-Soviet Arms Control*. Princeton: Princeton University Press, 1991.

³⁰ Intriligator, Michael, and Dagobert Brito. "Can Arms Races Lead to the Outbreak of War?" *Journal of Conflict Resolution* 28, no. 1 (1984): 63-84.

Kydd, Andrew. "Arms Races and Arms Control: Modeling the Hawk Perspective." *American Journal of Political Science* 44, no. 2 (2000): 228-244.

of great power disputes from 1816 to 1965 found evidence suggesting a relationship between the rate of change in armament expenditures prior to the dispute and the likelihood of escalation to open war; later research suggested this relationship held regardless of the status quo or revisionist tendencies of states that come out ahead in the arms race – implying that arms racing may be somehow directly causal of war, and that arms control might be beneficial in its own right regardless of adversary intentions. Paul Diehl disputed Wallace’s conclusions on methodological grounds; in a re-specified analysis leveraging additional data and stricter coding rules governing case selection, Diehl found that the correlation between arms races and war washes out. However, further re-specification by Susan Sample, including allowance for a five-year time lag between arms racing and escalation to war (allowing for both delayed effects and disaggregation of arms racing from war preparation), re-affirmed Wallace’s original conclusions (Diehl not surprisingly issued a responding call for greater theoretical and empirical specificity in the arms race research program). A more recent study by Douglas Gibler et al examined arms race effects in the context of longer-term strategic rivalries (versus static analysis of dispute dyads, as in the research previously cited); the authors found a strong statistical relationship between arms race behavior and the onset of both militarized disputes and full-scale war. Gibler et al offer a caveat that arms races only preceded a minority of the wars in their dataset, indicating that arms racing is by no means a necessary condition; however, the evidence is suggestive that arms racing is associated with particularly intense wars (as measured in terms of fatalities).³¹

³¹ Diehl, Paul. "Arms Races and Escalation: A Closer Look." *Journal of Peace Research* 42, no. 2 (1983): 205-212.

Arms Control as a Dependent Variable

Political science has much to say regarding deterrence and the dynamics of arms competition among states; it is more speculative regarding the utility of arms control in tempering these competitions and preventing the onset of war. Nonetheless, regardless of whether it serves the purposes intended, arms control is an observable phenomenon of international relations; states into the present continue to negotiate and accept constraints, limits, and even reductions on their capabilities for waging war. It is surprising then that that the discipline has little to offer in terms of predictive explanations for *why or when, in any case, states might choose to pursue arms control*. Certain explanations can be inferred from the literature previously cited. The canon of classical deterrence theory and structural realism (supported by certain mathematical arms race models) suggests that rivals might choose arms control to preserve a stable and mutually favorable status quo, assuming neither rival has more revisionist aims; it should be most expected when rivals are at peace and feel secure in their retaliatory capabilities (and ideally neither holds a decisive edge). Constructivist critiques of deterrence theory would add a further caveat that arms control, if truly an outcome of stable deterrence, may only be feasible if rivals share an intersubjective understanding of deterrence itself and the means by which it is

Diehl, Paul, and Jean Kingston. "Messenger or Message? Military Buildups and the Initiation of Conflict." *The Journal of Politics* 49, no. 3 (1987): 801-813.

Diehl, Paul, and Mark Crescenzi. "Reconfiguring the Arms Race-War Debate." *Journal of Peace Research* 35, no. 1 (1998): 111-118.

Gibler, Douglas, Toby Rider, and Marc Hutchison. "Taking Arms Against a Sea of Troubles: Conventional Arms Races During Periods of Rivalry." *Journal of Peace Research* 42, no. 2 (2005): 131-147.

Glaser, Charles. "When are Arms Races Dangerous?" *International Security* 28, no. 4 (2004): 44-84.

Sample, Susan. "Arms Races and Dispute Escalation: Resolving the Debate." *Journal of Peace Research* 34, no. 1 (1997): 7-22.

Wallace, Michael. "Arms Races and Escalation: New Evidence." *The Journal of Conflict Resolution* 23, no. 1 (1979): 3-16.

Wallace, Michael. "Armaments and Escalation: Two Competing Hypotheses." *International Studies Quarterly* 26, no. 1 (1982): 37-56.

achieved. The arms race literature on reciprocity further suggests an iterated history of cooperation as a prerequisite for restraint. None of these explanations are necessarily mutually exclusive, though adherents of different theoretical camps would be likely to claim primacy; it is notable then that so little research has been devoted to systematically testing these propositions.

A relative handful of authors deserve credit for attempting to address this gap; the literature can be broadly divided along qualitative and quantitative lines. Reflecting primarily on the SALT process, Albert Carnesale and Richard Haas asked a number of authors to examine a range of arms control hypotheses in light of U.S.-Soviet evidence; these included both explanatory hypotheses for what facilitated arms control achievements, and hypotheses regarding the longer terms effects of arms control (primarily on U.S. security). Regarding arms control achievements, the qualitative evidence proffered suggested that rough parity in military capabilities was a prerequisite for agreement; that agreement to limit certain capabilities was unlikely if either side saw technological promise in those capabilities, but had yet to invest in their development and deployment; that there was insufficient evidence on which to judge the merits of unilateral gestures and tacit bargaining; and that linked issues (e.g. political or military crises) exerted uncertain effects on the arms control process.³²

The Carnesale and Haas volume was published before completion of the INF and START treaties, raising questions of whether or not those groundbreaking agreements might have altered the authors' conclusions; a 1989 study by April Carter benefitted from

³² Carnesale, Albert, and Richard Haas. *Superpower Arms Control: Setting the Record Straight*. Cambridge: Ballinger Publishing, 1987.

this additional perspective. Carter's qualitative research examined the full range of Cold War arms control initiatives, from the test ban treaty negotiations in the 1950s; to the SALT, INF, and START processes; to multilateral conventional arms control negotiations under the Mutual and Balanced Force Reductions (MBFR) and Conference on Security and Cooperation in Europe (CSCE) frameworks. By contrast to the realist-oriented conclusions of Carnesale and Haas, Carter emphasized the importance of underlying political conditions (particularly *détente*), the character of negotiations (including the forum, participants, and bargaining tactics), and the role of bureaucratic factors in conditioning arms control success. In Carter's estimation, process played as much a role as underlying structures and security dilemmas. This analysis, delivered from a disarmament advocacy perspective, nonetheless foreshadowed institutional and normative trends in subsequent political science research. It also reinforced the previously cited observations of Downs, Rocke, and Weber.³³

Tackling the issue from a quantitative perspective, Vally Koubi has examined whether a lessening of military tensions is a prerequisite for arms control. Regarding the U.S.-Soviet relationship specifically, Koubi found that arms control agreements were unlikely to emerge in the face of serious hostilities (though minor incidents did not seem to exert effects); conversely, the achievement of arms control did not seem to affect the likelihood of future disputes. Subsequent research applied to a wider pool of global arms control achievements revealed more nuance; arms treaties often follow periods of *elevated* dispute, but then seem to be associated with more pacific relations following

³³ Carter, April. *Success and Failure in Arms Control Negotiations*. Oxford: Oxford University Press, 1989. Downs and Rocke, *Tacit Bargaining, Arms Races, and Arms Control* 1990. S. Weber 1991.

signing. Agreements are also more likely to follow from a slowdown in military buildups (a seemingly counterintuitive finding in combination with elevated dispute behavior). It is ultimately difficult to accept Koubi's conclusions as definitive given the measurement choices made in assessing what constitutes a military "buildup," the limited number of agreements sampled in the analysis, and the diversity of those agreements in the armaments regulated (including both conventional and nuclear weapons) – yet these conclusions are largely where contemporary political science ends in its empirical testing of arms control causation.³⁴

A New Look

Despite the attention received by arms control in the existing literature – particularly during the five decades of the Cold War – certain fundamental questions about the phenomenon remain not only unresolved, but in certain cases woefully under-addressed. These include:

What conditions lead rivals to pursue arms control – and what conditions hold them back? Surprisingly few scholars have attempted to systematically identify the conditions – strategic, normative, or otherwise – that lead rival powers to pursue arms control measures. The idea that states might build up armaments in response to certain conditions is well-established and well-

³⁴ Koubi, V. (1993). International Tensions and Arms Control Agreements. *American Journal of Political Science*, 37(1): 158-164.

Koubi, V. (1994). Military Buildups and Arms Control Agreements. *International Studies Quarterly*, 38(4), 605-620.

researched; the idea that states might restrain or even scale back their arsenals in response to certain conditions has, for whatever reason, merited less empirical analysis. Just as important is the question of what holds back arms control, especially given that certain types of arms control (particularly treaty-based, bilateral arms control) are relatively rare. It is entirely possible that the conditions that hold back arms control are not simply the inverse of those that facilitate.

Are there multiple causal paths that might lead countries to arms control? To the extent that existing research addresses the causal factors underlying arms control, explanations tend to be unicausal – or at least lean heavily on a single explanatory variable (e.g. the balance of power, hostility dynamics, reciprocity, or bureaucratic politics). However, it is plausible that a combination of factors might facilitate arms control behavior, and moreover that there may be multiple causal paths to the same outcome. The modern concept of arms control emerged during the Cold War, in which the U.S.-Soviet relationship dominated the discourse and exerted a strong influence on theory and practice. In the multipolar post-Cold War era, other regional and global rivalries have risen to the fore. Absent rigorous empirical testing, it is presumptuous to assume that the theory and conclusions drawn from the U.S.-Soviet experience are universally applicable across other contexts. As will be discussed in the next chapter, conventional analytic methods (including both rational choice modelling and statistics) do not lend themselves to identifying multicausal relationships, suggesting need for a new approach.

What is the relationship between strategic and normative factors in facilitating (or holding back) progress toward arms control? Social science researchers are apt to stake very partisan claims on either side of the rationalist/normative divide; this is likely one reason that “fourth wave” deterrence research has yet to yield a robust research program that truly engages with and credibly challenges the insights of classical deterrence theory. In the same manner that arms control might be a multicausal phenomenon, it might also very well arise from a combination of both strategic (i.e. rationalist) and normative factors conditioning the relationship between rivals. Moreover, as suggested by fourth wave deterrence researchers, these factors may be dynamically interactive – norms shape strategic concepts, while the implementation of strategic concepts might also yield new norms. Again, conventional analytic methods are not necessarily equipped to parse out such complexity.

The following chapters will attempt to address these questions in regards to the specific phenomenon of bilateral arms control between nuclear-armed rivals. Chapter 2 will propose a theoretical understanding of arms control, including testable hypotheses, that synthesizes and bridges many of the concepts articulated by existing research. The methodological approach for testing these propositions is two-pronged. First, in Chapter 3, the logic and methodology of Qualitative Comparative Analysis (QCA) will be applied to a cross-temporal analysis of all bilateral nuclear rivalries from 1949 (the year the

Soviet Union tested its first atomic bomb and formally initiated the first nuclear rivalry) to the present. The use of QCA allows the researcher to systematically identify the relationship between hypothesized facilitating conditions and the presence or absence of a specific outcome – in this case arms control behavior. The QCA analysis also permits identification of multi-causal dynamics, in which multiple variables interact to yield certain outcomes, making it uniquely suited to answering the questions posed. However, QCA is necessarily a blunt instrument useful for deriving macro-level conclusions, but less able to capture the nuances underlying causal mechanisms; it is most effective when combined with in-depth case study research. Chapters 4-6 will examine three case studies that illustrate, in historically-informed qualitative terms, the causal processes suggested by the QCA. The cases include interactions between the United States and the Russian Federation, India and Pakistan, and the United States and the People’s Republic of China – three nuclear rivalries of contemporary relevance that also illustrate the dynamic relationship between causal conditions and arms control outcomes.

Chapter 2. A Multi-causal Framework for Understanding Arms Control

Existing political science literature has tendered (often only implicitly) a range of explanations for why, and under what conditions, states might pursue nuclear arms control. This study does not contend that the insights have been fundamentally erroneous or even wildly misleading. Indeed, existing scholarship has provided important theoretical foundations and even testable hypotheses for understanding why states might reign in their arsenals. However, in addition to neglecting certain fundamental questions, the research is lacking in systematic testing of theoretical concepts. It has also largely neglected the proposition that arms control behavior might in fact be complexly multicausal in nature, requiring analysts to bridge multiple schools of thought. This chapter lays out the theoretical and methodological foundations for a more systematic examination of the conditions that lead rival powers to pursue arms control agreements.

An Alternative Causal Logic

Contemporary political science is heavily influenced by the linear cause-and-effect logic of statistical regression. In regression, independent variables are assumed to be mutually independent and linear in their correlation with the dependent variable outcome. Importantly, the results of regression analyses measure the *tendency* for dependent variable values to track with independent variable outcomes. Causation, based in theory, can be inferred from these measures of tendency. This approach is particularly

effective when working with large-scale phenomena and large data sets. It is much less effective when dealing with a more limited empirical universe. Moreover, excepting the use of multiplicative interaction terms, it is less effective in teasing out causal complexity and interaction among variables. Regression also generalizes away abnormal or errant cases, relegating these to the error term (assumed to be influenced by unspecified variables).

Nuclear arms control is a phenomenon limited to a relatively small subset of countries in the international system. There are only eight states that have only openly tested nuclear explosives (the United States, USSR/Russia, United Kingdom, France, China, India, Pakistan, and North Korea, in order of first testing), one that clandestinely acquired nuclear weapons and later openly renounced them (South Africa), and a handful of countries that inherited – but later gave up – nuclear weapons following the Soviet collapse (Belarus, Kazakhstan, and Ukraine). Several countries are currently suspected of secretly maintaining or pursuing nuclear weapons programs, while a larger (albeit still limited) number of countries started down the route of nuclear weapons acquisition, but turned back (or were compelled to turn back) for various reasons. The point is that the empirical universe of nuclear weapons possessing or seeking states is relatively limited, regardless of how one parses the distinction. Because of this, large-N statistical tools have proven limited in their ability to explain both horizontal and vertical proliferation of nuclear weapons, let alone why states might choose to roll back their nuclear capabilities; statistically significant samplings are simply lacking. Moreover, the limitations inherent in large-N statistical methods have prevented systematic analysis of the causal

complexity that potentially drives horizontal or vertical proliferation – complexity hinted at by the work of more qualitatively oriented authors.³⁵

Much of the deterrence and arms control literature previously cited leans heavily on anecdotal historical insight to support its conclusions, assuming empirical evidence is even proffered; the game theoretic literature in particular is often content to hang its conclusions on abstract models or thought exercises. The few qualitatively rich studies, like those of George and Smoke or Stephen Weber, are rich in contextual detail and qualitative empirical demonstration of theory; they provide a compelling illustration of causal mechanisms at work in a specific historical context. However, the limited universe of case studies examined raises inevitable questions regarding broader theoretical generalizability. In many cases, theory and evidence is largely derived from the perspective of U.S. interactions during the Cold War.

In seeking a middle ground between quantitative rigor and qualitative depth, this study is rooted in a methodological school – Qualitative Comparative Analysis (QCA) –

³⁵ For a sampling of such large-N approaches (as they apply to the study of horizontal proliferation), see: Furchman, Matthew. "Spreading Nuclear Temptation: Proliferation and Peaceful Nuclear Cooperation Agreements." *International Security* 34, no. 1 (2009): 7-41.
Jo, Dong-Joon, and Erik Gartzke. "Determinants of Nuclear Weapons Proliferation: A Quantitative Model." *Journal of Conflict Resolution* 51, no. 1 (2007): 167-194.
Kroenig, Matthew. *Exporting the Bomb: Technology Transfer and the Spread of Nuclear Weapons*. Ithaca: Cornell University Press, 2009.
Singh, Sonali, and Christopher Way. "The Correlates of Nuclear Proliferation: A Quantitative Test." *Journal of Conflict Resolution* 53, no. 2 (2009): 302-328.
For a critique of the quantitative proliferation literature, see:
Montgomery, Alexander, and Scott Sagan. "The Perils of Predicting Proliferation." *Journal of Conflict Resolution* 53, no. 2 (2009): 302-328.
Examples of qualitative, multi-causal studies include:
Hymans, Jacques. *The Psychology of Nuclear Proliferation: Identity, Emotions, and Foreign Policy*. Cambridge: Cambridge University Press, 2006.
Sagan, Scott. "Why Do States Build Nuclear Weapons? Three Models in Search of a Bomb." *International Security* 21, no. 3 (1996/97): 54-86.
Solingen, Etel. *Nuclear Logics: Contrasting Paths in East Asia and the Middle East*. Princeton: Princeton University Press, 2007.

more commonly associated with the field of comparative politics. The logic of QCA is fundamentally “set-theoretic.” Rather than being strictly “independent” variables, the configuration of causal conditions leading to an outcome is conceived in terms of set memberships. Figure 1 (below) illustrates very basic set-theoretic relationships. The analysis that follows will focus on pairs (or dyads) of states as the unit of analysis (explained later in this chapter); all such possible dyads are represented by the largest circle. More specifically, the research focuses on dyads composed of strategic rivals (the next biggest circle), a subset of the state dyads. Yet more specifically, the study is limited in scope to nuclear-armed dyad rivals. Finally, and even more to the point, this study examines the outcome of arms control between nuclear-armed rivalry dyads – these arms control-achieving dyads themselves being a subset within the set of all nuclear rivalry dyads. It is the difference in causal conditions between the arms control-achieving dyads and the non-achieving dyads that constitutes the focus of subsequent chapters.³⁶

Qualitative comparative analysis attempts to identify the configuration of sufficient and/or necessary conditions that lead to a certain outcome; the distinction between these two concepts is important to understand, and is illustrated in Figures 2 and 3. Figure 2 (below) illustrates a hypothetical conditional relationship of sufficiency between the outcome (Y) of arms control between nuclear-armed dyads, and the condition (X) of the dyad members possessing missile-deflecting force fields. The large circle contains the set (Y) of all nuclear-armed dyads that have achieved arms control.

³⁶ For further discussion of set theory and sufficient and necessary conditions, see: Ragin, Charles. *The Comparative Method: Moving Beyond Qualitative and Quantitative Strategies*. Berkeley: University of California Press, 1987, 99-102.
Ragin, C. *Redesigning Social Inquiry: Fuzzy Sets and Beyond*. Chicago: University of Chicago Press, 2008, 13-25.
Schneider, Carsten, and Claudius Wagemann. *Set-Theoretic Methods for the Social Sciences: A Guide to Qualitative Comparative Analysis*. Cambridge: Cambridge University Press, 2012, 42-90.

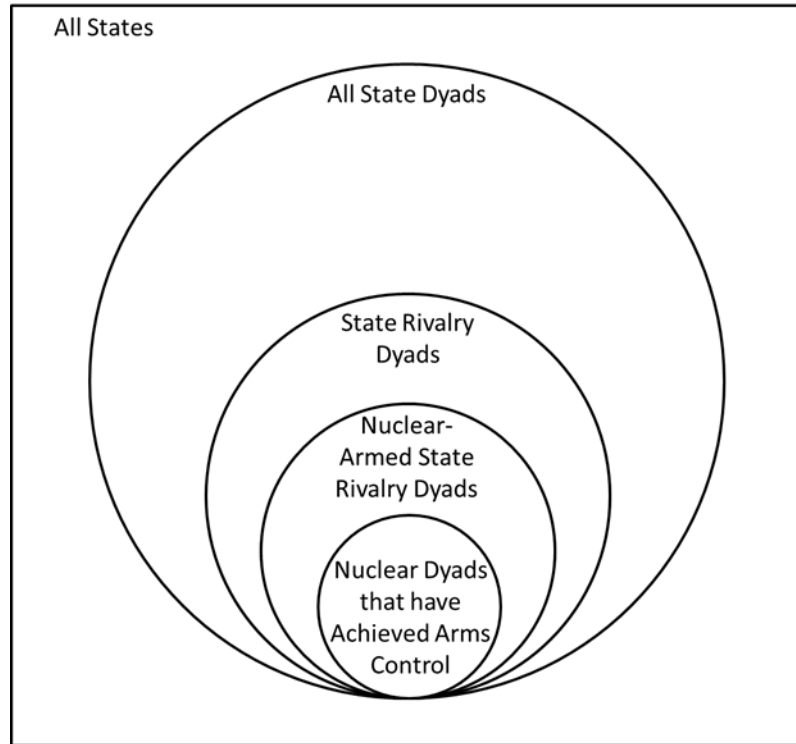


Figure 1: Dyadic Set-Theoretic Relationships

Within this circle exist two subsets; dyads that have achieved arms control without force fields ($\sim X$), and dyads that have achieved arms control with force fields (X). This suggests that the presence of force fields may be a *sufficient* condition for achieving arms control in some dyad cases; whenever force fields are present, arms control is also achieved. It is not a *necessary* condition, however, given that other dyads have achieved arms control without force fields; other potential facilitating conditions need to be identified.

Figure 3 illustrates a conditional relationship of necessity. This time, the larger circle comprises the set (X) of all nuclear-armed dyads possessing force fields. The smaller subset circle contains those dyads that also possess force fields, but have additionally achieved arms control (Y). The diagram suggests that force fields are in fact at minimum a *necessary* condition for achieving arms control; without their presence,

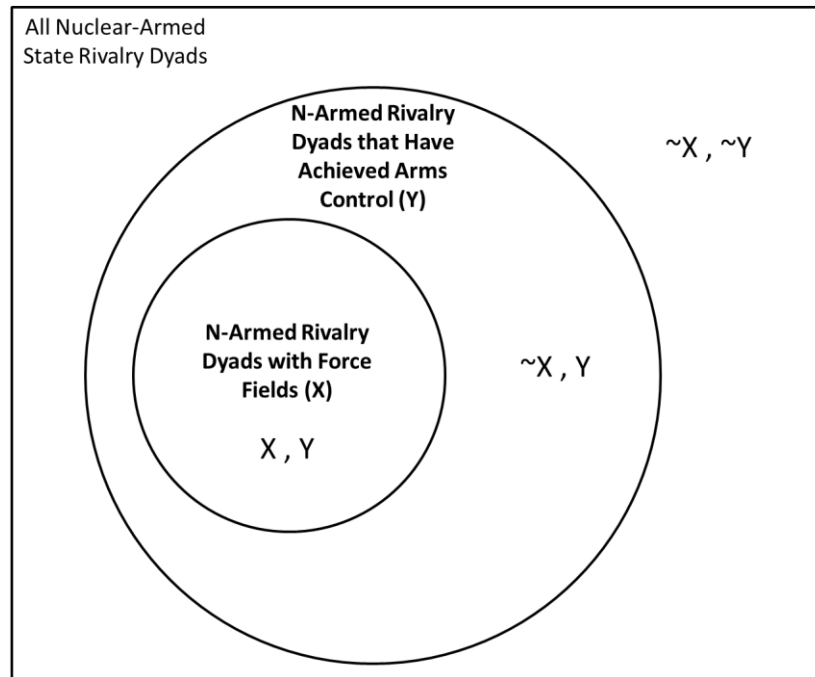


Figure 2: Sufficiency

dyads do not achieve arms control. Note that if no additional conditions can be identified that are necessary in combination with force fields for achieving arms control, then the presence of force fields would be both a *necessary and sufficient* condition. If, however, another necessary condition is identified that must be present in combination with force fields, then force fields would be *necessary but insufficient*.

Unicausal relationships are rare in modern social science (particularly statistical social science), and this study is no exception in that regard. Fortunately, the logic of QCA also allows for exploration of multicausal relationships, wherein the distinctions between sufficiency and necessity still apply. It may be possible that only one particular combination of conditions leads to a certain outcome, suggesting that this combination of conditions is necessary and sufficient. It may also be possible that multiple configurations of certain conditions are associated with the same outcome; in and of itself, each of these set combinations is then sufficient (though not necessary) for achieving the outcome.

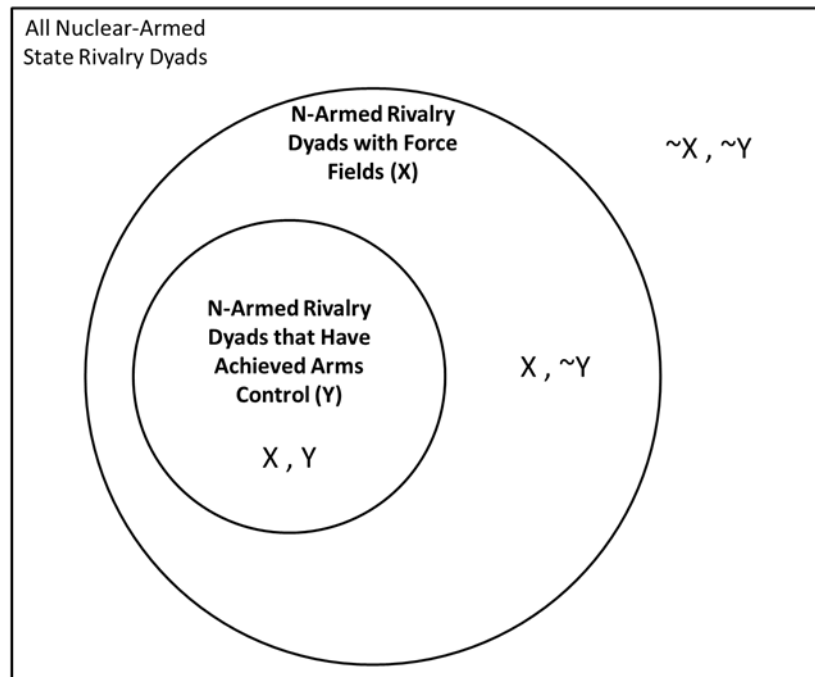


Figure 3: Necessity

This discussion of necessity and sufficiency is important in highlighting important contrasts between the logic of QCA and the logic of regression-based statistical analysis – and in particular why this method provides a useful lens for examining the multi-causal determinants of arms control behavior between states. First, QCA allows the researcher to more clearly discern *equifinality*, or the fact that multiple causal configurations may lead to a certain outcome; this is generally not discernable from statistical analysis, which only provides for observation of linear tendency in relationships between dependent and independent variables. Second, QCA also allows for analysis of *conjunctural causation*, in which conditions may not affect an outcome in isolation, but rather require the intersecting presence of additional conditions. Thirdly, QCA also allows for a similar systematic analysis of the conditions that lead to an outcome not happening, which may not simply be the inverse of the facilitating conditions – i.e. *asymmetrical causation*. Finally, it is worth noting that QCA does not require anything approaching the minimum

number of case studies required for statistical significance; the results gleaned from QCA certainly benefit from greater case study diversity, but the method does not require the hundreds or even thousands of observations preferred by statisticians.³⁷ The next chapter will explain the formal methodology for conducting QCA in more detail – namely so-called “fuzzy set” analysis, in which conditions and outcomes can be quantified along a measurable scale (rather than in binary terms). For the sake of theory development, it is simply important to note that this study uses the language and logic of set-theoretic QCA as a foundation for the case being made; the same logic will also be applied to the empirical evidence eventually presented, both quantitative and qualitative.

Unit of Analysis

This study draws on empirical evidence from more than six decades of interactions between seven pairs of nuclear-armed states: the United States and the Union of Soviet Socialist Republics (1949-1992), the United States and the Russian Federation (1992-present), the United States and China (1964-present), China and the Union of Soviet Socialist Republics (1964-1992), China and the Russian Federation (1992-present), India and Pakistan (1998-present), and India and China (1998-present). These state pairs constitute “nuclear rivalry dyads” (NRDs). International relations theory does not offer a consensus definition for what constitutes “rivalry” between states, despite regular use of the term. Cross-temporal research of militarized dispute trends has made it clear that a relatively small percentage of states in the international system account for

³⁷ Schneider and Wagemann, *Set-Theoretic Methods for the Social Sciences: A Guide to Qualitative Comparative Analysis* 2012, 76-83.

the majority of conflict. Those state pairs exhibiting a history of repeated disputes are often referred to as “enduring rivals,” though there is debate as to what frequency or intensity of dispute qualifies for an enduring rivalry; in the quantitative literature, precise definitions may vary depending on the research program and methodological requirements. A recent study by Karen Rasler et al defines “strategic rivalry” in terms of an intersection between competition over resources and threats to do harm – the latter being what separates peaceful economic rivalry (e.g. the United States and contemporary Japan) from war-prone strategic rivalry (the United States and pre-WWII Japan). This study uses this conceptualization as a starting point, but then modifies it to capture more unique dynamics associated with state possession of nuclear weapons.³⁸

Table 1 below categorizes potential dyadic rivalry (or non-rivalry) relationships in which at least one of the two states possesses a nuclear weapons capability. In order to qualify as a nuclear rivalry dyad (upper left quadrant), state pairs must 1) both possess a nuclear weapons capability, and 2) present a directed nuclear threat toward one another. In the context of this study, “nuclear capability” refers to the ability of the state to employ a functioning nuclear device for military purposes; such a capability is assumed to exist following initial testing of a nuclear explosive device. Critics may argue with this coding decision on the grounds that simply testing a nuclear device does not indicate the acquisition of a militarily deployable capability (i.e. a functional warhead mated to a

³⁸ Gochman, Charles, and Zeev Maoz. " Militarized Interstate Disputes, 1816-1976: Patterns, Procedures, and Insights." *The Journal of Conflict Resolution* 28, no. 4 (1984): 606-612.

Goertz, Gary, and Paul Diehl. "Enduring Rivalries: Theoretical Constraints and Empirical Patterns." *International Studies Quarterly*, 1993: 147-171.

Maoz, Zeev, and Ben Mor. "Enduring Rivalries: The Early Years." *International Political Science Review* 17, no. 2 (1996): 141-160.

Rasler, Karen, William Thompson, and Sumit Ganguly. *How Rivalries End*. Philadelphia: University of Pennsylvania Press, 2013.

	Mutual nuclear weapons capability	Asymmetric nuclear weapons capability
Directed nuclear threat	Nuclear Rivalry <i>(USA/Russia)</i>	Asymmetric nuclear rivalry <i>(Soviet Union/Germany)</i>
Lack of directed nuclear threat	Nuclear non-rivals <i>(USA/India)</i>	Asymmetric non-rivalry <i>(USA/Germany)</i>

Table 1: Nuclear Rivalry

functional delivery system); in addition, a functional capability can theoretically be acquired in the absence of nuclear testing (as South Africa did in the 1980s). However, the point at which most nuclearized states transition to a militarily deployable capability is often opaque because of information classification or deliberate obfuscation, making it difficult to establish a more nuanced coding rule. In more practical terms, most states have functionally assumed their rivals to be nuclearized following first testing (India and Pakistan being notable exceptions, to be discussed in a later chapter). More importantly from the standpoint of this study, arms control is generally observed in environments of acknowledged military capabilities; it is largely unrealistic to expect states to negotiate reciprocal control measure for capabilities that may or may not actually exist.

Nuclear rivals must also present one another with a directed nuclear threat – i.e. their capabilities should, on some acknowledged level, present a threat of harm to the other. In most historical cases, this is obvious owing to a combination of stated intent and functional capability; throughout the Cold War, the United States and the Soviet Union both constructed nuclear arsenals explicitly designed to hold targets of value to one another at risk. By contrast, the United States and the United Kingdom both deployed nuclear delivery systems theoretically capable of reaching one another’s territory, but

neither side ever intended to direct those capabilities at the other. There are situations in which this relationship can be more ambiguous; for example the United States and Russia following the Cold War, or the United States and China following the normalization of relations in the 1970s. In both of these cases, military competition and associated disputes dissipated, at least for a period of time. However, both sides in these relationships maintained (and in some cases continued to upgrade and modernize) nuclear capabilities at least implicitly directed at one other. Even after normalizing relations with the United States and forming an implicit alliance against the Soviet Union, China continued development and deployment of nuclear delivery systems capable of targeting the continental United States (discussed in more detail in Chapter 5). During the 1990s, the United States and Russia both continued to deploy and upgrade massive nuclear arsenals clearly scaled to match the magnitude of one another's threat (however remote the chances of conflict had become). Thus, these dyads continue to be classified as nuclear rivals. A dyad's nuclear rivalry status also implies some level of strategic competition for territory, resources, and/or political influence – otherwise there would be little justification for a directed nuclear threat. However, by contrast to other studies of enduring or strategic rivalries, the classification does not imply a minimum or specific level of competition, animosity, or sustained dispute. In the fact, in the QCA model specified in the next chapter, the level of animosity is allowed to be variable, in order to assess its relationship with arms control behavior.

This study excludes asymmetric dyads in which only one of two rivals possesses nuclear weapons capabilities (e.g. the United States and Russia before 1949). It is theoretically possible for arms control measures to be pursued in the context of nuclear

asymmetry. The United States and the Soviet Union both participated in multilateral nuclear arms control discussions in the immediate post-World War II period before the USSR tested its first nuclear device. More recently, discussions (largely at a semi-official level) have taken place between non-nuclear weapon states and weapon states on the verification and monitoring requirements for global nuclear disarmament. These are not insignificant cases studies undeserving of analysis. However, for reasons of theoretical and empirical consistency, this study focuses only on nuclearized dyads. To the extent that arms control might be feasible under conditions of asymmetry, it would very likely be subject to the influence of different causal conditions than those posited for mutually nuclear dyads. For similar theoretical and empirical reasons, this study also focuses on dyads in which a directed nuclear threat. It is theoretically possible (though at this point unobserved) for nuclear arms control to take place bilaterally between nuclear powers that do not threaten one another; however, such activity would even more certainly be subject to different causal conditions.

Finally, the list of rivalry dyads included in this study conspicuously excludes pairs incorporating the United Kingdom and France, both technically nuclear rivals opposite the Soviet Union and (perhaps more arguably) Russia. The exception is a theoretical and empirical decision based on the complex relationship between these countries' nuclear capabilities and their alliance relationship with the United States and the North Atlantic Treaty Organization (NATO). Both powers independently developed and deployed nuclear arsenals, ostensibly lacking confidence in the protective nuclear umbrella of the United States. However, despite political rhetoric to the contrary, it is a stretch to argue that French and (especially) British arsenals ever represented a truly

“independent” deterrent. It is difficult to imagine a scenario in which either power would have entered into a nuclear conflict with the Soviet Union (or later Russia) absent U.S./NATO involvement – at which point the modest arsenals of both countries would have effectively been auxiliary to far more substantial U.S. capabilities. In essence, it is difficult to disaggregate these two countries from their alliance partnerships as truly autonomous actors in a bilateral nuclear rivalry, to the same degree as other countries in the analysis (while the United States was of course a NATO partner, it enjoyed far greater freedom of action by virtue of its overwhelming share of military power, political influence, and geographic separation). The UK and French case studies merit analysis, especially given the dramatic unilateral nuclear reductions undertaken by both countries following the Cold War – but they are arguably outside the theoretical scope and explanatory potential of this study.

Outcomes

As indicated previously, this research is intended to explain the outcome of nuclear arms control between strategic rivals. Consistent with existing literature, this study assumes Schelling and Halperin’s definition of arms control as its starting point, which includes “all the forms of military cooperation between potential enemies in the interest of reducing the likelihood of war, its scope and violence if it occurs, and the political and economic costs of being prepared for it.” This definition was intentionally crafted to be broad in scope, encompassing a wide range of potential activities that include both conventional and nuclear arms control, explicit and tacit cooperation, and measures that might include both arms reductions and arms acquisitions in the interest of

strategic stability. This study, however, focuses on a very specific piece of the arms control spectrum – those measures that are intended to reduce nuclear-specific dangers, and particularly those that seek restraints on, limits to, and/or reduction of nuclear armaments. Besides bounding the empirical scope, this focus also tracks with the general direction of international nuclear arms control efforts since Schelling and Halperin first defined the issue space. International efforts to control nuclear weapons have almost entirely focused on restraints, limitations, and reductions on their development, acquisition, deployment, and/or use. Countries have rarely pursued the opposite as a matter of arms control foreign policy – i.e. removal of restraints or limitations on nuclear arms in the interest of reducing dangers (though such measures may have been undertaken for separate unilateral reasons, like the George W. Bush administration’s 2001 withdrawal from the Anti-Ballistic Missile Treaty). This study further draws a qualitative and ordered distinction between three different types of arms control outcomes: confidence building measures, arms capability limitation measures, and arms capability reduction measures. The analytical distinction between these three concepts is important, particularly for the formal QCA that follows.

Confidence Building Measures

The origins of the term “confidence building measure” (or CBM – also referred to in some contexts as Confidence and Security Building Measures, or CSBMs) are even more recent than arms control, though the underlying concept has similar historic antecedents. According to Jeffrey Larsen and Kurt Klingenberger, “Confidence- and security-building measures are intended to foster transparency and trust through

purposefully designed cooperative measures. They help clarify states' military intentions, reduce uncertainties about potentially threatening military activities, and constrain opportunities for surprise attack or coercion." Many definitions of CBMs exist, but most share common elements with this one, focusing on themes of trust-building through increased transparency. While the term CBM did not exist in 1963, the U.S.-Soviet "hotline" agreement, establishing a permanent communication channel between leaders in Washington and Moscow, is a prime example of such a measure. The hotline was intended to facilitate rapid and direct communication between national leaders in times of crisis, allowing for quicker clarification of intentions and (ideally) avoidance of escalation to nuclear war.³⁹

For the purposes of this study, CBMs are assumed to stop short of placing functional or numerical limitations on the development or acquisition of nuclear weapon systems. CBMs may place limits on certain weapon deployment patterns and postures that are threatening in nature (e.g. forward deployment), or even certain conditions on testing. For example, the *Agreement Between India And Pakistan On Pre-Notification Of Flight Testing Of Ballistic Missiles* places transparency requirements on the missile testing activities of each party (in the interest of preventing tests from being misconstrued as offensive launches). It does not, however, place any functional limitation on the research and development aims of those tests; parties are not constrained from developing new weapons or improving existing systems.

³⁹ Larsen, Jeffrey. *Arms Control: Cooperative Security in a Changing Environment*. Boulder: Lynne Reinner Inc, 2002.

For additional definitions and discussion of the term, see:

R. D. Burns 2009, 137-140.

Goldblat 2002, 10-11.

Arms Capability Limitation Measures

The gradation between what constitutes an arms limitation measure and an arms reduction measure is less well-defined in the existing literature. Most authors at least implicitly lump the two concepts together as a common analytical unit. For example, Burns describes limitation and reduction of armaments concurrently, noting that such measures “...place specified limits on the mobilization, possession, or construction of identified military personnel and weaponry – occasionally, their actual reduction. The restrictions may be qualitative...as well as quantitative.” However, this definitional approach glosses over an important distinction between two very different types of arms control.⁴⁰

The difference between the Strategic Arms Limitation Talks (SALT) interim agreement and the later Strategic Arms Reduction Treaty (START) is a case in point. The SALT I agreement placed quantitative ceilings on the nuclear weapon systems deployed by the United States and the Soviet Union. Importantly, the agreement did not provide for the elimination, or even reduction, of specific weapon systems (in fact, the agreement set limits that in some cases had not yet been reached). It was intended to freeze, but not roll back, the superpower arms race. By contrast, the START I agreement set quantitative benchmarks that required both powers to undertake significant reductions in their existing arsenals of nuclear delivery systems; large numbers of missiles, aircraft, and supporting infrastructure were dismantled to meet the terms of the agreement.⁴¹

⁴⁰ R. D. Burns 2009, 13.

⁴¹ Goldblat 2002, 80-92.

For the purposes of this study, arms capability limitation measures place defined qualitative or quantitative constraints on the development, acquisition, and/or deployment of nuclear weapon systems. Such measures go beyond the simple transparency objectives of CBMs, achieving commitment to functional limits on the capability for pursuing nuclear war. However, such measures stop short of requiring countries to eliminate or reduce existing weapon systems. It should be noted that the concept of “functional limits” is important in drawing distinctions between confidence building measures and substantive arms limitations. The history of nuclear test ban agreements is illustrative. For a period from 1958-1961, the United States and Soviet Union engaged in a reciprocal (though non-formalized) nuclear test moratorium while exploring the possibility of a long-term treaty-based test ban. This moratorium constituted an early (albeit informal) arms limitation measure; by refraining from either above- or below-ground testing of nuclear weapons, both powers placed certain research and development constraints on the qualitative enhancement of their arsenals. However, the test moratorium eventually broke down. In 1963, the two countries (along with the United Kingdom) agreed to sign the Limited Test Ban Treaty (LTBT), under which above-ground nuclear testing was banned. By the definition above, the LTBT – by contrast to the test moratorium – constituted a weaker confidence building measure, rather than a true arms limitation measure. The key difference lies in the concept of functional limits; under LTBT, the superpowers could continue testing nuclear weapons underground, which placed no real constraint on their ability to perfect and enhance warhead designs.⁴²

⁴² Carter 1989, 42-78.

Goldblat 2002, 48-68.

Seaborg, Glenn. *Kennedy, Khrushchev, and the Test Ban*. Berkeley: University of California Press, 1981.

Arms Capability Reduction Measures

Arms capability reduction measures, as already suggested, go beyond arms limitations in seeking to actually reduce or roll back capabilities for pursuing nuclear war. Parties to such agreements agree to the elimination – either partial or total – of existing weapon systems. The Intermediate Nuclear Forces (INF) Treaty between the United States and Soviet Union (later Russia) was an example of a reduction agreement eliminating an entire class of weapon system (ground-launched ballistic and cruise missiles with a range of 300-3400 miles). The START Treaty is an example of a reduction agreement in which no single weapon system was explicitly eliminated, but large reductions were made across a range of systems.

These three types of arms control measure are, for the purposes of this study, assumed to comprise three ordered points along a spectrum of potential arms control cooperation between strategic rivals, with CBMs constituting the “weakest” type of measure and arms capability reductions constituting the “strongest” type. One can conceive of additional points on this spectrum; nuclear disarmament, for example, would constitute a point beyond mere reductions. However, the world has yet to see reciprocal disarmament between rivals, so the phenomenon is excluded. It is also possible to identify gradations within each of these categories. Not all arms reductions are created equal; the START II and SORT treaties mandated far greater reductions in delivery systems than START I, suggesting a “stronger” or more comprehensive arms control measure. However, given the limited diversity of arms control cases that exist (and can therefore be used to calibrate a more discriminating measurement system), and the

inherent difficulty of precisely measuring the strength of agreements with both quantitative and qualitative dimensions, this study uses the three basic categories (CBM, limitation, and reduction) as its analytical basis.

This study also includes both formal and informal arms control measures in the analysis. The majority of the post-Schelling/Halperin literature on arms control has focused on treaty-based mechanisms for achieving arms control, in which countries sign negotiated agreements that are binding under international law. However, informal arms control – i.e. measures that countries voluntarily implement without a negotiated binding agreement – is also an important phenomenon that deserves attention. Schelling and Halperin noted early on that “It is an important tactical question whether the most promising approach to arms control is to seek formal treaties, informal agreements, tacit understandings, or just mutual self-restraint; there are many points of view on this, and much to be said for and against each of them.” International relations scholars have devoted much attention to the idea of “tacit” bargaining, in which states’ actions are intended to convey messages of intention or commitment. In Steve Weber’s reading of U.S.-Soviet arms control interactions, certain unilateral policy decisions regarding delayed introduction of anti-ballistic missile technologies and multiple independently target reentry vehicles (MIRV) were intended to be (at least in part) signals of restraint favoring a pause in the arms race.⁴³

While lacking legal institutionalization, informal measures can nonetheless be quite dramatic. The previously cited 1958-61 test moratorium is one example. India and

⁴³ Schelling and Halperin, *Strategy and Arms Control* 1961, 77.
S. Weber 1991.

Pakistan have adhered to a similar moratorium for decades, with a brief pause in 1998, which arguably constitutes a significant limitation on the qualitative enhancement of their nuclear arsenals. Even more dramatically, the United States and Russia have dismantled thousands of nuclear weapons in their respective arsenals since the 1990s; these large-scale reductions were not mandated by treaty, but nonetheless reflected a dramatic reduction in capability that arguably represents tacit implementation of arms control. This study, at least in part, seeks to understand whether or not such informal arms controls measures are subject to the same facilitating conditions as formal arms control.

Causal Conditions and Hypotheses

The existing literature is not lacking in theory – or at least suggestion of theory – for why states may or may not pursue arms control. This literature largely serves as the basis for the causal “conditions” (or independent variables) explored in this study, and their hypothesized relationships to the outcome – relationships that are both normative and instrumental in some cases. Three major conditions are explored: the relative balance of military forces (both nuclear and conventional), rivalry dynamics, and the relative symmetry of nuclear doctrines.

Balance of Military Forces (Nuclear and Conventional)

Hypothesis 1: Nuclear arms control, particularly in the form of limitations and reductions, is facilitated by relative symmetry in the balance of military forces between nuclear rivals.

The existing literature on deterrence and arms control places considerable emphasis on the balance of military forces between rivals, making it a natural point of departure for this study. Classical deterrence theory and realism in particular attribute the dynamics of arms races and arms control to balance of power considerations; states seek military capabilities to address security concerns and maintain (or sometimes expand) their power. Importantly, such gains are relative; any gain in arms capabilities by one power necessarily diminishes those of its rivals. Arms control can potentially serve as a means to preserve the balance of power and deterrence stability for security-seeking states. It follows from this logic that states should only pursue ambitious arms control measures upon feeling secure in their own military capabilities – and moreover, that more ambitious forms of arms control will only be pursued when states have achieved something resembling parity in capabilities.

When it comes to nuclear arms, scholars often make a distinction between two concepts – “strategic sufficiency” and “parity.” If a country has achieved strategy sufficiency in its nuclear arsenal, it is confident in its military capability to retaliate if attacked first by a rival; a common name for this in military parlance is “secure second-strike capability.” Note that this does not necessarily imply the capability to equally respond in kind – rather it is simply the ability to respond with some level of devastating and potentially deterrent force. Parity, which is more accurately the focus of this study, suggests a more direct equivalence in capabilities. As with sufficiency, parity is not a purely numeric concept; it comprises both quantitative and qualitative considerations. Rarely if ever do rivals have completely matching force structures or deployed numbers of weapon systems. For example, even at the point that the United States and Soviet

Union reached arguable strategic parity by the 1970s, the emphasis on certain types of weapons differed. The Soviet Union placed great emphasis on land-based ballistic missiles, while the U.S. force posture balanced capabilities more evenly across a triad that included substantial numbers of submarine-based ballistic missiles and long-range bombers. It should also be noted that mutual parity does not automatically imply mutual strategic sufficiency; it is possible for two countries to have roughly equivalent numbers of weapons, but to still lack confidence – for technical reasons or otherwise – in the security or reliability of their retaliatory capability.⁴⁴

While the existing literature has largely emphasized nuclear-on-nuclear force considerations, this study also considers the balance of conventional military capabilities between rival powers. Nuclear rivals have long been explicit in drawing connections between nuclear and conventional balance sheets. During the Cold War, the United States saw its nuclear arsenal as a NATO counterweight to numerically superior Warsaw Pact conventional forces; in the post-Cold War era, Russia has similarly compensated for the erosion of its conventional capabilities by leaning more heavily on its nuclear arsenal. On the subcontinent, Pakistan has repeatedly cited Indian conventional superiority as justification for a nuclear arms buildup, including the future acquisition of “tactical” battlefield nuclear weapons (these conventional/nuclear dynamics will be discussed further in Chapters 4 and 5). Existing theory offers little precedent for understanding the relationship between conventional and nuclear capabilities in conditioning either deterrence or arms control; however, the relationship has clearly factored into the decision calculations of certain countries and should be evaluated.

⁴⁴ Freedman, *The Evolution of Nuclear Strategy* 2003, 147, 325, 342-354.

Rivalry Intensity

Hypothesis 2. The feasibility of nuclear arms control between nuclear rivals is inversely proportional to the intensity of the rivalry that exists between them.

Rivalry may be expressed through multiple arenas of competition – military, economic, and diplomatic. For the purposes of predicting arms control behavior, this study focuses more narrowly on the military arena, assessing rivalry in terms of the degree to which rivals approach (or cross into) a state of armed military conflict. Nuclear arsenals are acquired (at least in part) to either confer military or the capability to inflict unacceptable damage on an adversary; thus it is assumed that military conflict dynamics should exercise a more direct effect on states' nuclear arms control choices.

Several strands of existing literature suggest that there should be an inverse relationship between the intensity of rivalry, in terms of both political and military conflict, and the ability to reach agreement on arms control. Defensive realism suggests that “greedy” states (those seeking a change to the status quo) are more likely to enter into conflict than their defensive, security-seeking counterparts. In so much as conflict is a symptom of attempts to disrupt the status quo, stability-seeking arms control should only take place in its absence. This hypothesis is also consistent with arms race literature suggesting that arms racing takes place when states perceive a threat. If rivals exist at the precipice of armed conflict, they will be unlikely to negotiate away the very armaments they may need to prevail (or at least survive) in such a conflict. Finally, this hypothesis reflects insights from studies on reciprocity and cooperation. Assuming that militarized

dispute is an expression of non-cooperative behavior, cooperative arms control should only follow from a declining trend in such disputes, suggesting more consistent and reciprocated cooperation.

Relative Symmetry of Nuclear Doctrine

Hypothesis 3: Nuclear arms control, particularly more intensive forms (limitations or reductions) is facilitated by relative symmetry in the military nuclear doctrines of rivals.

The concept of what constitutes a “nuclear doctrine” (often used interchangeably with “nuclear strategy” and, more recently in the United States, “nuclear posture”) has always been somewhat nebulous – in no small part because nuclear warfare fortunately remains an abstract concept. In the introduction to his signature work on the evolution of nuclear strategy, Lawrence Freedman chooses Basil Liddell Hart’s definition of strategy as a departure point: “the art of distributing and applying military means to fulfil ends of policy.” Barry Posen describes military doctrine more generally as the “subcomponent of grand strategy that deals specifically with military means... *What* means shall be employed? and *How* shall they be employed?” These two definitions form a basis for this study’s conception of nuclear doctrine as a state’s avowed policies regarding the military deployment and use of nuclear weapons.⁴⁵

⁴⁵ Freedman, *The Evolution of Nuclear Strategy* 2003, xviii.
Posen, Barry. *The Sources of Military Doctrine*. Ithaca: Cornell University Press, 1984, 13.

There are both normative and instrumental reasons to suspect that arms control should be at least partly predicated on the degree to which nuclear rivals converge or diverge in military nuclear doctrines. Fourth wave deterrence literature suggests that deterrence is a learned concept, reinforced by intersubjective understandings of the purpose served by nuclear weapons and what constitute appropriate thresholds of use and non-use. Assuming that nuclear weapons are acquired for deterrent purposes (and all states that have acquired nuclear weapon have, in one form or another, expressed this sentiment), a state's nuclear doctrine then should be an expression of its belief in the appropriate means to achieve deterrence stability. If two rivals fundamentally disagree in this regard, then it is difficult to imagine how they can reach agreement on a deterrence-stabilizing arms control agenda, beyond perhaps rudimentary confidence building measures intended to prevent misunderstandings and inadvertent escalation. Symmetry or asymmetry in doctrine may also reflect the degree to which "nuclear learning" has taken place between adversaries, through either observation of one another's tacit gestures or actual intellectual exchanges between policymakers and epistemic expert communities.

From an instrumental standpoint, nuclear doctrines influence the choices states make regarding deployed military capabilities. Arms control treaties – particularly limitation or reduction treaties – tend to be give-and-take exercises, in which rival powers barter capabilities in the interest of achieving an acceptable balance. States with differing nuclear doctrines may deploy very different types of forces, from both a qualitative and a quantitative standpoint. A country with limited means of delivery has less to horse trade with a country possessing a diversity of capable systems. States with more transparent force structures may find it challenging to identify an acceptable arms control

compromise with states whose arsenals are more opaque in composition; states with opaque nuclear postures might find it challenging to accept verification measures required by a treaty-seeking rival.

This study focuses on two primary empirical components of nuclear doctrine: first-use policy and doctrinal flexibility. First-use policy indicates the point in a military confrontation at which a country may exercise the use of nuclear weapons – no trivial matter given their destructive potential. Traditionally, nuclear states have been divided between those that maintain the option for nuclear first use in certain circumstances, and those that have declared they will only use nuclear weapons in response to an adversary's first use of nuclear weapons (the “no-first-use” pledge). The United States is an example of the former, while the People's Republic of China is an example of the latter. In practice, the dichotomy is not always so clean cut; significant variations exist among states' declared thresholds, and interpretations of these thresholds are sometimes debated. A state may decide that it will only use nuclear weapons after an adversary's weapons have detonated on its own soil (this is the posture of historical “no-first-use” states); others may opt for a “launch-on-warning” posture, in which nuclear retaliation may be launched as soon as a rival's first strike has been detected. From a strategic interaction standpoint, a state's declared use threshold provides some indication of how it conceptualizes the deterrence “game,” namely whether deterrence will be achieved by firmly defined lines in the sand, or ambiguity and the “threat that leaves something to chance.” It also potentially speaks to the normative baggage placed on nuclear use, namely whether use is a fundamentally distasteful yet necessary last-resort response to an unrestrained and unreasonable nuclear-capable enemy, or potentially has broader

applications in deterring or even compelling adversaries under a range of scenarios – including those presenting less-than-existential threats.

First-use doctrine addresses the question of *when* states will use nuclear weapons; doctrinal flexibility – indicating the variability of circumstances and scenarios in which a state envisions using nuclear weapons – provides some indication of *how* those weapons may be used. Doctrinal flexibility includes both targeting decisions and distinctions between strategic and tactical nuclear weapons. The previous chapter’s review of deterrence literature noted a distinction between “counterforce” and “countervalue” targeting. Counterforce targeting implies the ability and intent to hold the deployed military nuclear assets of an adversary at risk (e.g. missile silos or submarines); countervalue targeting implies the ability and intent to hold a state’s population centers and industry at risk. While in practice these distinctions may be blurry (e.g. in the case of a military airfield located near a civilian population center), counterforce targeting has been historically associated with the deployment of more accurate and responsive capabilities appropriate to a dynamic warfighting environment, while countervalue targeting is associated with more indiscriminate capabilities intended to yield the greatest aggregate level of destruction. These targeting concepts are related, though not interchangeable, with the distinction between strategic and tactical nuclear weapons. In historical parlance, strategic weapons are those intended to be launched from long distances at targets deep within an adversary’s homeland (the targeting may be either counterforce or countervalue), while tactical weapons are intended for use in battlefield applications against an adversary’s military forces (both conventional and nuclear). Doctrinal flexibility is often correlated with first-use posture; no-first-use states often

espouse doctrines suggesting minimal flexibility and an emphasis on strategic forces and countervalue targeting. However, it is possible for a no-first-use state to maintain the option for flexibility in the event it is struck first; the USSR arguably fit this paradigm during the decade in which it adhered to a no-first-use pledge (discussed later in Chapter 4).

From a normative standpoint, doctrinal flexibility speaks to the value a state places on nuclear weapons as military instruments, indicating whether they are primarily political tools, an option of last resort, or merely a maximally destructive endpoint on a spectrum of potentially deployable military capabilities. Flexibility also indicates the degree to which a state believes the deterrence game to be relatively limited in duration – an action-reaction spasm of massively destructive violence – or potentially drawn out across various levels of escalation. From an instrumental standpoint, flexibility signals the types of capabilities a state intends to maintain, and therefore the compromises it is potentially capable of negotiating and accepting through arms control.

Necessary Conditions for Arms Control

Figure 4 (below) summarizes the hypothesized relationship between conditions and outcomes, and the central argument of this study as reflected in its title – “balance of threat, balance of mind.” On the horizontal axis, the balance or imbalance of military forces (primarily nuclear, but potentially also conventional) is reflected. The relative symmetry or asymmetry of nuclear doctrine is reflected on the vertical axis. The additional condition of rivalry intensity is illustrated by the bisection of each grid. Each

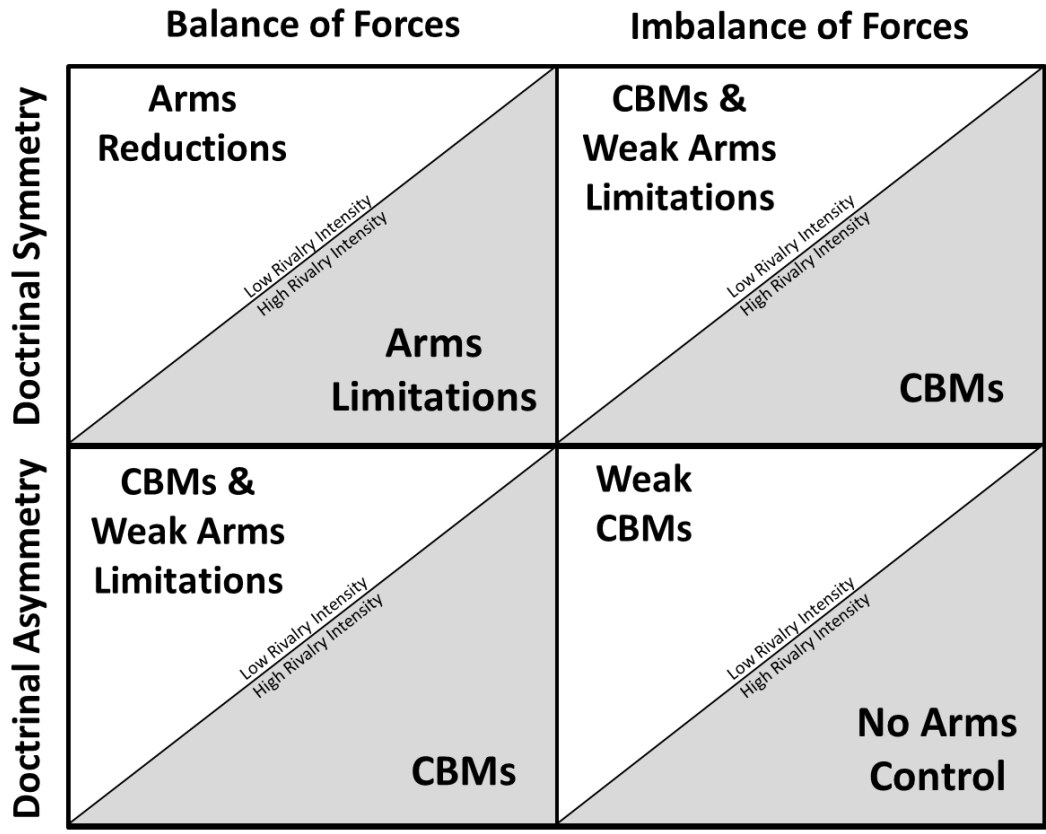


Figure 4: Relationship between Conditions and Outcomes

triangular section of the figure essentially represents an intersection of necessary conditions leading to an outcome.

The achievement of ambitious nuclear arms control, in the form of substantive arms limitations or reductions, comes about from a balance of threat and mind (the upper left quadrant). Reductions require rivals to not only limit their arsenals, but scale back capabilities from existing levels – thus the preexisting force balance is crucial in such situations. Symmetry of doctrine is equally vital; reductions follow from a mutual understanding regarding the role played by nuclear weapons in national security, whether that position is minimalist or somehow more complex. Moreover, a minimum level of confidence in one another’s intentions is required, given that even stringent verification

measures cannot completely eliminate the potential for cheating on an agreement; such confidence would only necessarily emerge in the context of a reduction in rivalry intensity. While rivals on the precipice of war would unlikely to accept a drawdown of forces, ceilings or limitations on the further acquisition of armaments may be agreeable as a means to curb the arms race and limit the damaging effects of potential war. On the opposite end of the spectrum (lower right quadrant), a complete disjuncture of both force and mind is anathema to prospects for control – particularly when combined with high levels of hostility. There is simply too much perceived risk and lack of reciprocated trust in the cooperative intentions of rivals. At lower levels of rivalry intensity, superficial confidence building measures may be feasible, but rivals will most likely be unwilling to undertake more significant commitments.

The upper right and lower left quadrants represent the space where more ambitious, albeit still limited forms of arms control become possible between rivals. Asymmetries may still exist, but rivals are moving closer to one another in either force or mind, creating opportunities for arms control through either mutual confidence in retaliatory power, or mutual agreement on the threshold of nuclear conflict. At high levels of hostility, confidence building measures will be the most likely outcome. Confidence building measures historically served the purpose of “reducing the likelihood of war” (in the words of Schelling and Halperin). Hotlines between capitals, notifications of military tests and exercises, or agreements to refrain from provocative deployment postures serve to prevent accidental escalation toward nuclear war as a result of misperception – a risk that usually follows from rivals existing at the precipice of war. In addition, these measures usually do not require functional limitations or reductions in the

military capabilities of rivals, who are free to continue growth and enhancement of arsenals. Thus, force balance should not be a pre-requisite. Similarly, confidence building arrangements can potentially be reached even if military nuclear doctrines are out of sync (though options may be more constrained depending on the severity of the disjuncture). If hostility can be reduced, however, opportunity may exist not only for confidence building measures, but possibly weak limitations on armaments – for example agreements to refrain from certain types of research (such as limited nuclear test bans) or refraining from deployment of particularly destabilizing weapon systems.

The hypotheses presented in this chapter are informed by existing theory and largely anecdotal empirics; the next step is to undertake a systematic analysis of the relationship between conditions and outcomes. The next chapter will do just this, operationalizing these concepts through fuzzy set analysis of dyadic rivalries from 1949 to the present. It will identify broad patterns that can be addressed in more depth through case study analysis in subsequent chapters.

Chapter 3. Qualitative Comparative Analysis: A First Cut

Fuzzy Set Qualitative Comparative Analysis Overview

The formal methodology of Qualitative Comparative Analysis (QCA) generally takes one of two forms – “crisp set” analysis (csQCA) or “fuzzy set” analysis (fsQCA). The two approaches are related, and an overview of the former aids understanding of the latter. Both methods use a process of logical minimization to identify configurations of necessary and/or sufficient conditions associated with the presence or absence of an outcome. From the standpoint of set-theoretic logic, as described in the previous chapter, both methods attempt to identify overlaps between a case’s outcome (the dependent variable in tactical parlance) and the presence or absence of hypothesized enabling conditions. The two methods differ in how set membership is quantified and then mathematically analyzed.

In crisp set analysis, set membership for the conditions (i.e. independent variables) and outcome (i.e. dependent variable) is measured in purely binary terms. An individual case is assigned a value of 0 or 1 signifying whether the case is fully “outside” or “inside” a particular set, respectively (alternatively, one can think of the condition or outcome as being either “of” or “on”). This determination is based on the researcher’s calibration decisions and reading of empirical evidence. In some cases, this can be a relatively simple determination – coding a country as 1 if it is located in the geographically defined limits of North America or 0 if it is not, for example. In other cases, the decision may be more difficult – for example coding a country as 1 if it is

economically “developed” or 0 if it is still “developing,” most likely based on some subjectively determined economic cutoff point. Crisp set analysis notably does not allow for intermediate measurement points.⁴⁶

Once all of have been assigned values for the presence or absence of conditions and outcomes, this data can be incorporated into a “truth table” (a hypothetical example involving three conditions A, B, and C is illustrated in Table 2 below). The truth table lists all potential combinations of conditions and outcome, whether or not those combinations are actually observed to exist in the population of cases under consideration (in the example, the hypothetical cases are labeled C1, C2, C3, etc...). Next, the researcher assigns cases to rows corresponding with the appropriate combination of conditions, and notes the outcome value associated with that particular combination in the outcome column (assume for the moment no cases exhibit identical combinations but contradictory outcomes – a plausible situation that will be addressed in further detail). In the example illustrated, two combinations are associated with the presence of the outcome – the absence of A, presence of B, and presence of C; and the presence of A, the presence of B, and the presence of C. In the Boolean nomenclature of QCA, these possible combinations may be written as:

$$\sim ABC + ABC \rightarrow X$$

The tilde indicates negation of a condition; the plus sign indicates a relationship of “or”; and the arrow indicates the result of the combination (either outcome X or the

⁴⁶ For further discussion of calibration in QCA, see:
Ragin, *Redesigning Social Inquiry: Fuzzy Sets and Beyond* 2008, 71-105.
Schneider and Wagemann, *Set-Theoretic Methods for the Social Sciences: A Guide to Qualitative Comparative Analysis* 2012, 32-41.

Condition A	Condition B	Condition C	Outcome X	Cases
0	0	0	0	C7
0	0	1	0	C3
0	1	0	0	C4
0	1	1	1	C2, C5, C8
1	0	0	0	C9, C10
1	0	1	0	C11
1	1	0	0	C12
1	1	1	1	C1, C6

Table 2: Example Truth Table

negation thereof). In other words, the combinations of $\sim ABC$ or ABC yield Outcome X. These are referred to as “primitive expressions” because a process of logical minimization has not been applied yet. While a full discussion of logical minimization is beyond the intended scope of this chapter, it is easy to see in this example how it is possible to further reduce the combinations. Outcome X is observed in the presence of both conditions B and C; it is further observed *whether or not* condition A is present. Condition A is therefore logically redundant, while B and C are the “prime implicants” conditioning Outcome X. The original equation can now be rewritten in simplified terms as:

$$A * B \rightarrow X$$

This “parsimonious solution” indicates that the combination of Conditions A and B is necessary and sufficient to reach Outcome X. Both conditions are necessary, but neither is sufficient on its own to achieve Outcome X. Turning to analysis of the *absence* of Outcome X, the following primitive expressions can be constructed:

$$\sim A\sim B\sim C + \sim A\sim BC + \sim AB\sim C + A\sim B\sim C + A\sim BC + AB\sim C \rightarrow \sim X$$

While complicated, these primitive expressions can be further simplified through successive steps of a similar logical minimization process:

$$\sim A\sim B + \sim B\sim C + \sim BC + B\sim C + A\sim B + AB \rightarrow \sim X$$

$$\sim B\sim C + A\sim B \rightarrow \sim X$$

$$\sim B(\sim C + A) \rightarrow \sim X$$

The final solution term indicates that the combination $\sim B\sim C$ (absence B, absence C), *or* the combination $A\sim B$ (presence A, absence B) is sufficient to yield the absence of Outcome X. Importantly, the absence of Condition B is a necessary but not sufficient condition for yielding Outcome X. Both combinations are sufficient to yield Outcome X, but neither combination is by itself necessary. This example is important, because it illustrates the principles of asymmetry and equifinality. It would be tempting, based solely on analysis of the positive outcome, to simply state that since combination BC is necessary and sufficient for observation of the outcome, then combination $\sim B\sim C$ is symmetrically necessary and sufficient for negation of the outcome. However, logical minimization reveals multiple paths to negation – or equifinality (and therefore

asymmetry). A diligent researcher would need to explain the theoretical significance of both combinations.⁴⁷

The example presented assumes the researcher's ability to express conditions and outcomes in binary form. However, observable phenomena in social science often do not allow for simply binary discrimination. Certain concepts – like symmetry between two country's nuclear doctrines – often require more discerning measurement. So-called “fuzzy sets” allow for this granularity. Fuzzy sets allow the researcher to construct a scale on which to measure gradations in set membership for the conditions and outcomes. For example, a scale of 0.0, 0.33, 0.66, and 1.0 would indicate membership as completely out, more out than in, more in than out, and completely in, respectively. The researcher can choose as many scale points as deemed necessary for precise measurement. Researchers are generally encouraged to avoid assigning measurements of 0.5, indicating what has been termed “the point of maximum ambiguity”; while it is theoretically possible – and perhaps in some cases justifiable – to do so, ambiguous values complicate the minimization and analysis process.⁴⁸

Fuzzy set analysis operates according to similar principles as csQCA; the ultimate aim is to similarly construct a truth table of possible and observed combinations, and then logically minimize to identify necessary and/or sufficient combinations. However, the analysis requires a more complex logical minimization process. Because of the measurement gradations, the researcher must identify the degree to which a particular

⁴⁷ For further discussion of logical minimization, see: Schneider and Wagemann, *Set-Theoretic Methods for the Social Sciences: A Guide to Qualitative Comparative Analysis* 2012, 91-114.

⁴⁸ Schneider and Wagemann, *Set-Theoretic Methods for the Social Sciences: A Guide to Qualitative Comparative Analysis* 2012, 28, 100-101.

observed case fits a specific combination of causal conditions and outcomes, by comparison to the other cases (i.e. its place in mathematical space relative to the distribution of all cases across the potential values of the causal conditions). This requires measurement of *consistency*, or the degree to which the observed fuzzy set relationship deviates from a perfect binary set relationship. In csQCA, consistency can also be measured, and is specifically necessary when there is any number of cases displaying identical conditional combinations but different outcomes (also called logical contradictions). When analyzing crisp sets, consistency is simply measured as the number of cases where the conditional combination and an outcome is present, divided by all cases in which the combination is present, or:

$$\text{Consistency of } X \text{ as a sufficient condition of } Y = \frac{\# \text{ of cases where } X=1 \text{ and } Y=1}{\# \text{ of cases where } X=1}$$

For a fuzzy set relationship, consistency measures the sum of the minimum values across the membership scores in condition X and outcome Y, divided by the sum of membership values in X for all cases, or:

$$\text{Consistency}_{\text{Sufficient Conditions}} (X_i \leq Y_i) = \frac{\sum_{i=1}^I \min(X_i, Y_i)}{\sum_{i=1}^I X_i}$$

The researcher must decide a cutoff value at which consistency is high enough to decide whether a condition, or set of conditions, can be considered sufficient to yield the outcome. For fsQCA, Schneider and Wagemann suggest a minimum value of at least 0.75, to be adjusted lower or (preferably) higher depending on the researcher's theoretical claims and the number of available observations. In fsQCA, once the researcher has set the minimum consistency value, all of the cases can be assigned to their best-fitting

conditional combinations, yielding primitive expressions. Logical minimization can be conducted as previously described, yielding parsimonious solutions. An aggregate “solution consistency” can also be calculated, indicating the degree to which the final minimized solution term explains the all of the cases exhibiting the outcome – suggesting something resembling a statistical model’s “goodness of fit.”

The discussion to this point has assumed that for a given pool of cases, every possible combination of conditions is expressed. However, when using actual data – and especially when there are multiple conditions and many possible combinations – it is often the case that some (possibly many) combinations will not be expressed (often referred to as “limited diversity”). These unexpressed combinations are referred to as “logical remainders,” and – since there is no observed relationship between these combinations and the outcome – they cannot be factored into the logical minimization process. A researcher can deal with this in several ways. The researcher might consider re-specifying the model with a smaller number of conditions, or different conditions, that minimize the number of possible combinations and maximize observed diversity; this may not always be feasible, however, for both theoretical and empirical reasons. Another option is to simply minimize as much as logically possible within the combinations empirically expressed, yielding what is termed a “complex” or sometimes “conservative” solution; this may be enough to narrow the possibilities down to an analytically manageable and theoretically satisfying number of combinations.

However, the complex solution may present the researcher with considerable causal heterogeneity that – at least on the surface – seems to say very little of theoretical value. In this case, the researcher may leverage Charles Ragin’s “standard analysis”

procedure. This first involves generation of a “most parsimonious” solution, factoring in all logical remainder combinations that would potentially make the solution more parsimonious, assuming they were associated with the presence of the outcome (this task, complex to explain let alone execute, is usually managed with QCA software). The most parsimonious solution essentially yields the non-negotiable conditions within each of the potential causal pathways. From that point, the researcher can eliminate from the pathways in the complex solution any conditions not in the parsimonious solution – and that conform to theoretically-informed expectations regarding the directionality of the relationship between condition and outcome. This yields an “intermediate” solution that, if generating theoretically insightful results, can be analyzed in combination with the complex and parsimonious solutions.

In addition to consistency, individual causal combinations in both csQCA and fsQCA can be described in terms of their solution *coverage*, indicating the degree to which a particular combination accounts for all instances of the outcome. For crisp sets, coverage is calculated as follows:

$$\text{Coverage of } X \text{ as a sufficient condition of } Y = \frac{\# \text{ of cases where } X=1 \text{ and } Y=1}{\# \text{ of cases where } Y=1}$$

For fuzzy sets:

$$\text{Coverage}_{\text{Sufficient Conditions}}(X_i \leq Y_i) = \frac{\sum_{i=1}^I \min(X_i, Y_i)}{\sum_{i=1}^I Y_i}$$

There is no minimum cutoff point for solution coverage; this measure is always evaluated after the consistency cutoff has been determined and cases have been logically minimized. In situations where a high degree of multicausality and equifinality is present, coverage is likely to vary inversely with consistency. Coverage speaks to the relevance

and explanatory power of individual causal combinations, but is not in and of itself a reason to include or exclude particular combinations in the solution set. In addition to the “raw” coverage yielded by the equations above, it is also useful to calculate “unique” coverage. In many instances (again when real-world data is complex), some cases may be explained by multiple causal combinations. Unique coverage indicates the percentage of cases – out of all those yielding the outcome – that are uniquely explained by a particular combination. Finally, like consistency, the final logically minimized solution can also be evaluated in terms of aggregate “solution coverage,” or the percentage of all cases exhibiting the outcome explained by the solution term.

Measurement and Data

The Unit of Analysis Revisited

As described in the previous chapter, this study focuses on nuclear rivalry dyads – state pairs in which both countries possess nuclear weapons capabilities that presented a directed threat against one another. These include the United States and the Union of Soviet Socialist Republics (1949-1992), the United States and the Russian Federation (1992-Present), the United States and China (1964-Present), China and the Union of Soviet Socialist Republics (1964-1992), China and the Russian Federation (1992-Present), India and Pakistan (1998-Present), and India and China (1998-Present).

A simple fsQCA might examine each dyad as a singular case study, aggregating the decades of interaction and seeking to explain the penultimate arms control outcome achieved as of the present day. Indeed, this approach is often taken when fsQCA is used

in comparative politics research projects – e.g. in explaining transitions to democracy, or the emergence of organized labor movements. While appropriate for explaining such singular events, this approach is less satisfying when applied to analysis of arms control behavior. The nuclear rivalries under consideration have all taken place over the span of multiple decades – in some cases for more than half a century. Arms control initiatives, successes, and failures have emerged and receded within the context of changing strategic conditions, technological developments, leadership administrations, and nuclear strategy choices. Arms control outcomes, and associated causal conditions, may look very different depending on the point in time in which the interaction takes place. Furthermore, analysis of singular dyads would limit the size and diversity of the data set to seven case studies, yielding results of questionable generalizability.

For these reasons, the unit of analysis in the fsQCA is further parsed into nuclear rivalry dyad *regime interaction periods*. In this case, “regime” simply refers to the executive head of government in each country. Typically, these individuals (or groups of individuals) set foreign policy agendas (including arms control initiatives); successes and failures are usually attributed to their leadership. The “interaction period” is the period of time in which a unique pair of rival executives engaged with one another politically. If leadership changed within one country and/or the other at any point, a new dyadic regime interaction period (i.e. case study) is created. The case studies (37 total) are summarized in Table 3 below; each row represents an individual case study. Each of these regime interaction periods represents a discrete opportunity in which arms control could possibly have been achieved between the two rivals. The use of regime interaction periods is admittedly imperfect. There is significant variability in the timescale represented by each

United States	Soviet Union	Time Period
Harry Truman	Joseph Stalin	1949-1952
Dwight Eisenhower	Nikita Khrushchev	1953-1961
John Kennedy	Nikita Khrushchev	1961-1963
Lyndon Johnson	Leonid Brezhnev	1964-1969
Richard Nixon	Leonid Brezhnev	1969-1974
Gerald Ford	Leonid Brezhnev	1974-1977
Jimmy Carter	Leonid Brezhnev	1977-1981
Ronald Reagan	Leonid Brezhnev ¹	1981-1984
Ronald Reagan	Mikhail Gorbachev	1984-1989
George H.W. Bush	Mikhail Gorbachev	1989-1991
United States	Russian Federation	Time Period
George H.W. Bush	Boris Yeltsin	1991-1993
Bill Clinton	Boris Yeltsin	1993-1999
Bill Clinton	Vladimir Putin	1999-2001
George W. Bush	Vladimir Putin ²	2001-2009
Barack Obama	Vladimir Putin ²	2009-2010
United States	People's Republic of China	Time Period
Lyndon Johnson	Mao Zedong	1964-1969
Richard Nixon	Mao Zedong	1969-1974
Gerald Ford	Mao Zedong	1974-1977
Jimmy Carter	Deng Xiaoping	1978-1981
Ronald Reagan	Deng Xiaoping	1981-1989
George H.W. Bush	Deng Xiaoping	1989-1992
Bill Clinton	Jiang Zemin	1993-2001
George W. Bush	Jiang Zemin	2001-2003
George W. Bush	Hu Jintao	2003-2009
Barack Obama	Hu Jintao	2009-2010
Soviet Union	People's Republic of China	Time Period
Leonid Brezhnev	Mao Zedong	1964-1976
Leonid Brezhnev ¹	Deng Xiaoping	1978-1984
Mikhail Gorbachev	Deng Xiaoping	1984-1991
Boris Yeltsin	Jiang Zemin	1992-1999
Vladimir Putin	Jiang Zemin	1999-2003
Vladimir Putin	Hu Jintao	2003-2010
People's Republic of China	India	Time Period
Jiang Zemin	Atal Vajpayee	1998-2003
Hu Jintao	Manmohan Singh	2004-2010
India	Pakistan	Time Period
Atal Vajpayee	Nawaz Sharif	1998-1999
Atal Vajpayee	Pervez Musharraf	1999-2004
Manmohan Singh	Pervez Musharraf	2004-2008
Manmohan Singh	Yousaf Gillani	2008-2010

¹ Also includes the tenure of Yuri Andropov.

² Also includes the tenure of Dmitry Medvedev.

³ While elected prime ministers served during Pervez Musharraf's tenure (including Zafarullah Jamali, Chaudhry Hussain, Shaukat Aziz, Muhammad Soomro, and Yousaf Gillani), he is assumed to be the functional head of state during this time period.

Table 3: Nuclear Rivalry Dyad Regime Interaction Periods

interaction, particularly where certain leaders only lasted a handful of years in office (e.g. Gerald Ford's interaction with Leonid Brezhnev), where incoming/outgoing administrations only overlapped for a brief period (e.g. Bill Clinton and Vladimir Putin), or where rival authoritarian leaders lasted many years in office (e.g. Leonid Brezhnev and Mao Zedong). This study explicitly excludes interactions that lasted one year or less, assuming that one year is hardly sufficient time for even the coziest of rivals to negotiate an arms control accord.

The most logical alternative to this approach would be to use units of time like dyad years or dyad decades. This would overcome the temporal discrepancies created by regime interaction periods, and would be more consistent with statistical best practices. However, this approach was rejected for similar reasons to the singular dyadic approach. Set periods are likely to aggregate, cut across, or otherwise gloss over important political and strategic developments that do not track with artificially imposed temporal divisions. These types of changes are more closely (though still imperfectly) associated with political leadership transitions.

Outcome Measurement and Data

The outcome to be explained is a dyad's commitment to arms control during a given dyadic regime interaction period. For the purposes of fsQCA, the outcome is measured along a six-step intervallic scale from 0.0 to 1.0 (Table 4, below). Dyads achieving scores from 0.6 to 1.0 qualify as more "in" than "out" of the set of dyads that achieved arms control. Scores from 0.0 to 0.4 suggest that a dyad is more "out" than "in"

1.0	Reciprocated reduction and/or elimination of nuclear weapon systems.
0.8	Reciprocated functional capability limitations on the development, acquisition, and/or deployment of nuclear weapon systems (short of actual reduction or elimination of existing systems).
0.6	Reciprocated confidence building measures placing restraint or transparency requirements on the development, acquisition, and/or deployment of nuclear weapon systems (short of functional capability limitations).
0.4	Reciprocated confidence building measures intended to enhance communication and crisis management, but falling short of imposing restraint or transparency requirements on the development, acquisition, and/or deployment of actual nuclear weapon systems.
0.2	Reciprocated confidence building measures of a largely rhetorical or symbolic nature.
0.0	No arms control commitments during the interaction period.

Table 4: Outcome Measurement

of the set of dyads that achieved arms control, though the scale allows for incorporation of outcomes that – while falling short of arms control as defined for the purposes of this study – nonetheless represent qualitatively significant steps in the direction of substantive arms control. Secondary source material was used to code the outcome measurements, including arms control compendiums, online databases, and country or region-specific histories.⁴⁹

The outcome measurement for each dyadic interaction period represents the *highest level of arms control commitment among all agreements or initiatives* during that period. During some interaction periods, rivals may have negotiated a gamut of arms

⁴⁹ See in particular: Goldblat 2002.

Krepon, Michael, and Julia Thompson, . *Deterrence Stability and Escalation Control in South Asia*. Washington, D.C.: Stimson Center, 2013, 9-19.

Fact Sheets: U.S.-Russia Nuclear Forces and Arms Control Agreements. Retrieved June 17, 2015 from the *Arms Control Association*: <http://www.armscontrol.org/factsheets/USRussiaAgreements>

control agreements. For example, the Nixon and Brezhnev governments negotiated both arms limitation measures (SALT and the Anti-Ballistic Missile Treaty) and confidence building measures (the Nuclear Accidents Agreement and Agreement on the Prevention of Nuclear War) during their interaction period. However, the outcome in this period is coded 0.8 to reflect the highest level of arms control commitment achieved under these agreements. The outcomes (and conditions) for each dyadic interaction are summarized in Table 5 below. Additionally, rivalry dyads gain credit for continuing to uphold arms control agreements negotiated in a previous period, albeit with a one-step penalty to reflect the comparative ease of maintaining commitments versus accepting new commitments.

Conditions Measurements and Data

Nuclear Balance

The nuclear balance between rivals is coded as the *average annual ratio of the smaller nuclear arsenal to the larger nuclear arsenal* during the interaction period under consideration, rounded to fit a six-point 0 to 1 scale. While theoretically simple, this measurement is more challenging given available data and issues of technical interpretation specific to each dyad. First, measurement of a nuclear arsenal looks very different depending on whether the researcher considers individual nuclear warheads versus delivery systems. A single nuclear warhead is by no means trivial in terms of destructive power; however, without a capable delivery system (such as an aircraft or missile) military utility is marginal – especially when long distances separate rivals.

Case Study	Conditions					Outcome
	Nuclear Balance (NB)	Conv Balance (CB)	Rivalry Intensity (RI)	First Use Policy (1ST)	Doctrine Flex (FX)	Arms Control Commitment
Truman/Stalin 1949-1952	0	0.6	0.4	0.6	0.0	0.0
Eisenhower/Khrush 1953-1961	0	0.6	0.6	0.6	0.2	0.6
Kennedy/Khrush 1961-1963	0.2	0.8	0.6	0.6	0.4	0.6
Johnson/Brezhnev 1964-1969	0.4	0.8	0.6	0.8	0.4	0.4
Nixon/Brezhnev 1969-1974	1.0	1.0	0.4	0.8	0.4	0.8
Ford/Brezhnev 1974-1977	0.8	0.8	0.2	0.6	0.6	0.6
Carter/Brezhnev 1977-1981	0.8	0.8	0.4	0.6	0.6	0.8
Reagan/Brezhnev 1981-1984	0.8	0.8	0.6	0.4	0.6	0.6
Reagan/Gorbachev 1984-1989	0.8	0.8	0.4	0.4	0.6	1.0
HW Bush/Gorbachev 1989-1991	0.8	0.8	0.2	0.4	0.6	1.0
HW Bush/Yeltsin 1991-1993	0.8	0.6	0.2	1.0	0.8	1.0
Clinton/Yeltsin 1993-1999	0.8	0.4	0.0	1.0	1.0	0.8
Clinton/Putin 1999-2001	0.8	0.4	0.2	1.0	0.8	0.6
W Bush/Putin 2001-2009	1.0	0.4	0.2	0.6	0.6	1.0
Obama/Medvedev 2009-2010	0.6	0.4	0.0	0.6	0.6	1.0
Johnson/Mao 1964-1969	0.0	0.6	0.6	0.0	0.0	0.0
Nixon/Mao 1969-1974	0.0	0.6	0.6	0.0	0.0	0.0
Ford/Mao 1974-1977	0.0	0.8	0.2	0.0	0.0	0.0
Carter/Deng 1978-1981	0.0	0.8	0.0	0.0	0.0	0.0
Reagan/Deng 1981-1989	0.0	0.8	0.0	0.0	0.0	0.0
HW Bush/Deng 1989-1992	0.0	0.8	0.0	0.0	0.0	0.0
Clinton/Jiang 1993-2001	0.0	1.0	0.4	0.0	0.0	0.2
W Bush/Jiang 2001-2003	0.0	0.8	0.4	0.0	0.0	0.0
W Bush/Hu 2003-2009	0.0	0.8	0.2	0.0	0.2	0.0
Obama/Hu 2009-2010	0.0	0.8	0.2	0.0	0.2	0.0
Brezhnev/Mao 1964-1976	0.0	0.6	0.4	0.0	0.0	0.0
Brezhnev/Deng 1978-1984	0.0	0.6	0.2	0.6	0.0	0.0
Gorbachev/Deng 1984-1991	0.0	0.8	0.0	0.6	0.0	0.0
Yeltsin/Zemin 1992-1999	0.0	0.4	0.0	0.0	0.0	0.2
Putin/Jiang 1999-2003	0.0	0.4	0.0	0.0	0.0	0.0
Putin/Hu 2003-2010	0.0	0.2	0.0	0.0	0.0	0.0
Zemin/Vajpayee 1998-2003	0.0	0.4	0.0	1.0	0.0	0.0
Hu/Singh 2004-2010	0.2	0.4	0.2	1.0	0.0	0.2
Vajpayee/Sharif 1998-1999	0.8	0.2	1.0	0.0	0.4	0.8
Vajpayee/Musharraf 1999-2004	1.0	0.2	0.8	0.0	0.2	0.6
Singh/Musharraf 2004-2008	0.8	0.2	0.6	0.0	0.0	0.6
Singh/Gillani 2008-2010	1.0	0.2	0.6	0.0	0.0	0.4

Table 5: Condition and Outcome Values for all Dyad Regime Interaction Periods

However, evaluating equivalencies in delivery systems is itself not a simple task given variability in range, accuracy, and survivability (not to mention that some delivery systems can carry multiple, independently targeted warheads). Secondly, nuclear arsenals are highly sensitive military assets, and countries – especially those with smaller, more vulnerable arsenals – are unlikely to publish authoritative statistics on numbers of warheads or delivery systems (especially if there is no arms control requirement to do so). This study relies on arsenal data furnished by the non-profit Natural Resources Defense Council (NRDC) and the *Bulletin of the Atomic Scientists*; the statistics provided by these sources are widely cited in arms control and nonproliferation literature. Where possible, these organizations rely on official data provided by governments or gleaned from unclassified documents. However, in some cases arsenals can only be estimated based on journalistic accounts, the estimated output of known production facilities, or other secondary sources.⁵⁰

In the case of dyads involving the United States (opposite the USSR, Russia, or China), the measurement used reflects a ratio of *deployed strategic delivery vehicles*, including long-range bomber aircraft, land-based intercontinental ballistic missiles, and submarine-based ballistic missiles. Strategic delivery vehicles are counted given the vast geographic distance separating the home territory of these rivals; warheads only offer strategic military value when paired with a delivery system of intercontinental range (tellingly, delivery systems have been the primary currency of U.S./Soviet and U.S./Russian arms control treaties). As stated, delivery vehicles often do not correlate

⁵⁰ See:

Archive of Nuclear Data. n.d. <http://www.nrdc.org/nuclear/nudb/datainx.asp> (accessed June 17, 2015).
Nuclear Notebook. 2015. <http://bos.sagepub.com/cgi/collection/nuclearnotebook> (accessed June 17, 2015).

1:1 with warheads, and it should be noted that statistics do exist for deployed strategic warheads. However, warheads are as technically variable as delivery systems; questions of how to measure equivalencies (e.g. aggregate warhead payloads – or “throw weights” – for each delivery system, or total yield delivered on target) have vexed strategic planners (and arms control negotiators) throughout the nuclear age. For the sake of simplicity and ease of reproducibility, this study uses delivery vehicles as the basic unit of measure for geographically separated case studies.

The nuclear balance between less geographically separated dyads cannot be easily reduced to strategic delivery systems. Dyads like India and Pakistan, India and China, or Russia and China share geographic borders; warheads do not necessarily require an intercontinental delivery system to reach a rival’s homeland and threaten “strategic” effects. Moreover, in the case of the smaller nuclear powers under consideration (especially India and Pakistan), reliable estimates do not exist for individual delivery systems (observers have attempted to extrapolate warhead counts based on estimated fissile material output). For these reasons, aggregate warhead counts are used to calculate the nuclear balance.

Conventional Balance

The conventional military balance between rivals is similarly calculated as the *average annual ratio of the smaller conventional military capability to the larger conventional military capability* during the interaction period under consideration, rounded to fit a six-point 0 to 1 scale. This measurement is based on a comparison of the

two countries' Composite Index of National Capability (CINC) scores, based on National Material Capabilities data gathered by the University of Michigan Correlates of War (COW) project. The CINC score represents a state's share of aggregate military capabilities in the international system, as derived from measures of total population, urban population, iron/steel production, energy consumption, military personnel, and military spending. The CINC score is only a rough proxy for conventional military capability, as it does not compare more complex (though salient) features of a state's military capacity such as technical sophistication, force readiness, or numbers of individually significant weapon systems like tanks, artillery, aircraft, or ships. However, it is the most thorough data source currently available and continues to be widely utilized in statistical studies of interstate conflict. CINC data is only currently available up to 2007; for the period of 2008-2010, CINC scores were held constant from 2007 levels.⁵¹

Rivalry Intensity

Correlates of War data is also utilized to measure the intensity of rivalry within a dyad during a given interaction period. The Militarized Interstate Dispute (MID) data set compiles year-by-year incidents of militarized conflict, noting dispute participants, duration, and "hostility level," among other statistics. The hostility level of each dispute participant is measured along a 1 to 5 scale indicating 1) no military action, 2) threats to use force, 3) displays of force, 4) uses of force, and 5) war. To calculate rivalry intensity for the fsQCA, each dyad receives a score for the highest level dispute (or max-MID) that

⁵¹ Singer, David, Stuart Bremer, and John Stuckey. "Capability Distribution, Uncertainty, and Major Power War, 1820-1965." In *Peace, War, and Numbers*, edited by Bruce Russett, 19-48. Beverly Hills: Sage, 1972. This study used v4.0 of National Military Capabilities data, which may be found at: <http://www.correlatesofwar.org/data-sets/national-material-capabilities>

occurred in a given year, as an average of the hostility level of the two participants (if no MIDs occurred, a score of 0 is recorded). This max-MID data is then compiled into a 10-year rolling weighted average of annual hostility levels, rounded to fit a six-point 0 to 1 scale. The use of a rolling average (as opposed to simply the annual max-MID) acknowledges the influence of the “shadow of the past” on present-day threat perceptions. Just because two rivals do not experience a militarized dispute in a given year does not mean past disputes are forgotten; it takes time for leaders, governments, and citizens to recover from past indignations and lower their threat perception of a recent enemy.⁵²

Symmetry of First-use Policy and Doctrinal Flexibility

Measurement of nuclear doctrine does not benefit from existing data sources, unfortunately. Assessment of doctrine is inherently qualitative; even seemingly binary concepts, like first-use vs. no- first-use policy, are subject to potential gradations. Drawing on secondary source material – including country studies, policy documents, interviews, and recorded national statements – the symmetry of both first-use policy and doctrinal flexibility within a dyad is measured along a six point scale (Tables 6 & 7, below); these sources and their insights will be discussed in detail in subsequent case study chapters. Wherever possible, this study attempts to assign value based on official

⁵² Ghosen, Faten, and Scott Bennett. "Codebook for the Dyadic Militarized Interstate Incident Data, Version 3.10." *Correlates of War*. 2003. <http://www.correlatesofwar.org/data-sets/MIDs> (accessed June 17, 2015).

Palmer, Glenn, Vito D'Orazio, Michael Kenwick, and Matthew Lane. "The MID4 Data Set: Procedures, Coding Rules, and Description." *Conflict Management and Peace Science*, 2015: Forthcoming. This study used v4.1 of the Militarized Interstate Disputes database, which may be found at: <http://www.correlatesofwar.org/data-sets/MIDs>

1.0	First-use policies are largely identical.
0.8	First-use policies are largely similar, with minor differences suggested by declaratory statements and/or deployed capabilities.
0.6	First-use policies are more similar than dissimilar, though declaratory statements and/or deployed capabilities suggest significant differences.
0.4	First-use policies are more dissimilar than similar, though declaratory statements and/or deployed capabilities suggest certain congruities.
0.2	First-use policies are largely different, with minor similarities in declaratory statements and deployed capabilities
0.0	First-use policies are completely different.

Table 6: Condition Measurement -- Symmetry of First-use Policy

1.0	Doctrinal flexibilities are largely identical.
0.8	Doctrinal flexibilities are largely similar, with minor differences suggested by declaratory statements and/or deployed capabilities.
0.6	Doctrinal flexibilities are more similar than dissimilar, though declaratory statements and/or deployed capabilities suggest significant differences.
0.4	Doctrinal flexibilities are more dissimilar than similar, though declaratory statements and/or deployed capabilities suggest certain congruities.
0.2	Doctrinal flexibilities are largely different, with minor similarities in declaratory statements and deployed capabilities
0.0	Doctrinal flexibilities are completely different.

Table 7: Condition Measurement -- Symmetry of Doctrinal Flexibility

policy statements or other qualitative evidence; where such evidence is lacking, the determination may also be made (particularly in regards to flexibility) based on the doctrine suggested by deployed nuclear capabilities.

Analysis of Necessity

Table 8 summarizes a single-condition analysis of necessity for the outcome of arms control commitment in a given dyadic regime interaction period. Methodological literature suggests a consistency cutoff of at least 0.9 for analysis of single-condition necessity; no single condition meets this threshold. The condition that comes closest is the nuclear balance between rivals, with a consistency measure of 0.83 and a coverage measure of 0.85. A lack of rivalry intensity is the next most consistent condition, registering consistency of 0.75 and coverage of 0.41, followed by the conventional balance (0.7 and 0.43), symmetry of doctrinal flexibility (0.62 and 0.74), and symmetry of first use doctrine (0.62 and 0.65). The preliminary analysis of necessity seems to provide some validation for realist and classical deterrence explanations for arms control as balancing behavior; the data suggests it can only be expected when countries approach parity in capabilities. However, the failure of this condition to meet minimum consistency thresholds is strongly indicative that motivations for arms control are more complicated than the balance of power. In particular, the data suggests that cooperation theories and complementary strategic logics may be just as important.

The second column of Table 8 summarizes the analysis of necessity for a *lack* of arms control commitment during a dyadic regime interaction period. In this case, nuclear imbalance appears to constitute a necessary condition for rivals not to pursue arms control, registering consistency of 0.91 and coverage of 0.90. Lack of symmetry in doctrinal flexibility comes next closest to crossing the 0.9 threshold with consistency of 0.87 and coverage of 0.8. Interestingly, lack of rivalry intensity also approaches the threshold with consistency of 0.82 and coverage of 0.74. It is followed by lack of first-

Condition	Arms Control Commitment		No Arms Control Commitment	
	Consistency	Coverage	Consistency	Coverage
Nuclear Balance	0.83	0.85	0.18	0.31
~Nuclear Balance	0.33	0.19	0.91*	0.90
Conventional Balance	0.70	0.43	0.69	0.71
~Conventional Balance	0.54	0.51	0.45	0.71
Rivalry Intensity	0.52	0.63	0.34	0.70
~Rivalry Intensity	0.75	0.41	0.82	0.74
First Use Symmetry	0.62	0.65	0.29	0.52
~First Use Symmetry	0.54	0.31	0.80	0.78
Flexibility Symmetry	0.62	0.74	0.25	0.50
~Flexibility Symmetry	0.58	0.31	0.87	0.80

Table 8: Analysis of Necessity

use symmetry (0.8 and 0.78). These results again (and even more strongly) support the centrality of the nuclear strategic balance, suggesting that lack of such a balance is a necessary condition for countries not to undertake arms control commitments. However, the results indicate even greater significance for the role of doctrine – namely that divergence in both first-use policies and doctrinal flexibility lead to a null outcome. Probably most interestingly, a lack of rivalry intensity is associated with both positive and negative arms control outcomes – a phenomenon meriting further exploration and explanation. The analysis of necessity is a first cut at identifying key conditions or variables in the causal relationship. However, it does not provide insight beyond univariate relationships, which requires truth table analysis and logical minimization.

Analysis of Sufficiency

Arms Control Commitment

Table 9 summarizes the complex solution set for the analysis of sufficiency for arms control commitments between rivals in a given regime interaction period. Each row indicates a causal combination meeting the minimal threshold of consistency (the full truth table, containing all possible combinations and associated consistency values, can be found in the appendix). For analysis of sufficiency, practitioners make allowance for a more relaxed consistency cutoff; this study uses 0.75 (though it should be noted that most results presented meet or exceed a stricter 0.85 cutoff). In order to make the tables more legible, an asterisk indicates a relationship of “and” between two conditions. A tilde indicates the negation of that particular condition. Measures are included for consistency, raw coverage, and unique coverage. The last column lists the case studies consistent with the causal combination and associated outcome. Highlighted case studies indicate ones that are uniquely explained by a specific causal combination.

Regarding positive arms control commitments, five causal combinations meet the consistency threshold. The first – and one of the two most consistent combinations (score 1.0) – is the nexus of nuclear balance, conventional balance, and mixed symmetry and asymmetry on the two elements of doctrine considered. Notably, this combination (erring in the direction of mutual strength and at least a partial balance of mind) uniquely covers two of the most dramatic periods in U.S.-Soviet arms control – interactions between the administrations Ronald Reagan and Mikhail Gorbachev (yielding the INF treaty), and later George H.W. Bush and Gorbachev (yielding START I). It also covers interaction between Reagan and Leonid Brezhnev, though the only commitments at that time were continuing obligations under the SALT agreements. The other perfectly consistent combination includes nuclear balance, conventional balance, lack of militarized hostility,

Causal Combination	Consist	Raw Cov	Unique Cov	Consistent Cases
NB*CB*~1ST*FX	1.00	0.32	0.04	Reagan/Brezhnev Reagan/Gorbachev Bush/Gorbachev
NB*~RI*1ST*FX	0.97	0.51	0.09	Ford/Brezhnev Carter/Brezhnev Bush/Yeltsin Clinton/Yeltsin Clinton/Putin W Bush/Putin Obama/Putin
NB*CB*~RI*1ST	1.00	0.43	0.01	Nixon/Brezhnev Ford/Brezhnev Carter/Brezhnev Bush/Yeltsin
~NB*CB*RI*1ST*~FX	0.79	0.22	0.07	Eisenhower/Khrushchev Kennedy/Khrushchev
NB*~CB*RI*~1 ST *~FX	0.90	0.28	0.13	Vajpayee/Sharif Singh/Musharraf

Solution Consistency	0.89
Solution Coverage	0.80

Table 9: Analysis of Sufficiency, Arms Control Commitment (Complex Solution)

and symmetry of first-use doctrine. This combination is uniquely associated with the SALT negotiating period under Richard Nixon and Brezhnev; it also redundantly accounts for the SALT periods involving the Ford and Carter administrations. A combination of nuclear balance, lack of hostility, and symmetrical doctrine accounts for all of the post-Cold War U.S.-Russian interactions – uniquely in fact, with the exception of those that briefly took place between George H.W. Bush and Boris Yeltsin.

It is neither uncommon nor necessarily problematic for case studies to be explained by multiple causal combinations; indeed, this is reflective of the ambiguities inherent in both quantitative and qualitative analysis (regardless of methodology). It is up to the researcher to interpret fsQCA results through a theoretically and empirically informed lens. The analysis is highly suggestive that dramatic nuclear arms control breakthroughs (like SALT under Nixon/Brezhnev, INF under Reagan/Gorbachev, and

START under Bush/Gorbachev), in which significant limitations or reductions were negotiated with minimal precedent, followed from mutual conventional and nuclear strength in combination with at least some symmetry of nuclear doctrine – a balance of force and mind. The evidence is also suggestive that a lack of rivalry intensity further facilitates limiting and reductive arms control, whether the ambitious initiatives previously cited, or qualitative and quantitative enhancements to existing arms control paradigms – namely the cases of post-Cold War U.S.-Russia arms control. Indeed, subsequent analysis will argue that lack of rivalry intensity was an important facilitator for arms control in the 1990s, allowing Russian cooperation even as conventional military power precipitously diminished following the Soviet collapse. It should not be surprising then that overlap exists between sets of cases; however, careful qualitative analysis can better differentiate between unique subsets.

Both periods in which Indian and Pakistani leaders reached agreement on confidence building gestures are associated with nuclear balance, conventional imbalance, high rivalry intensity, and a complete disjuncture in doctrine (with a relatively high consistency of 0.90). Periods of confidence building between the United States and the Soviet Union during the late 1950s and early 1960s are also associated with force imbalances (though nuclear, as opposed to conventional), high rivalry intensity, and at least partial asymmetry in doctrine. Both of these combinatory patterns importantly suggest that some level of arms control is feasible even between militarily unequal rivals under conditions of militarized hostility, and even divergent thinking on the role of nuclear weapons – though the measures negotiated are largely intended to prevent

inadvertent war outbreak and are unlikely to yield dramatic limitations, and certainly not arsenal reductions.

Ultimately, the evidence suggests three broad paradigms for arms control behavior between rivals. The first, evidenced by the South Asian and early U.S.-Soviet cases is arms control as a means of “hostile stabilization”; nuclear rivals facing destabilizing imbalances, recurring militarized crises, and divergent nuclear doctrines may nonetheless pursue limited arms control measures aimed at stabilizing relations and preventing uncontrolled escalation toward war. The second paradigm is one of “cold balancing”, in which rivals have approached a point of nuclear (and likely also conventional) parity. Just as important, the rivals have also reached parity in their thinking on the role of nuclear weapons in the deterrent relationship. This combination creates space for more ambitious attempts at stabilizing the arms race through quantitative of qualitative limitations, and possibly even modest reductions. When these conditions are combined with consistently pacific relations, a process of “equilibrium maintenance” sets in; further arms control serves to maintain the balance of force (and possibly also mind). Importantly, this combination does not seem to provide incentive for evolution toward more ambitious arms control – even ostensibly “new” initiatives (like U.S.-Russian treaties introduced during the Bush/Putin and Obama/Medvedev/Putin periods) largely perpetuate previous arms control trends.

It is notable that the complex solution set, which hues most closely to the empirical record, offers the most theoretically satisfying explanation for states’ pursuit of arms control. With the exception of intriguing complexity in the relationship between militarized hostility and arms control, these three archetypes largely comport with

Causal Combination	Consist	Raw Cov	Unique Cov	Consistent Cases	
NB	0.85	0.83	0.58	Nixon/Brezhnev Ford/Brezhnev Carter/Brezhnev Reagan/Brezhnev Reagan/Gorbachev Bush/Gorbachev Bush/Yeltsin	Clinton/Yeltsin Clinton/Putin W Bush/Putin Obama/Putin Vajpayee/Sharif Singh/Musharraf
CB*RI*1ST	0.85	0.32	0.07	Eisenhower/Khrushchev Kennedy/Khrushchev	

Solution Consistency	0.90
Solution Coverage	0.82

Table 10: Analysis of Sufficiency, Arms Control Commitment (Intermediate Solution)

hypotheses from the previous chapter. The intermediate solution (Table 10 above), involving greater reductionism based on harder assumptions of causal directionality and assumed relationships with logical remainders, yields results of less interesting theoretical insight. It does lend further emphasis to the importance of nuclear balance as a key causal variable; inclusion of this condition alone generates a consistency value of 0.85 and explains a majority of the historical arms control cases (though excluding early U.S.-Soviet cases in which a nuclear imbalance existed; these require a more complex explanation involving conventional balance, high rivalry intensity, and agreement on first-use policy).

Lack of Arms Control Commitment

By contrast to explaining positive arms control developments, the complex solution is less useful in explaining null arms control outcomes (Table 11). The analysis yields three combinations of relatively high consistency (0.93), but little unique

Causal Combination	Consist	Raw Cov	Unique Cov	Consistent Cases	
$\sim\text{NB}^*\text{CB}^*\sim\text{1ST}^*\sim\text{FX}$	0.93	0.53	0.04	Johnson/Mao Nixon/Mao Ford/Mao Carter/Deng Reagan/Deng Bush/Deng	Clinton/Jiang W Bush/Jiang W Bush/Hu Obama/Hu Brezhnev/Mao
$\sim\text{NB}^*\sim\text{RI}^*\sim\text{1ST}^*\sim\text{FX}$	0.93	0.59	0.10	Ford/Mao Carter/Deng Reagan/Deng Bush/Deng Clinton/Jiang W Bush/Jiang	W Bush/Hu Obama/Hu Brezhnev/Mao Yeltsin/Jiang Putin/Jiang Putin/Hu
$\sim\text{NB}^*\text{CB}^*\sim\text{RI}^*\sim\text{FX}$	0.93	0.54	0.04	Truman/Stalin Ford/Mao Carter/Deng Reagan/Deng Bush/Deng Clinton/Jiang	W Bush/Jiang W Bush/Hu Obama/Hu Brezhnev/Mao Brezhnev/Deng Gorbachev/Deng
$\sim\text{NB}^*\sim\text{CB}^*\sim\text{RI}^*\text{1ST}^*\text{FX}$	0.76	0.14	0.06	Vajpayee/Jiang Singh/Hu	

Solution Consistency	0.93
Solution Coverage	0.75

Table 11: Analysis of Sufficiency, Lack of Arms Control (Complex Solution)

explanatory power; many cases are redundantly captured by two if not three combinations. Clearly, a lack of nuclear balance is a key condition necessarily associated with lack of arms control; disagreement regarding doctrine is also a consistent feature. However, the relationship between arms and other factors – namely the conventional balance and rivalry intensity – is less clear from the results. The most unique relationship is evidenced by the two China/India case studies, which appear to owe their lack of arms control to a combination of military imbalance (both nuclear and conventional), lack of hostility, and (interestingly) agreement on nuclear doctrine.

The ambiguous complex solution suggests further insight might be gained from greater reductionism, and the indeed the intermediate solution (Table 12) paints a

Causal Combination	Consist	Raw Cov	Unique Cov	Consistent Cases	
~NB*~CB*~RI	0.90	0.38	0.06	Yeltsin/Jiang Putin/Jiang Putin/Hu	Vajpayee/Jiang Singh/Hu
~NB*~RI*~FX	0.93	0.66	0.05	Truman/Stalin Ford/Mao Carter/Deng Reagan/Deng Bush/Deng Clinton/Jiang W Bush/Jiang W Bush/Hu	Obama/Hu Brezhnev/Mao Brezhnev/Deng Gorbachev/Deng Yeltsin/Jiang Putin/Jiang Putin/Hu
~NB*~1ST*~FX	0.93	0.71	0.11	Johnson/Mao Nixon/Mao Ford/Mao Carter/Deng Reagan/Deng Bush/Deng Clinton/Jiang	W Bush/Jiang W Bush/Hu Obama/Hu Brezhnev/Mao Yeltsin/Jiang Putin/Jiang Putin/Hu
Solution Consistency	0.93				
Solution Coverage	0.83				

Table 12: Analysis of Sufficiency, Lack of Arms Control (Intermediate Solution)

somewhat clearer (though still rather ambiguous) picture. Most interestingly, the China/India cases are re-binned in the intermediate solution with post-Cold War Russia/China cases, sharing a combination of military imbalance (conventional and nuclear) and lack of hostility. The remaining cases are explained by a combination of nuclear imbalance, lack of rivalry, and lack of agreement on doctrinal flexibility; and/or a combination of nuclear imbalance and asymmetry across both first-use policy and doctrinal flexibility. Most of the U.S./China dyads can be explained by these two combinations interchangeably, with the exception of interactions between the Johnson and Nixon administrations and Mao Zedong, which appear best explained by the dual asymmetry of nuclear force and mind alone. Most of the USSR/China and Russia/China cases are also interchangeable in this manner, though late Soviet interactions with Deng

Xiaoping (when Chinese-Soviet relations warmed following the chill of the 1970s) are uniquely explained by the lack of rivalry intensity in combination with the asymmetries.

Overall, these results suggest (though perhaps less conclusively) two broad paradigms of null arms control between nuclear rivals. The first, encompassing the China/India and Russia/China case studies, is a situation of “pacific asymmetry” in which the rivalry is not particularly intense, but gross asymmetries in nuclear capability exist. The second is the concept of a “dually reinforcing asymmetry,” in which rivals enjoy neither balance in nuclear forces nor their doctrinal approach; in certain cases lack of rivalry intensity may also contribute to the null outcome. With the notable exception once again of rivalry intensity, these two paradigms are not inconsistent with previously theory and hypotheses; they both point to the importance of strategic balance, and the latter (which accounts for most cases) is consistent with an imbalance of force/imbalance of mind interpretation of failure to pursue arms control.

Conclusions

Fuzzy set QCA provides a systematic and qualitatively informed heuristic framework for understanding the complex relationship between conditions and outcomes. Definitive conclusions should only be drawn based on a conversation between the fsQCA results and a more thorough reading of the qualitative evidence; this will be the focus of subsequent chapters. Nonetheless, a handful of preliminary conclusions can be drawn from the results presented so far:

Nuclear parity is often necessary, though not sufficient for rivals to pursue arms control. In a sense, the fuzzy set analysis suggests that realism and classical deterrence theory represent the first hurdle for arms control; rivals are unlikely to reach agreement on arms control if wide disparities exist in military capabilities. Examples of arms control under nuclear asymmetry exist, but the agreements negotiated were modest and in some cases fragile. The Eisenhower-Khrushchev test moratorium collapsed, while measures negotiated between Khrushchev and Kennedy in 1963 were extremely limited in the constraints placed on the two sides. It wasn't until the two parties reached a semblance of parity in the 1970s that the SALT agreements became possible. In all other cases (including South Asia), nuclear arms control has followed from conditions of nuclear balance. It is worth emphasizing that the causal mechanism at work may be more complicated than just a rationalist calculation of relative power or capability. Scott Sagan has suggested a significant normative component to the pursuit of nuclear weapons, positing that national pride plays an important role; pride may similarly be tied into desires for nuclear parity.⁵³

More ambitious nuclear arms control, including substantive arms limitations and reductions, is facilitated by a balance of both force and mind on the part of rivals. While nuclear parity can account for the vast majority of arms control case studies, it does not permit differentiation between modest confidence building achievements and those of more lasting durability. The evidence is strongly suggestive that more dramatic accomplishments require at least partial

⁵³ Sagan, *Why Do States Build Nuclear Weapons? Three Models in Search of a Bomb* 1996/97.

normative consensus on the operative elements of nuclear deterrence; this is consistently associated with rivals that achieved arms limitations and reduction measures. The data is silent as to whether such consensus comes about from independently reached conclusions, a process of tacit signaling and agreement, or an explicit back-and-forth of ideas; this requires a more qualitative examination of the empirical record.

Transformative arms control is usually implemented when parties negotiate from a position of mutual strength (both conventional and nuclear), coupled with doctrinal parity. The evidence suggests that breakthrough arms control initiatives like SALT, INF, and START – initiatives that broke the mold of existing paradigms and led to truly significant limitations or reductions in weapons – followed from rivals’ mutual strength in terms of both conventional and nuclear capabilities. These breakthroughs were similarly facilitated by some level of agreement on doctrinal issues, though not necessarily complete symmetry.

Equilibrium maintenance is best served by a combination of pacific relations, nuclear force balance, and strong agreement on doctrinal issues. Importantly, this holds true even in the presence of a substantive conventional force imbalance, as is the case with post-Cold War U.S.-Russia arms control. However, it is not clear to what extent this set of conditions facilitates ambitious or transformative

new initiatives; evidence from the past two decades of U.S.-Russian relations (to be discussed in detail in the next chapter) suggests it is not promising.

The relationship between militarized hostility and arms control is not linear.

This is one of the more interesting insights from the fsQCA. Evidence suggests that militarized hostility may in some cases actually provide a window of opportunity for arms control, as evidenced by early U.S.-Soviet cases and recent history on the Asian subcontinent. This impetus may arise internally, reflecting a desire on the part of rivals to prevent catastrophe; the impetus may also owe to external pressures, namely from foreign powers with stakes in the conflict (this duality is particularly salient in the India/Pakistan case study discussed in Chapter 5). The analysis further suggests that consistently pacific relations are associated with rivals that never pursue arms control, like China and Russia or China and India. If nuclear rivals perceive little near term risk of military conflict, they may see less incentive for arms control; asymmetries in military balance or doctrine may further reinforce a non-arms controlling equilibrium. However, the evidence also indicates that declining hostility is associated with more dramatic forms of arms control, and is particularly important in the context of equilibrium maintenance; it seems that cooperative reciprocity provides an important underpinning for long term arms control between rivals.

Modest nuclear arms control is possible under conditions of extreme hostility, divergent nuclear doctrines, and even military imbalance – though

within limits. It is important to emphasize this point, as arms control critics like Colin Gray have been apt to suggest that arms control is rarely possible when it is most needed (i.e. when rivals are at the precipice of military conflict). This is true to the extent that arms control is strictly defined in terms of quantitative reduction measures. However, if one assumes a more inclusive definition encompassing all potential measures to limit or mitigate military conflict, then it becomes clear that space for arms control exists even between bitterly feuding rivals. The evidence indicates that it is a limited space allowing primarily for confidence building and modest limitations – but it is a significant space nonetheless.⁵⁴

The fsQCA provides compelling longitudinal evidence in support of these conclusions. However, this evidence must also withstand the test of deeper qualitative analysis. Fuzzy set QCA is not intended to generate standalone conclusions, nor act as a substitute for in-depth research. It represents a first cut at dissecting historical data and identifying broad relationships between causal conditions and resulting outcomes; to paraphrase Charles Ragin, it is only one component of the “dialogue of ideas and evidence.” The results of the analysis suggest complex, multi-causal dynamics best illustrated through detailed parsing of individual case studies – the methodological approach of “process tracing.” Alexander George and Andrew Bennet describe process tracing as a method that “attempts to identify the intervening causal process – the causal chain and causal mechanism – between an independent variable (or variables) and the outcome of the independent variable.” This is particularly crucial in the context of an argument predicated on fsQCA, as the formal methodology itself only suggests

⁵⁴ Gray, Colin. *House of Cards: Why Arms Control Must Fail*. Ithaca: Cornell University Press, 1992.

conditional relationships; it does not, however, explicitly identify causality. George and Bennet note that process tracing is useful for considering “the alternative paths through which the outcome could have occurred,” and provide the basis for charting a “repertoire of causal paths that lead to a given outcome and the conditions under which they occur.” In other words, process tracing is the natural qualitative counterpart to formal set theoretic analysis.⁵⁵

George and Bennet further describe a “building block” approach to case study research in which “studies of particular types or subtypes of a phenomenon identify common patterns.” This approach is particularly consistent with set theoretic approaches to social science (like QCA) in which, rather than attempting to attribute causality to a single overarching theory or paradigm, the researcher is examining how case studies fit within a typology of configurationally organized theories. In George and Bennet’s words, each case study subtype “fills a ‘space’ in the overall...typological theory.” The remaining chapters will qualitatively examine three key subtypes of arms control relationship as identified through the fsQCA. Each case speaks to variation among the three primary dimensions of analysis in this study (the balance of forces, militarized hostility, and congruence in doctrine), and each represents three distinct variations in causal combinations and gradation in the outcome.⁵⁶

The next chapter will address the arms control relationship between the United States and Russia following the Cold War. Special attention will be given to

⁵⁵ Brady, Henry, and David Collier. *Rethinking Social Inquiry*. New York: Rowman & Littlefield, 2004, 125.

George, Alexander, and Andrew Bennett. *Case Studies and Theory Development in the Social Sciences*. Cambridge: MIT Press, 2005, 205-210.

⁵⁶ George and Bennett, *Case Studies and Theory Development in the Social Sciences* 2005, 76-79.

developments that took place between the Bush/Yeltsin and Clinton/Yeltsin administrations following the breakup of the Soviet Union, as the nuclear rivalry transitioned from two decades of “cold balancing” to a period of “equilibrium maintenance.” The post-Cold War U.S.-Russia case studies represent what Carsten Schneider and Ingo Rohlfing term “most typical cases” – they display maximal scores on both the outcome (arms control) and on key conditional indicators within their explanatory subset of equilibrium maintenance (namely nuclear balance and symmetry of doctrine). Given the strength of the observed relationships, along with a comparative wealth of data by comparison to other dyads, these cases readily facilitate process tracing and illustration of causal mechanisms.⁵⁷

Chapter 5 will explore developments between India and Pakistan immediately following their 1998 nuclear tests, when the two rivals engaged in a turbulent period of “hostile stabilization” leading to modest arms control gains. These again represent “most typical” examples of their subset. From a comparative process tracing standpoint, they also present an opportunity to examine dissimilar outcomes within the larger subset of dyads that achieve arms control; the post-1998 India/Pakistan case studies register minimally in terms of arms control outcomes, particularly by comparison to the U.S./Russia cases previously cited. For purposes of comparative process tracing, Schneider and Rohlfing suggest maximizing “the difference of the cases’ set membership in the superset and the subset,” with the “inferential aim” of establishing a causal mechanism between condition and outcome and demonstrating the directional relationship across varying levels of both. Among post-Cold War arms control case

⁵⁷ Schneider, Carsten, and Ingo Rohlfing. "Combining QCA and Process Tracing in Set-Theoretic Multi-Method Research." *Sociological Methods and Research* 42, no. 4 (2003): 581.

studies, those involving the United States and Russia on the one hand, and India and Pakistan on the other, probably exhibit these differential tendencies most dramatically. Both have achieved arms control (the outcome), but to very different degrees. In terms of causal conditions, both exhibit similarity in regards to a symmetry of nuclear forces (though with important qualitative differences), but vary inversely (and starkly) in terms of hostility dynamics and doctrinal symmetry. Comparative process tracing provides a means to demonstrate the causal processes that separate arms control outcomes under more volatile conditions of hostile stabilization, compared to the steadier (those still occasionally dynamic) paradigm of equilibrium maintenance.⁵⁸

While the fsQCA did not contribute as strongly to understanding of null arms control outcomes, it is still worth examining at least one of the subtypes suggested by the results. The United States and China, throughout most dyadic interaction periods, represent most typical examples of “dually reinforcing asymmetry.” The two sides throughout history have varied inversely in terms of both raw numbers of nuclear weapons and strategic delivery systems, as well as their doctrine for employing those systems. Chapter 6 will explore these dynamics with a special emphasis on relations in the immediate post-Cold War period, when relations between the two rivals experienced new challenges following the collapse of U.S.-Soviet bipolarity. George and Bennet caution against case selection that deviates from reasoned comparative analysis, particularly the tendency to select examples that are merely “interesting” or “important” (ostensibly for reasons other than the advancement of social science). However, it is hard to pass over analysis of this dyad from the standpoint of policy relevance alone, as the

⁵⁸ Schneider and Rohlfing, *Combining QCA and Process Tracing in Set-Theoretic Multi-Method Research* 2003, 583.

nuclear relationship between the United States and China will arguably be one of the most significant of the twenty-first century – whether or not the two countries ever reach an understanding on strategic stability through arms control.⁵⁹

⁵⁹ George and Bennett, *Case Studies and Theory Development in the Social Sciences* 2005, 83-84.

Chapter 4. Equilibrium Maintenance: The United States and Russia after the Cold War

The formal dissolution of the Soviet Union in December 1991 bookended an arms race in which the competitors amassed seemingly limitless destructive potential. The number of warheads and delivery systems possessed by the two rivals at the close of the Cold War was staggering, despite considerable political capital spent over four decades attempting to curb the action-reaction cycle of armament. According to NRDC estimates, the Russian Federation and its former satellites (Belarus, Kazakhstan, and Ukraine) inherited a stockpile of approximately 35,000 nuclear warheads – a total including strategic and tactical warheads, as well as obsolete or treaty-controlled warheads awaiting dismantlement. The United States stockpile (again based on NRDC estimates) stood at more than 20,000 warheads. Those numbers didn't even represent peak output; the U.S. arsenal peaked at more than 32,000 warheads during the mid-1960s, while the Soviet total exceeded 40,000 by the mid-1980s.

As a function of distance and politics, “strategic” nuclear arms (i.e. warheads and intercontinental delivery systems capable of reaching one another's territory) were the currency of formal nuclear arms control during the Cold War, and continue to be into the present. The former Soviet strategic stockpile in 1992 totaled nearly 10,000 warheads, married to delivery systems that included 950 intercontinental ballistic missiles (ICBMs), 628 submarine-launched ballistic missiles (SLBMs) on 40 vessels, and 112 long range

bomber aircraft. The opposing U.S. arsenal included more than 8,000 warheads apportioned across 550 ICBMs, 488 SLBMs on 24 vessels, and 158 bombers.⁶⁰

When Boris Yeltsin entered office, a framework for limiting and reducing the two arsenals had been negotiated by his predecessor and awaited ratification by the newly elected Duma. The Treaty between the United States of America and the Union of Soviet Socialist Republics on Strategic Offensive Reductions (START I) mandated that deployed strategic forces not exceed 6,000 warheads and 1,600 delivery platforms. The numbers negotiated still left the rivals with more than enough megatonnage to destroy one another multiple times over. Moreover, START I did not mandate (nor has any treaty since) the actual destruction of nuclear warheads themselves. Technical verification disputes that continue into the present day only allowed for reciprocal confirmation of the presence or absence of warheads on deployed delivery systems.⁶¹

Nonetheless, START I was historic in that it signaled a true rolling back of the arms race and at least notional acceptance by both parties of parity in strategic nuclear capabilities. Previous agreements negotiated under the Strategic Arms Limitation Talks (SALT) had only placed upward bounds on certain delivery systems; under SALT I, the parties hadn't even reached some of those bounds at the time of signing. SALT I incorporated minimal verification provisions, essentially leaving the task to surveillance through national technical means (NTM), and it allowed the parties ample maneuvering room to enhance and reconfigure arsenals within specified limits. By contrast, START I placed definitive quantitative and qualitative limits on strategic arsenals that required

⁶⁰ Norris and Cochran, *Nuclear Weapons Databook: US-USSR/Russian Strategic Offensive Forces 1945-1996*, 1997.

⁶¹ "Treaty Between the United States of American and the Union of Soviet Socialist Republics on Further Limitation and Reduction of Strategic Offensive Arms (START I)." *Federation of American Scientists*. 1991. <http://www.nti.org/treaties-and-regimes/treaties-between-united-states-america-and-union-soviet-socialist-republics-strategic-offensive-reductions-start-i-start-ii/> (accessed January 31, 2015).

verifiable dismantlement of excess systems on both sides. While physical dismantlement of warheads was not required, the reductions in delivery systems (along with budget pressures) eventually provided both powers with ample justification to eventually dismantle excess warheads no longer serving an overt strategic purpose.⁶²

START I formally entered into force in 1994, and the framework it established is the point of departure for this study's analysis of modern U.S.-Russia arms control dynamics. However, it is important to provide some background regarding how the two countries came to the point of equilibrium maintenance in the 1990s – both in terms of reaching a balance of force and a balance of mind. The U.S.-Soviet Cold war experience constitutes a significant portion of the dyadic regime case studies considered in the previous chapter's longitudinal QCA, contributing significantly to theory development in this study. Moreover, the generalizability of those theoretical conclusions hinges significantly on the degree to which meaningful comparisons can be consistently demonstrated across the pre- and post-Cold War case studies.

U.S.-Soviet Arms Control: From Hostile Stabilization to Cold Balancing

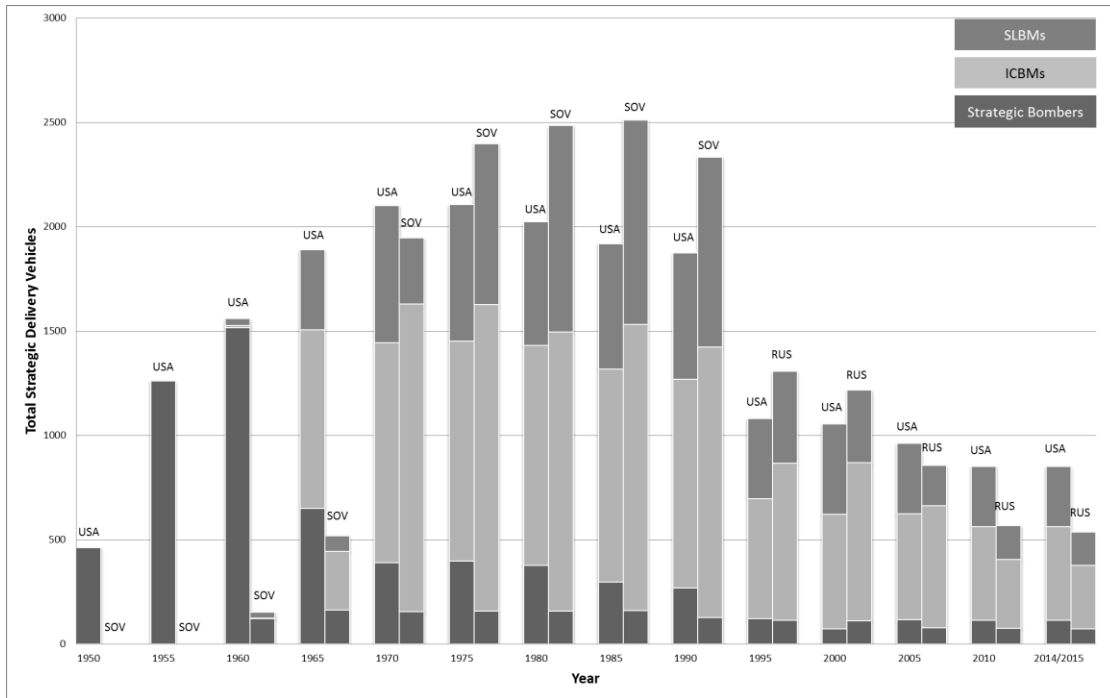
START I represented the dénouement of more than two decades of “cold balancing” on the part of the United States and the Soviet Union, a process initiated through the SALT talks and facilitated by a coming together of both force and mind on the part of the adversaries. By virtue of discovering the atomic bomb first and ending

⁶² For further background on the negotiation and parameters of SALT I and II, see: Garthoff, Raymond. *Detente and Confrontation: American-Soviet Relations from Nixon to Reagan*. Washington, D.C.: The Brookings Institution, 1985.
Goldblat 2002, 80-83.
Lebovic 2013, 64-131.

World War II on an overwhelming advantageous economic and industrial footing, the United States staked an early – and dramatic – lead in the arms race of the 1950s and 1960s. The disparity is readily apparent from Figure 5, below. By 1960, the United States could muster nearly 1,600 state-of-the-art delivery platforms (mostly strategic bombers) capable of reaching Soviet targets with an arsenal of 7,000 available warheads. Despite the alleged U.S.-Soviet “missile gap” leveraged to advantage by John F. Kennedy in the 1960 presidential election, the Soviet Union could (at best) muster 121 delivery systems and 400 warheads – mostly in the form of bombers only realistically capable of a one-way trip to the United States (where they would encounter formidable air defenses). Only a handful of Soviet ICBMs (perhaps less than half a dozen) were operational by 1960, liquid fueled missiles requiring extensive preparation time for launch and hardly representing a quick reaction deterrent capability. These strategic weapon system totals also obscured a massive disparity in non-strategic systems between the two powers. The U.S. non-strategic stockpile stood at more than 13,000 warheads, versus 1,200 Soviet warheads. Importantly, many U.S. warheads could be forward-deployed on aircraft and intermediate range missile systems in Europe, effectively putting the Soviet homeland within range of these “tactical” systems. These disparities at least partly drove Nikita Khrushchev to deploy missiles to Cuba in 1963.⁶³

The Cuban Missile Crisis was a watershed event for U.S.-Soviet “hostile stabilization.” Threats of nuclear retaliation had been traded in previous altercations, but the actual potential for use was never perceived to be as high as the crisis of 1963. It was abundantly clear that the current superpower dynamic was untenable. However, given the

⁶³ Norris and Cochran, Nuclear Weapons Databook: US-USSR/Russian Strategic Offensive Forces 1945-1996, 1997.

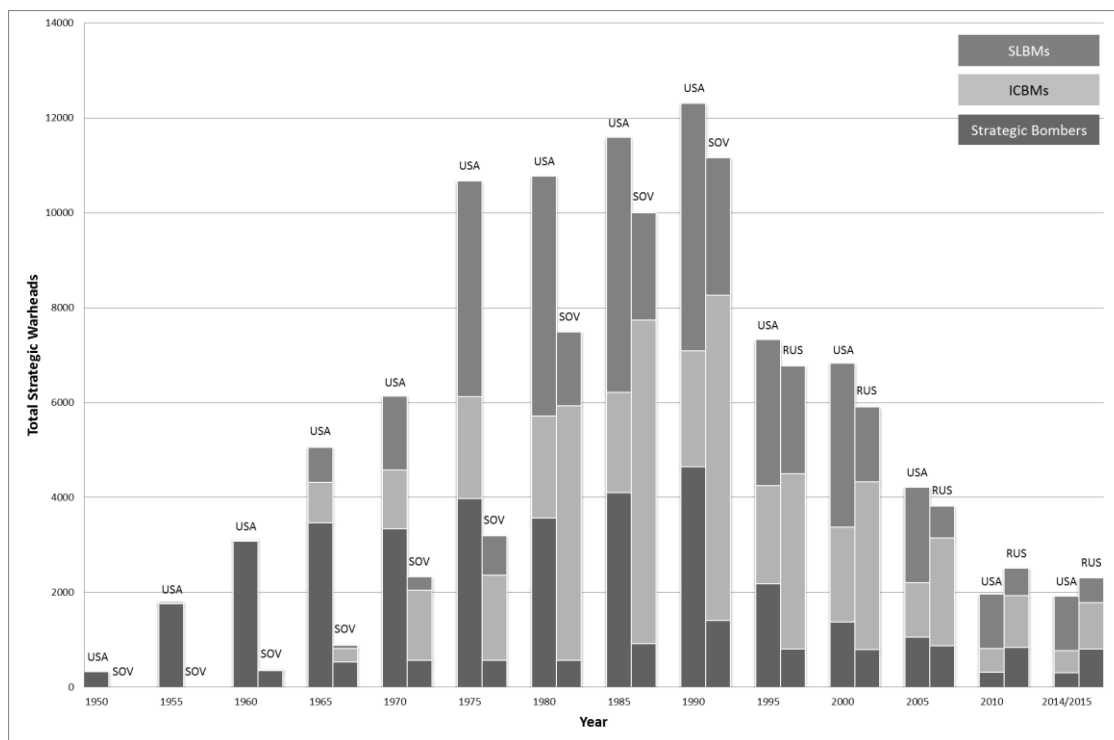


SLBM = Submarine Launched Ballistic Missile
 ICBM = Intercontinental Ballistic Missile

Table sources:
 Archive of Nuclear Data, Natural Resources Defense Council
 Nuclear Notebook, Bulletin of the Atomic Scientists

Figure 5: Strategic Delivery Vehicles, United States, Soviet Union, & Russia 1949-2015

force disparities and threat perceptions, ambitious arms control remained largely off the table. This had been reinforced over more than a decade of sparring over disarmament proposals in United Nations forums and lack of agreement up to that point on the feasibility of a nuclear test ban. However, the crisis provided impetus for at least limited measures. The Soviet Union withdrew its missiles from Cuba, while the United States withdrew Jupiter missile systems from Turkey – a secret trade that while limited in practical effect and negotiated under duress, represented a to that point unprecedented confidence building gesture. More dramatically from a visibility standpoint, the two governments formally agreed to install direct communication “hotlines” between their



Color coding indicates proportion of total warheads assigned to specific delivery systems.

SLBM = Submarine Launched Ballistic Missile

ICBM = Intercontinental Ballistic Missile

Table sources:

Archive of Nuclear Data, Natural Resources Defense Council

Nuclear Notebook, Bulletin of the Atomic Scientists

Figure 6: Strategic Warheads, United States, Soviet Union, and Russia, 1949-2015

respective executives (an arrangement periodically updated throughout the Cold War and continuing into the present) and agreed to cease above-ground nuclear testing. As previously noted, the latter measure represented a confidence building gesture at best, given the lack of real constraints it placed on further arsenal development. However, the Limited Test Ban Treaty at least demonstrated the ability of the two rivals to reach negotiated agreement on a legally binding arms control mechanism.⁶⁴

⁶⁴ Seaborg 1981.

Zubok, Vladislav. *A Failed Empire: The Soviet Union in the Cold War from Stalin to Gorbachev*. Chapel Hill: University of North Carolina Press, 2007, 123-153.

U.S.-Soviet military tensions slowly eased through the course of the 1960s, coinciding (perhaps not coincidentally) with rapid Soviet progress in bridging nuclear capability gaps – particularly in regards to acquisition of land- and sea-based ballistic missile systems. By the end of the decade, Soviet leaders could at least claim some sufficiency in retaliatory potential, if not full numerical or technical parity. When U.S. and Soviet negotiators commenced the SALT talks in 1969, both could legitimately claim to be negotiating from a position of military and economic strength. While this offered some measure of reassurance, the rapid pace of technical progress also meant both sides felt acutely insecure about potential upsets. Advances in missile defense systems, delivery system accuracy, and especially the inevitable deployment of multiple independently targeted reentry vehicles (MIRV) meant that both sides faced an incentive to stabilize the arms race, lest the action-reaction dynamic of acquisitions feed into perpetual uncertainty and budget-straining efforts to maintain competitive edge.⁶⁵

The lessening of tensions and achievement of nuclear balance also coincided with growing consensus between the superpowers on the deterrent role of nuclear weapons. Again by virtue of its early nuclear advantage, the United States in the 1950s was in a position to set the pace in strategic thought. Rather than maintain a consistent tack, however, U.S. nuclear strategy follow an uncertain course into the early 1960s. The Eisenhower administration, in an attempt to reconcile competing impulses to draw down expensive conventional forces while still containing communist military expansion, sought to deter aggression through threats of “massive retaliation” through nuclear

⁶⁵ For a discussion of the strategic implications debates surrounding ABM and MIRV, see: Herken, Gregg. *Counsels of War*. New York: Oxford University Press, 1987, 229-256. S. Weber 1991, 86-203. Freedman, *The Evolution of Nuclear Strategy* 2003, 328-341.

weapons. The precise circumstances that might elicit such a response were unclear, but the posture codified the idea that the United States would not rule out first use— a posture that continues into the present day (albeit in much-caveated form, to be discussed later). The administration was never able to resolve the ambiguities inherent in this posture, and as the 1950s closed and Soviet provocations mounted without a nuclear response (and critics lined up to criticize the policy), it became clear massive retaliation was untenable. Eisenhower himself expressed reservations with the concept even as he signed off on the country’s first nuclear war plan (the Single Integrated Operational Plan, or SIOP-62 as the first document was eventually coded), detailing an all-out nuclear aerial assault on the military-industrial capabilities and urban centers of the Soviet Union and its allies.⁶⁶

The Kennedy administration, seeking a clean break and responding to the critics, initially sought to provide U.S. leaders with a greater range of options for nuclear deployment. This “flexible response” approach required the means to wage “limited” war both at the conventional level and with nuclear strikes short of the full-on annihilation called for in SIOP-62. Secretary of Defense Robert McNamara was initially attracted to deterrence theories (like those described by Schelling) approaching nuclear warfare as a bargaining game, in which rational opponents might exercise “escalation control” and refrain from targeting certain assets (particularly homeland civilian targets) to locally contain the conflict. Thus the United States might even initially pursue a “city avoidance”

⁶⁶ Burr, William, ed. "The Creation of SIOP-62: More Evidence on the Origins of Overkill." *The National Security Archive*. July 13, 2004. <http://www2.gwu.edu/~nsarchiv/NSAEBB/NSAEBB130/index.htm> (accessed January 31, 2015).

Freedman, *The Evolution of Nuclear Strategy* 2003, 76-85.

Sagan, *Moving Targets: Nuclear Strategy and National Security* 1989, 18-26.

Smoke, Richard. *National Security and the Nuclear Dilemma: An Introduction to the American Experience in the Cold War*. New York: McGraw Hill Inc, 1993, 63-94.

strategy, limiting its offensive to counterforce strikes against deployed military capabilities – assuming the adversary exercised reciprocal restraint.⁶⁷

Flexible response – at least as formulated under McNamara – proved no more realistic in practice than massive retaliation. Escalation control must be reciprocated by the adversary, and it was never clear that Soviet strategists ever bought into the concept. Official documentation on Soviet nuclear war planning outside of military journal articles remains scant, but accounts (including interviews with Soviet-era strategists after the Cold War) are highly suggestive that planners assumed from an early stage that war between the superpowers would inevitably escalate to a full-scale strategic exchange. Although Soviet planners did not plan for a “bolt from the blue” disarming first strike (as many American strategists feared), early strategy during Khrushchev’s time focused heavily on the ability to preempt an impending American/NATO attack with intercontinental nuclear strikes and then seize the advantage through conventional military thrusts into Western Europe – an “active defense” intended to head off a reprise of the devastating military defeats suffered by the USSR following Hitler’s surprise invasion of 1941.⁶⁸

Soviet confidence in the ability to fight, let alone decisively win, a nuclear war would begin to wane by the end of the decade, however. Khrushchev attempted to roll back conventional defense spending during his time in office, favoring nuclear investments; tellingly, this trend was reversed by successors who saw a need for more flexibility in military options. In this regard, Soviet nuclear planning debates seemed to

⁶⁷ Freedman, *The Evolution of Nuclear Strategy* 2003, 216-226.
Herken 1987, 148-162.

⁶⁸ Hines, John, Ellis Mishulovich, and John Shull. *Soviet Intentions 1965-1985, Volume I: An Analytical Comparison of U.S.-Soviet Assessments During the Cold War*. McLean: BDM Federal, Inc, 1995.

mirror those of the United States, albeit on a 5-10 year lag. Given the limited intellectual exchange that took place during the 1950s and 1960s, the “nuclear learning” curve arguably owed little to transnational epistemic communities. However, a dialogue of ideas did take place in the form of tacit gestures broadcast via statements of nuclear strategy and military deployment decisions; in the early years, the United States (owing to its technical edge) was often the initiator of such exchanges. Describing the response to large-scale U.S. deployments of Minuteman missiles and SLBMs, two prominent veterans of the Soviet decision-making process noted in 1995 that “American deployment demonstrated to the Soviet leaders that the existence of such a huge number of weapons could be rationalized on both military and political grounds.”⁶⁹

NATO allies, who saw massive retaliatory threats as a counterweight to perceived Soviet conventional advantages, were also skeptical of the utility in limited war, fearing that threatening anything short of a full nuclear response would undermine the deterrent credibility of the alliance. McNamara was further dismayed to find that flexible response only served to drive an inter-service arms race within the U.S. military and empower further growth in the military industrial complex, with the services eagerly seeking newer and ever more expensive capabilities for waging nuclear war under a wider range of potential contingencies. By the late 1960s, the concept of “Mutually Assured Destruction” (MAD) had entered into the parlance and would come to implicitly define both U.S. and Soviet nuclear postures, to varying degrees, for the remainder of the Cold War. The McNamara Pentagon introduced the concept of “assured destruction” as a means to contain and more rationally scale (at least from a defense spending standpoint)

⁶⁹ Freedman, *The Evolution of Nuclear Strategy* 2003, 243-254.
Savel'yev, Alexandr', and Nikolay Detinov. *The Big Five: Arms Control Decision-Making in the Soviet Union*. Westport: Praeger, 1995, 2-3.

U.S. nuclear capabilities. Under assured destruction, the United States would not seek a “winning” advantage over the Soviet Union in nuclear capabilities (which McNamara judged to be futile), but merely a retaliatory capability of sufficient strength to convince Soviet leaders that initiating a nuclear war would entail sustaining crippling damage far disproportionate to any potential gain. The actual term “MAD” was seized upon by critics of McNamara, who felt the strategy represented a fatalistic capitulation, and U.S. policymakers remained wary of embracing the concept throughout the Cold War. Fears persisted that the Soviet Union in fact intended to achieve a winning advantage in counterforce capabilities, and the United States could not be complacent in allowing this to happen. The language of flexible response and counterforce continued to be used by American and NATO war planners throughout the Cold War, and first use of nuclear weapons was still considered a potential response to a large-scale Soviet conventional offensive.⁷⁰

In strategic practice, however, the implicit assumption increasingly accepted by senior leadership in the rival blocs was that nuclear weapons existed not for achieving tactical advantage in an inevitable superpower war, but to deter such a mutually devastating conflict from occurring in the first place. Challenges to the assured destruction paradigm (particularly in U.S. policymaking circles) would continue to reemerge, but the United States would never reclaim the warfighting advantage it briefly held in the 1950s and early 60s; this fact, combined with no indication that the Soviet Union accepted or sought an alternative strategic paradigm, represented a *de facto* coming together in the balance of mind. This intellectual alignment (tenuous as it was),

⁷⁰ Freedman, *The Evolution of Nuclear Strategy* 2003, 226-231, 271-314.
Herken 1987, 248-249.
Sagan, *Moving Targets: Nuclear Strategy and National Security* 1989, 26-39.

coupled with relatively stable relations and a rough balance of force, facilitated the cold balancing that followed in the 1970s. The Nixon administration – with Henry Kissinger as its foreign policy architect – sought not only to disentangle itself from the foreign policy quandaries of its predecessor (namely Vietnam), but to achieve a new global balance of power yielding a favorable status quo for the United States. The administration’s outreach to China was one important facet of this rebalancing, intended to exploit communist ideological divisions to U.S. advantage. The SALT talks and agreements fit into a broader policy of detente and engagement with the Soviet Union, seeking not necessarily to eliminate ideological differences or conflicts of interest (which were still profound), but to at least find room for accommodation and peaceable coexistence. The administration even talked of a pivot toward “strategic sufficiency” in nuclear capabilities – arguably “assured destruction” by another name.⁷¹

Just as important were parallel shifts in Soviet thinking that commenced shortly after Leonid Brezhnev succeeded Khrushchev in 1964. Khrushchev’s fall owed in no small part to internal party disillusion with his brinkmanship foreign policy approach, culminating in the Cuban Missile Crisis. While by no means sympathetic to the United States or the Nixon administration, Brezhnev and his influential Foreign Minister Andrei Gromyko similarly sought a more stable and favorable status quo in which Soviet-U.S. relations could be predicated on a sense of parity (rather than competition for superiority), Soviet and Eastern Bloc borders (including East Germany) were recognized as legitimate, and greater attention could be given to internal economic development.

⁷¹ Freedman, *The Evolution of Nuclear Strategy* 2003, 324-327.

Garthoff 1985.

MacMillan, Margaret. *Nixon and Mao: The Week that Changed the World*. New York: Random House, 2008, 118-123.

Soviet nuclear doctrine would also evolve under Brezhnev's tenure; while planners still assumed that superpower war would inevitably escalate to the nuclear level, they backed away from the inflexible one-two nuclear/conventional punch assumed under Khrushchev's tenure. Although still suspicious of escalation control, planners allowed for options below the total war threshold, and thinking (although still ambiguous) seemed to increasingly favor a retaliatory (versus preemptive) posture on the nuclear front. Relatedly, Soviet delivery systems continued to diversify in both type and sophistication, beginning to more directly match those of the United States.⁷²

As already noted, the SALT agreements placed a cap on the upward trajectory of the arms race, limiting the acquisition of certain strategic delivery systems on both sides; the ABM Treaty further headed off potentially destabilizing competition in strategic missile defenses. While the gains appear modest in retrospect, the talks established important foundations for ongoing strategic dialogue and set the parameters by which future arms control agreements would be negotiated. The talks also provided an opportunity for the two sides to better understand one another's conceptions of deterrence and doctrine. Important differences of opinion existed at the start of the SALT process, particularly on missile defense, which Soviet negotiators initially dismissed as little threat to strategic stability. However, accounts suggest that U.S. intellectual arguments about the destabilizing effects of missile defense –namely that it undermined assured retaliation and encouraged further arms racing – ultimately proved influential in swaying certain members of the Soviet defense establishment with critical influence on negotiating positions. The degree to which this logic was absorbed and socialized would be

⁷² Garthoff 1985, 36-68.
Hines, Mishulovich and Shull 1995, 35-48, 73-76.
Zubok 2007, 192-226.

evidenced by the vehemence of subsequent protests against U.S. changes in missile defense posture (discussed later in this chapter). Accounts further indicate that the SALT process pushed Moscow to create institutional mechanisms providing both bureaucratic and intellectual support for its negotiating team, which had entered the talks with minimal technical background and inability to rapidly make decisions; the United States, by contrast, had been ruminating on arms control issues in government and academic forums for more than a decade. A special Politburo commission was formed that included representatives from the Central Committee, the defense ministry, the foreign ministry, the defense industrial complex, and the KGB; besides providing approval at key decision points in the negotiating process, this “Big Five” committee also liaised with relevant technical experts to evaluate the feasibility and strategic acceptability of U.S. and Soviet positions.⁷³

Verification was an important area where U.S. and Soviet opinions more sharply diverged; Soviet leaders remained averse to onsite inspections or any measures more intrusive than reconnaissance satellite overflights (which already took place regardless of the agreement). This lack of verification, coupled with modernization programs on both sides that expanded strategic capabilities while testing the numerical limits, would chip away at U.S. domestic credibility of the agreement (and its successor) in the coming decade. The SALT consensus further eroded in the face of deteriorating relations between east and west. By the end of the decade, the Soviet Union faced increasing pressure on the human rights front, encouraging retrenchment and withdrawal from engagement with the west. Conversely, income from rising oil prices provided the Soviet regime with much-needed income and greater latitude to act autonomously. Proxy conflicts in the

⁷³ Savel'yev and Detinov 1995, 15-42.

third world further tested the limits and legitimacy of “détente.” The Soviet invasion of Afghanistan, seen by the United States as a blatant act of expansionist aggression, effectively put an end to the SALT process; the Carter administration withdrew the SALT II treaty from Senate consideration (where it was likely doomed to failure in any case). In the same period, the United States and NATO allies agreed upon a “double track” strategy of deploying sophisticated intermediate range missile systems in Europe as a response to Soviet capabilities, while also pursuing a treaty banning such systems. The subsequent election of the Reagan administration, openly hostile not only to the Soviet regime but the status quo approach to arms control, suggested potential for an abrupt break from cold balancing – particularly after the administration indicated a profound challenge to the doctrinal status quo of assured destruction through the Strategic Defense Initiative and a doctrine emphasizing the capability to “prevail” in a nuclear war, rather than simply retaliate in kind. Soviet leaders reacted with alarm to the new administration, their increasing insecurity made starkly apparent during the “Able Archer” nuclear war scare of 1983.⁷⁴

Nonetheless, the rivals avoided a complete backslide toward pre-1970s hostile stabilization. While continuing to reject ratification of SALT II, the Reagan administration nonetheless voluntarily elected to remain consistent with the treaty’s limits until 1986 – a move more or less reciprocated by Soviet leaders. Neither side made a dramatic attempt to leap ahead in the arms race, despite fears in both capitals that a

⁷⁴ Freedman, *The Evolution of Nuclear Strategy* 2003, 385-397.

Garthoff 1985, 591-679, 801-820, 849-938.

Jones, Nate, ed. "The 1983 War Scare: "The Last Paroxysm" of the Cold War Part I." *The National Security Archive*. May 16, 2013. <http://www2.gwu.edu/~nsarchiv/NSAEBB/NSAEBB426/> (accessed January 31, 2015).

Sagan, *Moving Targets: Nuclear Strategy and National Security* 1989, 48-54.

Zubok 2007, 227-264.

strategic breakout was on the horizon. Although amply funded, SDI proceeded at a slow pace and failed in its time to present a credible challenge to assured destruction. No crisis of the 1980s approached Berlin or Cuban Missile crisis levels of military confrontation. The continued balance of threat and mind (however tenuous it seemed) helped facilitate arms control breakthroughs that came in the latter half of the decade, as the Reagan administration and Mikhail Gorbachev ultimately found common ground for strategic stability. The first definitive product of this new consensus was the 1987 Intermediate Nuclear Forces (INF) Treaty, groundbreaking not only for its elimination of an entire class of nuclear weapon system, but also for the intrusive verification measures it introduced including onsite inspections and real time monitoring of output at missile production facilities – measures permissible because of new Soviet openness under Gorbachev’s leadership. The INF agreement was a significant step, and the first real arms reduction measure undertaken by the two rivals. It is notable however, that START required a further four years of negotiation before signature, and another three years after that to come into full force. The transition from cold balancing to equilibrium maintenance did not come easily and as discussed in the rest of this chapter, could not be taken for granted as inevitable or irreversible.⁷⁵

A Tenuous Balance of Threat

In retrospect, it is probably remarkable that START I weathered the fall of the Soviet Union, coming only five months after its signing. This is not because the Russian successor government was somehow opposed to arms control; the treaty provided

⁷⁵ Goldblat 2002, 84-87.

breathing room for Boris Yeltsin and the newly elected Duma to focus on domestic political issues, restructuring the economy, and managing the abrupt breakaway of successor states – rather than continue their predecessors’ perennial competition for strategic edge with the United States. What is more remarkable is that START survived the considerable instability that followed and particularly the crippling disarray of the Russian military machine in the 1990s. This disruption of the balance of threat could very well have undermined the transition to equilibrium maintenance, and indeed played into the ultimate unraveling of START II. Moreover, it offers a cautionary lesson on just how tenuous bilateral arms control dynamics can be, even in a time of unprecedented peace between rivals. The facilitating conditions identified in Chapters 2 and 3 do not offer an absolute guarantee of outcomes, and must be carefully considered within the political and economic circumstances in which they are observed.

This chapter opened with an exposition of raw numbers. At the time Gorbachev stepped aside, these quantitative measures of Soviet military nuclear capabilities still held some qualitative significance – i.e. Soviet leaders could probably still expect to muster the majority of the weapon systems in that count with some certainty in a crisis. With the collapse of the USSR, both the readiness and qualitative capabilities of the arsenal were called into question. In January 1992, a fifth of available strategic systems were located on the territory of successor states, including 176 ICBMs and 44 strategic bombers in Ukraine, 81 ICBMs in Belarus, and 104 ICBMs and 40 bombers in Kazakhstan – along with some 6,000 strategic and tactical warheads. While the force remaining on Russian territory was still formidable, these externally located assets included most of the country’s strategic bomber force (including its most modern TU-160 cruise missile

delivery aircraft) and a third of its SS-18 heavy ICBMs, each of which mounted up to ten MIRV warheads and had in the past contributed to U.S. fears of a Soviet comparative advantage in counterforce capabilities and potential for launching a disarming first strike. The degree to which Russia maintained operational command and control over these systems is not fully clear from the historical record; while the newly independent governments ostensibly lacked the autonomous ability to arm and launch these systems, Russia's ability to itself command deployment of the weapons in a crisis was likely also compromised. All of the warheads were eventually returned and many of the delivery systems destroyed under the terms of the 1992 Lisbon Protocol to START I, a process only fully completed by 1996 (though Russia would continue to bargain with Ukraine for its bomber aircraft for some years).⁷⁶

Far more crippling for Russia's strategic nuclear capability was the post-Soviet economic crisis and concurrent downturn in defense spending. The Soviet war machine had been sustained through high defense expenditures at the expense of investments in other areas of the economy; this trend was reversed by the newly democratic government. In 1990, Soviet defense spending stood at 12.3% of GDP; by 1992, this figure dropped precipitously to 4.8%. While U.S. defense spending in 1992 had scaled back to a similar GDP percentage, the value in actual dollars was considerably more – nearly \$500 billion dollars versus \$62 billion in Russian defense spending. Russian spending would continue to fall throughout the decade, reaching a low of \$20.8 billion in 1998.⁷⁷

⁷⁶ Pikayev, Alexander. "Post-Soviet Russia and Ukraine: Who Can Push the Button?" *The Nonproliferation Review*, no. Spring-Summer (1994): 31-46.

Podvig, Pavel. *Russian Strategic Nuclear Forces*. Cambridge: MIT Press, 2004, 25, 398.

⁷⁷ Figures taken from the Stockholm International Peace Research Institute Military Expenditures Database. http://www.sipri.org/research/armaments/milex/milex_database

Russian conventional forces bore the brunt of these cutbacks, actually leading to an elevated role for nuclear forces (discussed later in this chapter). However, neither the nuclear military units nor the associated defense industrial complex could be insulated from the economy. New procurement slowed to a crawl (and in many cases ceased), despite the fact that many delivery systems including ICBMs, submarines, and aircraft were reaching the end of their operational lives in the 1990s. Arguably more concerning was the toll exacted on human resources; personnel in nuclear security sensitive positions experienced extreme financial hardship and a declining sense of mission, raising concerns about their reliability in maintaining the security of sensitive assets against exploitation by foreign governments or terrorists. Insecurity in this dynamic was felt acutely on both sides of the former Iron Curtain, motivating one of the more remarkable examples of cooperation between nuclear rivals.⁷⁸

U.S. congressional policymakers realized even before the Soviet dissolution that this combination of economic volatility, disillusioned personnel, and nuclear weaponry was a recipe for nuclear proliferation or worse, leading to formation of the Cooperative Threat Reduction (CTR) program in November 1991. For the next two decades, billions of dollars in U.S. taxpayer money would be allocated to dismantling or repurposing infrastructure related to the weapons of mass destruction (WMD) enterprise in the former Soviet Union and its satellites, including destruction of obsolete or excess delivery systems, improved security measures at sensitive facilities, and even finding new

⁷⁸ Blair, Bruce, and Clifford Gaddy. "Russia's Aging War Machine: Economic Weakness and the Nuclear Threat." *The Brookings Review* 17, no. 3 (1999): 10-13.

Hoffman, David. *The Dead Hand: The Untold Story of the Cold War Arms Race and its Deadly Legacy*. New York: Doubleday, 2009, 379-411.

Perry, Todd. "Securing Russian Nuclear Materials: The Need for an Expanded US Response." *The Nonproliferation Review*, no. Winter (1999): 84-97.

employment for scientists and other personnel formerly involved – but no longer capable of being sustained – in defense research and development. While Cooperative Threat Reduction does not quite fit the functional definition of arms control used in this study (namely in its lack of reciprocity; there was no equivalent effort undertaken, or needed, on the U.S. side), it is reasonable to assume that similar facilitating conditions allowed an effort like CTR to take place – namely a drastic reduction in tensions and a balance of mind in terms of certain threat perceptions.⁷⁹

Besides the economy, there was ample functional evidence of the degradation in Russian nuclear capabilities during the 1990s. One dramatic indicator was the number of patrols undertaken by Russian ballistic missile submarines. From their inception, ballistic missile submarines served to provide nuclear powers with a highly secure second strike capability. That capability is only arguably secure if submarines are at sea and remain undetected; while some Russian SLBMs are capable of reaching U.S. territory from Russian waters, a submarine at dock is a conspicuous target for preemptive first strike. From 1992-2001, estimates suggest that Russia’s navy averaged only thirteen ballistic missile submarine deterrent patrols per year (a “patrol” indicating that a vessel left port on an operational deterrent mission); this average reflects a high of roughly 30 patrols in 1992, precipitously diminishing to just two by 2001. This is in dramatic contrast to a U.S. average of more than 50 patrols per year throughout the decade. On paper, the Russian navy could muster 26 ballistic missile submarines. In theory, those at dock could be “surged” out to sea in the event of a crisis wherein a nuclear exchange was believed to be eminent. In reality, most of these vessels (some of which dated to the 1970s) were in

⁷⁹ Nikitin, Mary, and Amy Woolf. *The Evolution of Cooperative Threat Reduction: Issues for Congress*. Washington: Congressional Research Service, 2014.

desperate need of routine maintenance and refitting; capable crews were also in short supply. Again, the contrast with the United States was notable. While the United States retired a number of legacy submarines during the 1990s, reaching a low point of 14 vessels in 1993, the remaining “Ohio” class submarines were basically new and continued to be upgraded with the latest technologies (including Trident II missiles entering service in 1990). More importantly, the United States could afford to maintain these vessels and keep a significant number continuously at sea.⁸⁰

The START II treaty was signed by George H.W. Bush and Boris Yeltsin in 1993, before START I even entered into force. The initial momentum of the treaty leveraged a previous decade of negotiations on START I, increasingly pacific relations, a seeming consensus of mind on the diminishing role of nuclear weapons in the post-Cold War era, and strategic reassessments on both sides following the end of Soviet communism. An American participant in the negotiations noted that by comparison to START I, where a number of contentious issues required torturous back-and-forth diplomacy, the START II negotiations were “much less adversarial” with the two sides behaving more like “one delegation” attempting to achieve a common outcome. START II promised truly dramatic reductions in nuclear arsenals, seeking an end state of 3000-3500 deployed strategic warheads on each side. The treaty would have further eliminated the MIRVing of ICBMs in both arsenals, complete elimination of heavy ICBMs like the

⁸⁰ Kristensen, Hans. "Declining Deterrent Patrols Indicate Too Many SSBNs." *Federation of American Scientists*. April 30, 2013. <http://fas.org/blogs/security/2013/04/ssbnpatrols/>.
Kristensen, Hans. "Russian SSBN Fleet: Modernizing But Not Sailing Much." *Federation of American Scientists*. May 3, 2013. <http://fas.org/blogs/security/2013/05/russianssbns/>
Lieber, Keir, and Daryl Press. "The End of MAD? The Nuclear Dimensions of U.S. Primacy." *International Security* 30, no. 4 (2006): 7-44.
Norris and Cochran, *Nuclear Weapons Databook: US-USSR/Russian Strategic Offensive Forces 1945-1996*, 1997.

SS-18 (which could be easily re-“uploaded” if allowed to exist as single-warhead missiles), and limited each side to no more than 1750 warheads on submarines. By significantly reducing or eliminating certain counterforce-capable systems, START II aimed not only to bring down the respective arsenals, but further solidify the deterrent stability of mutually assured destruction.⁸¹

In principle, START II should have provided Russian leaders with a convenient political pretext for shedding nuclear capabilities that could no longer be maintained; the reality proved far more complicated and ultimately doomed the treaty. Domestic political upheaval, predictable in the context of a nascent democracy, prevented the rapid Duma ratification of START II for which Yeltsin hoped in 1993. Conservative factions skeptical of western intentions grew more powerful in Russia throughout the decade. Additionally, military strategists questioned whether, given Russia’s aforementioned difficulties maintaining and upgrading the nuclear force, the cuts mandated by START II were really in the country’s interest – in other words whether or not Russia could truly maintain the balance of threat enshrined by the agreement.⁸²

A Russian participant in the START II negotiations later suggested that the United States likely overreached; its efforts to “squeeze as much as possible in terms of concessions” from Russia yielded a treaty that was “unratifiable” – particularly in terms of the expensive restructuring it required in order for Russia to meet treaty requirements while still maintaining an effective force. The treaty required Russia to eliminate a disproportionately large number of MIRV-capable land-based missile systems. While

⁸¹ Goldblat 2002, 92-94.

Interview with former U.S. government official.

⁸² Lepingwell, John. "START II and the Politics of Arms Control in Russia." *International Security* 20, no. 2 (1995): 63-91.

many of these missiles were aging and likely to be phased out in any case, they nonetheless formed the backbone of Russia's retaliatory force (particularly given deteriorating submarine capabilities). The only new land-based missile being introduced at the time was the SS-25, a single warhead road-mobile missile plagued by production delays (partly due to key production infrastructure being located in now-independent former Soviet republics); Russia would need to acquire hundreds, if not thousands, of the new missile to fully compensate for the START II heavy ICBM reductions. Some strategists further questioned whether the road-mobile missiles were as survivable as their silo-based predecessors (similar debates accompanied U.S. induction of the Peacekeeper missile in the 1970s and 80s). Critics ultimately argued that a SS-25 centric missile force, coupled with questionable submarine capabilities and a skeletal air force, would put Russia at a profound disadvantage vis-à-vis the United States. Additionally, the terms of START II allowed the United States to keep a significant number of non-deployed weapons in storage (rather than be outright destroyed, like Russian SS-18s) or in some cases repurpose assets to conventional missions (as in the case of the B-1B bomber fleet); it was alleged this provided the United States an advantageous treaty "breakout" capability. The results of the 1993/94 U.S. Nuclear Posture Review (discussed later), which explicitly recommended maintenance of a "warhead upload hedge," could only have reinforced these perceptions.⁸³

⁸³ Interview with Nikolai Sokov, former official in the Soviet and later Russian Ministry of Foreign Affairs, April 9, 2015.
Arbatov, Alexei. *Implications of the START II Treaty for U.S.-Russian Relations*. Washington: Henry L. Stimson Center, 1993, 19-23.
Miasnikov, Eugene. "Problems of START-2 Ratification in Russia: Is START-3 Possible?" *INESAP Information Bulletin*, no. 10 (1996): 15-17.
Podvig, Russian Strategic Nuclear Forces 2004, 134-142.

By the end of the 1990s, these insecurities were further compounded by NATO expansion and U.S. missile defense programs. In 1997, NATO formally invited the Czech Republic, Hungary, and Poland into the alliance, capping accession discussions initiated in 1991. U.S. and NATO officials downplayed the security implications of the expansion, emphasizing democracy-building and economic development in the former Eastern Bloc; rhetoric from Clinton administration officials like Anthony Lake strongly suggested that expansion would support a more durable “democratic peace” in Europe – versus simply an effort to bolster the military capabilities and geographic scope of the alliance. Entreaties were even made to Russia through the 1994 Partnership for Peace (PFP) initiative, intended to establish security relationships and cooperation between NATO and former Warsaw Pact states, short of full membership. No amount of diplomatic massaging could assuage Russian security concerns where it came to new NATO members. New member states meant not only a potential expansion in NATO military power, but potentially the stationing of NATO forces (including nuclear forces) closer to Russia’s borders. Indeed, even as the three new members were formally incorporated in 1999, talks were already well underway regarding states directly abutting Russian territory – Estonia, Latvia, and Lithuania.⁸⁴

Russian leaders also cited unwritten assurances made by Bush administration officials in 1991 to the effect that the United States would not expand the alliance further after inclusion of a unified Germany. Russian policymakers interpreted these statements as a quid pro quo for their acquiescence, offsetting their clear preference for a neutral unified Germany. U.S. officials denied that any such assurances were made, and

⁸⁴ Goldgeier, James. "NATO Expansion: The Anatomy of a Decision." *The Washington Quarterly* 21, no. 1 (1998): 85-102.

continued to emphasize the pacific intentions behind NATO expansion. Regardless of the veracity of either side's claims, the decision to expand fueled Russian perceptions of western duplicity and magnified long-held fears of encirclement.⁸⁵

Finally, the issue of ballistic missile defense continued to present a seemingly intractable challenge for U.S.-Russian arms control, even after the end of Reagan's Strategic Defense Initiative. As noted, the majority of SDI's grander schemes failed to materialize – in part because of immaturity in requisite technologies (paired with arguably unrealistic objectives), but also because the end of the Cold War seemed to negate the need for a massively expensive missile umbrella. Nonetheless, missile defense advocacy seemed to possess limitless political and bureaucratic inertia, as well as ability to chimerically adapt to geopolitical circumstances. Following the 1991 Gulf War, U.S. threat perceptions turned to the menace of “rogue states” – lower or middle tier powers (like Iraq, Iran, and North Korea) that combined autocracy and opposition to U.S. interests with pursuit of WMD as a means to asymmetrically confront U.S. conventional military preponderance. Politicians, defense strategists, and non-government interests pointed to an emerging ballistic missile threat from these countries. While none yet possessed missiles capable of reaching U.S. territory, these individuals alleged such a capability would emerge in the coming decade – a conclusion shared (in contradiction to official intelligence estimates) by the 1998 congressional Commission to Assess the

⁸⁵ Kramer, Mark. "The Myth of a No-NATO-Enlargement Pledge to Russia." *The Washington Quarterly* 32, no. 2 (2009): 39-61.

Ballistic Missile Threat to the United States (known as the “Rumsfeld Commission” for its enigmatic chairman).⁸⁶

George H.W. Bush dramatically scaled back SDI efforts during his term, repositioning the program to respond to more limited ballistic missile threats like those faced in the war with Iraq. New research focused on “hit to kill” missile interceptors that would directly collide with an incoming ballistic missile, as opposed to more blunt Cold War systems that relied on proximity detonation of conventional or in some cases nuclear explosives. The Clinton administration continued research programs in this direction, examining the feasibility of deploying a radar detection system and a small number of hit-to-kill interceptors on U.S. territory. However, Clinton stopped short of actually deploying such a system, instead establishing criteria the technology would need to meet before deployment. Implicit in all of this debate and research was the notion that if the U.S. ever did deploy a national missile defense system, then commitments under the 1972 ABM Treaty would need to be revisited.⁸⁷

Neither the limited scope of U.S. missile defense research, nor U.S. assurances that the system was targeted at rogue states, nor even the fact that proposed systems fell far short of presenting a real threat to Russian offensive nuclear capabilities, could reassure Russian politicians and defense officials that insisted the 1972 ABM Treaty was foundational to the deterrent relationship. Russian Foreign Minister Igor Ivanov articulated Russian fears in noting that, “It is common knowledge that global potentials

⁸⁶ Cerniello, Craig. "Rumsfeld Panel Releases Report on Missile Threat to U.S." *Arms Control Today*, June 1, 1998.

Executive Summary of the Report of the Commission to Assess the Ballistic Missile Threat to the United States. Washington, D.C.: U.S. Congress, 1998.

⁸⁷ Giles, Keir, and Andrew Monaghan. *European Missile Defense and Russia*. U.S. Army War College Strategic Studies Institute, Carlisle Barracks, PA: U.S. Army War College Press, 2014, 3-9.

Newhouse, John. "The Missile Defense Debate." *Foreign Affairs* 80, no. 4 (2001): 97-109.

are built into the architecture of any national antimissile defense system, even at initial stages” – in other words, a limited system would provide the United States with technologies and infrastructure foundational to a more comprehensive system. Ivanov further reflected the sentiments of an alarmed Russian defense establishment when threatening, “Thus, in accordance with the statement made when START I was signed, Russia will regard the withdrawal of the United States from the ABM treaty or the treaty's substantial violation as an exceptional circumstance giving Russia the right to withdraw from START I,” and, “Russia would be forced to respond with neutralizing measures to ensure its own security.”⁸⁸

By the end of the decade, the balance of threat between Russia and the United States could be characterized as uncertain at best. The conventional military balance unquestionably tipped in favor of the United States (even absent the inclusion of NATO alliance capabilities) and Russia was in no place militarily or economically to strongly assert its interests. Russia’s nuclear capabilities were also unquestionably in a state of deterioration – though importantly, the precise extent of this deterioration was opaque to outside observers. Nuclear weapons are arguably unique among military assets in that they retain significant deterrent effect regardless of whether their total capability or utility can actually be demonstrated. As one observer of the Russian defense complex noted, even if half of the missile arsenal in the 1990s malfunctioned during launch, the remaining missiles would have provided more than enough destructive power to go around. Even if Russia’s ability to muster its entire nuclear arsenal was questionable, the fact of the matter was that the Kremlin leadership had potentially thousands of nuclear

⁸⁸ Ivanov, Igor. "The Missile Defense Mistake: Undermining Strategic Stability and the ABM Treaty." *Foreign Affairs* 79, no. 5 (2000): 15-20.

weapons at their disposal; the (likely) possibility that even a fraction of that arsenal could be successfully launched at U.S. territory continued to represent a formidable deterrent to direct military aggression.⁸⁹

Early Signs of a Shifting Balance of Mind

Before addressing the final trajectory of U.S.-Russian arms control dynamics at the end of the decade, it is important to also consider doctrinal developments on both sides in the years immediately following the end of the Cold War – the “balance of mind” the QCA analysis from Chapter 3 suggests is essential to nuclear equilibrium maintenance between rivals in a state of relative peace. During the early 1990s, defense planners on both sides undertook significant reassessments of both the deterrent relationship and respective force postures, resulting in significant changes and even sweeping arms control initiatives pursued without formal treaty frameworks. However, by the middle of the decade much of the early momentum was spent, and – when combined with a tenuous balance of threat – effectively stalled hopes for arms control beyond START I.

George H.W. Bush entered office with no expectation the Soviet Union would fall, though dramatic developments were already underway. The fall of the Berlin Wall, the subsequent disintegration of the Soviet empire, and the signing of START suggested the need for a major reconsideration of U.S. nuclear force requirements, if not overall doctrine. Additionally, the 1991 Gulf War demonstrated the United States was far more

⁸⁹ Interview with Pavel Podvig, Director and Principal Investigator for the Russian Nuclear Forces Project, May 19, 2015.

likely to become embroiled in regional conflicts in the coming decade, requiring precision military capabilities far more discriminating than the nuclear cudgel. Finally, Bush faced significant domestic political pressures to address the federal deficit. The administration seized the opportunity to exploit the emerging “peace dividend” and scale back the defense spending boom of the Reagan era.

The Bush administration undertook several significant steps indicating a cautious reevaluation of the U.S. deterrent relationship with the Soviet Union and later Russia. Even preceding Gorbachev’s departure, administration officials including Secretary of Defense Dick Cheney and Chairman of the Joint Chiefs Colin Powell undertook a comprehensive review of U.S. nuclear targeting policies, seeking to roll back decades of accrued redundancies and inefficiencies the Pentagon had used to rationalize qualitative and quantitative arsenal requirements. In the words of one scholar, “The dilemma of conflicting plans...not only eluded resolution but seemed to have been compounded by modern computation, specialization, and remoteness from the world of policy.”⁹⁰ The revisions included removing targets from non-Russian Eastern Bloc states (most of which were in the process of deposing communist puppet regimes), reducing the number of industrial and transportation targets not directly associated with military operations, and simply reducing the sheer number of warheads redundantly assigned to individual targets. The revised war plan still assumed the potential for a massive nuclear exchange involving thousands of warheads – but it seemed to acknowledge that an era of limitless nuclear

⁹⁰ Nolan, Janne. *An Elusive Consensus: Nuclear Weapons and American Security after the Cold War*. Washington, D.C.: Brookings Institution Press, 1999, 29-31.

warfighting possibilities was drawing to an end. Importantly, it also provided a strategic pretext for the next round of nuclear reductions under START II.⁹¹

Far more dramatic evidence of a reevaluation was demonstrated through unilaterally implemented changes in deployment postures and procurement decisions. The so-called “Presidential Nuclear Initiatives” (or PNIs) were launched in September 1991, when Bush announced a unilateral U.S. decision to withdraw – and ultimately dismantle – all ground-launched tactical nuclear weapons (including artillery shells and short range missiles) from overseas locations. A residual arsenal of air-dropped munitions in Europe, deemed necessary to maintain NATO commitments, would remain in place. In addition, the United States would no longer deploy tactical nuclear weapons at sea (including cruise missiles and air-launched munitions), withdrawing the weapons to land-based storage (though still reserving the right to redeployment if circumstances dictated) and dismantling roughly half the stockpile. Furthermore, the United States would de-alert its strategic bomber force, accelerate the timetable for destruction of Minuteman ICBMs within START limits, and cancel development of a small road-mobile ballistic missile euphemistically known in policy circles as the “Midgetman.” Seizing on the spirit of cooperation, Mikhail Gorbachev responded in October with a Soviet commitment to eliminate its arsenal of nuclear artillery shells, mines, and short range missile warheads; withdraw and partially eliminate nuclear surface to air missile warheads; withdraw tactical weapons from warships to central storage locations; abandon certain missile

⁹¹ Freedman, *The Evolution of Nuclear Strategy* 2003, 431-432.

Lebovic, James. *Flawed Logics: Strategic Nuclear Arms Control from Truman to Obama*. Baltimore: Brookings Institution Press, 2013.

Ottaway, David, and Steve Coll. "Trying to Unplug the War Machine." *Washington Post*, April 12, 1995: A01.

Interview with former U.S. government official.

programs; and implement further strategic nuclear arms reductions below START I limits.

Shortly after the first round of PNIs, Bush announced in January 1992 significant strategic arsenal cutbacks including ending production of the Peacekeeper ICBM (a 10-MIRV ICBM deployed in response to Soviet heavy ICBM capabilities), canceling development of a small silo-based ICBM, limiting B-2 stealth bomber procurement to 20 aircraft, and ending development and procurement of advanced nuclear air and sea launched cruise missiles. Yeltsin responded with intention to end production of land-based tactical nuclear weapons, eliminate half of existing nuclear surface to air missile warheads, eliminate half of Russian air-launched tactical weapons, end production of bomber aircraft and air-launched cruise missiles, scale back ballistic missile submarine patrols, and accelerate the strategic arms reduction process toward reaching START limits.⁹²

The legacy of the Presidential Nuclear Initiatives is mixed, owing in no small part to the lack of a formal negotiating framework or treaty governing their implementation. Assuming both parties acted in good faith, the PNIs may have resulted in the ultimate elimination of well more than 10,000 tactical warheads between the two sides – a result dwarfing the achievements of any single formally negotiated nuclear arms treaty.

However, lack of verification and extreme open source uncertainties regarding the

⁹² Goldblat 2002, 97-100.

Kimball, Daryl, and Tom Collina. "The Presidential Nuclear Initiatives (PNIs) on Tactical Nuclear Weapons at a Glance." *Arms Control Association*. August 2012.

<https://www.armscontrol.org/factsheets/pniglance> (accessed January 24, 2015).

Koch, Susan. *The Presidential Nuclear Initiatives of 1991-1992*. Washington, D.C.: National Defense University Press, 2012.

Saradzhyan, Simon. *Russia's Non-Strategic Nuclear Weapons in their Current Configuration and Posture: A Strategic Asset or Liability?* Cambridge: Belfer Center for Science and International Affairs, 2010.

starting arsenal sizes of the two powers (particularly Russia) mean it is currently impossible to quantify the achievement. The Bush administration (and Clinton following) followed through with its non-procurement commitments. However, as the decades pass and delivery systems continue to age, it is not clear either power remains committed to the spirit of the PNIs in the longer term. Both countries are currently pursuing development of advanced strategic bomber aircraft to succeed platforms limited under the PNIs. The United States is exploring alternatives for a successor to the Minuteman II, while Russia is committed to development and deployment of a new generation of silo-based and mobile ballistic missiles. Some observers question whether Russia actually followed through with dismantlement of withdrawn warheads, and more recent allegations indicate Russia may be once again deploying nuclear cruise missiles on attack submarines.⁹³

Regardless of current status, the PNIs were remarkable in their time and suggested important shifts in the nuclear strategic calculation on both sides. The withdrawal of thousands of tactical nuclear weapons indicated the two parties felt deterrence of a land war in Europe, or a conflict at sea, no longer required forward deployment of nuclear assets permitting rapid – though potentially destabilizing – responses to provocations. Absent NATO commitments, it is not clear the United States would even have left the residual arsenal of air-dropped weapons in Europe. Colin Powell

⁹³ Corin, Eli. "Presidential Nuclear Initiatives: An Alternative Paradigm for Arms Control." *Nuclear Threat Initiative*. March 1, 2004. <http://www.nti.org/analysis/articles/presidential-nuclear-initiatives/> (accessed January 24, 2015).

Broad, William, and David Sanger. "U.S. Ramping Up Major Renewal in Nuclear Arms." *New York Times*, September 22, 2014: A1.

Schneidmiller, Chris. "Russia Might Still Use Sea-Fired Nuclear Cruise Missiles." *Global Security Newswire*, January 14, 2013.

Sutyagin, Igor. *Atomic Accounting: A New Estimate of Russia's Non-Strategic Nuclear Forces*. London: Royal United Services Institute, 2012.

was (and remains) a vocal skeptic regarding the utility of tactical nuclear weapons in a ground war, a conclusion reached while exploring nuclear war-fighting contingencies in the first Gulf War as Chairman of the Joint Chiefs. Furthermore, U.S. defense planners at the same withdrew all forward-deployed tactical weapons from East Asia, confident that extended deterrence commitments vis-à-vis South Korea and Japan could still be met (and despite the arguably greater post-Cold War likelihood of a nuclearized conflict on the Korean peninsula).⁹⁴

Doctrine Revisited in the Clinton Administration

Bill Clinton won the 1992 U.S. presidential election on a domestically-oriented political agenda. However, the administration could not escape the fact that it was inheriting a foreign policy in transition; the sole unifying organizing principle across previous administrations – the Soviet threat – had evaporated to yield “a new world order,” as George H.W. Bush described the situation. On U.S.-Russia relations, and arms control in particular, the outgoing administration had initiated potentially transformative changes including the Presidential Nuclear Initiatives, the START treaties, Cooperative Threat Reduction, and the beginning of a new security relationship with Russia and the former eastern bloc. That said, much remained the same, or at least existed in a state of uncertain limbo. The NATO alliance remained intact, and indeed was poised to grow – though its ultimate purpose absent the Warsaw Pact threat was uncertain. START II, the more ambitious of the two treaties, remained to be ratified on both sides. U.S. defense

⁹⁴ Schwartz, Stephen. *Atomic Audit: The Costs and Consequences of U.S. Nuclear Weapons Since 1940*. Washington, D.C.: Brookings Institution Press, 1998, 168.

planning continued to hedge against uncertainty in the Russian transition, not discounting the potential for a resurgent enemy. While the United States was scaling back its nuclear arsenal, it still maintained most of its Cold War capabilities, including a “triad” of strategic delivery systems (ICBMs, SLBMs, and strategic bombers) and tactical weapons for battlefield use by aircraft and ships. Missile submarines continued to prowl the oceans and ICBMs remained poised to launch on short notice if an attack on the United States was detected.

The Clinton Administration’s 1994 *National Security Strategy of Engagement and Enlargement* was a reflection of the new security environment and the uncertainties it presented. The document recognized a “complex array of new and old security challenges.” These “new” security challenges included fragile states in the former Soviet Union and other regions of the world, the proliferation of weapons of mass destruction, violent extremism, and transnational threats like terrorism, drug trafficking, and environment degradation. Importantly, it noted that “the line between our domestic and foreign policies has increasingly disappeared”; American power abroad would be directly proportional to economic empowerment at home. The administration’s strategy would consist of three “central components” – enhancing security through a strong defense and promotion of cooperative security measures; opening foreign markets and encouraging global economic growth; and promoting democracy abroad. The United States seemed to be in an unprecedented position to shape the world in its own liberally democratic and capitalistic image.⁹⁵

⁹⁵ "A National Security Strategy of Engagement and Enlargement." The White House. 1995. <http://www.au.af.mil/au/awc/awcgate/nss/nss-95.pdf> (accessed June 21, 2015).

It is notable that the 1994 National Security Strategy (NSS) addressed the issue of nuclear deterrence in the context of “Combatting the Spread and Use of Weapons of Mass Destruction and Missiles.” Rather than just deterrence of peer-level nuclear competitors, the document suggested the arsenal was more broadly intended to threaten retaliation “against those who might contemplate the use of weapons of mass destruction, so that the costs of such use will be seen as outweighing the gains.” Weapons of mass destruction included nuclear, biological, and chemical capabilities (along with associated missile delivery systems), suggesting that U.S. nuclear weapons might be used in response to attacks of a non-nuclear nature. While this retaliatory threat was not necessarily new, its explicit inclusion in the NSS seemed clearly aimed at “rogue states” U.S. defense planners expected to be confronting in the post-Cold War security environment. Moreover, it was a theme that would persist beyond the Clinton administration.

Regarding strategic nuclear capabilities, the 1994 NSS noted:

“We will maintain nuclear forces sufficient to deter any future hostile foreign leadership with access to strategic nuclear forces from acting against our vital interests and to convince it that seeking a nuclear advantage would be futile. Therefore we will continue to maintain nuclear forces of sufficient size and capability to hold at risk a broad range of assets valued by such political and military leaders. We are engaged in a review to determine what nuclear posture is required in the current world situation.”

The ambiguities inherent in this statement haunted further efforts to revise U.S. nuclear doctrine and posture throughout the decade, and even into the new millennium. The specific enemy, beyond “future hostile foreign leadership,” was ambiguous, though it could imply any number of countries with unfriendly governments or uncertain political futures. Exactly what constituted a “nuclear advantage” was left unclear – did this imply numerical advantages, qualitative advantages, or simply the ability to nullify a U.S. threat of massive retaliation? The requirements dictating “sufficient size and capability” were left unspecified, except for the need to hold a “broad range of assets” at risk – suggesting room for the kind of scope creep that plagued McNamara’s flexible response doctrine.⁹⁶

The last sentence of the statement was a reference to the 1993-1994 Nuclear Posture Review (NPR), still underway at the time the NSS document was released. The NPR was initiated by the administration as an analog to the Pentagon’s “Bottom-Up Review” of 1993, the goals of which (in the words of Secretary of Defense Les Aspin) had been to comprehensively “reassess...defense concepts, plans, and programs” and direct a shift “away from a strategy designed to meet a global Soviet threat to one oriented to the new dangers of the post-Cold War era.” Similarly, Aspin stated in a 1993 press conference that the NPR would address every aspect of U.S. nuclear policy, including the role of nuclear weapons in U.S. security strategy, their number, type, delivery systems, and safety concerns.⁹⁷

There was reason to believe that under the leadership of Aspin, the NPR might actually lead to substantive changes. Aspin seemed to recognize that the global security

⁹⁶ A National Security Strategy of Engagement and Enlargement 1995, 13-16.

⁹⁷ Aspin, Les. *Report of the Bottom-Up Review*. Washington, D.C.: Department of Defense, 1993. Schafer, Susanne. "Aspin: New Review of Nuclear Arsenal Needed." *Associated Press*, October 29, 1993.

environment had fundamentally changed, embodied in his support while a congressional representative for cooperative threat reduction and expressed concern for nuclear weapons in the hands of terrorist actors and rogue states. Moreover, he had voiced (on the record) personal doubts regarding nuclear deterrence assumptions, even indicating the United States might ultimately be better served by a world without nuclear weapons. Unfortunately, Aspin resigned his position in December 1993 following the death of 18 U.S. servicemen in Mogadishu that year.⁹⁸

Implementation of the review itself was led by Assistant Secretary of Defense Ashton Carter. Like Aspin, Carter was seen as a potential agent of change in what many perceived to be an ossified defense establishment still mired in Cold War assumptions. As it turned out (or at least as the limited official record suggests), Carter was ill-equipped to turn back five decades of entrenched thought in the defense nuclear establishment. He was distrusted from the start by senior officers in the United States Strategic Command (STRATCOM), successor to the Cold War-era Strategic Air Command and charged with inter-service operational command and control of all U.S. nuclear forces. Carter's assumptions regarding the purpose of the review fundamentally differed from those of the military and long-serving civilians in the Pentagon establishment; the latter felt the review should be used to assess current threats and recalibrate U.S. deterrent capabilities and postures as appropriate, while Carter hoped for a more fundamental reevaluation of whether or not the current triad of delivery systems – tied to a “launch on warning” alert posture that reports suggest he severely distrusted – still made sense. Even more problematically, Carter lacked senior-level cover; following

⁹⁸ Nolan 1999, 38-41.
Schafer 1993.

Aspin's departure, it was not clear any senior Clinton administration officials shared similar enthusiasm for the review's original goals.

Most of the official record related to the NPR deliberations remains classified, including the final document itself. However, the few events that played out in the public eye suggested a bitter civil-military dynamic. In particular, Carter was subjected to public rebuke when an internal Pentagon memo, contesting proposals to reduce or eliminate the ICBM leg of the triad, was leaked to Republican congressmen. In official testimony, the commander of STRATCOM openly distanced himself and the NPR from the proposals, suggesting such options were not being seriously considered. This not only directly contradicted Carter, but was arguably insubordinate given Carter's authority over the Posture Review. Nonetheless, the leak – and the now public civil-military dispute transformed the posture review into a partisan issue that put the Clinton administration on the defensive. The process never recovered, at least in terms of achieving Les Aspin's original ambitions.⁹⁹

The final results of the NPR, summarized in a handful of unclassified press documents (including a 37-slide presentation), suggested 10 months of effort had fallen far short of a comprehensive reassessment. The slides, narrated by Deputy Secretary of Defense John Deutch, trumpeted large-scale reductions in the U.S. arsenal since 1988 and acknowledged that the threat environment had changed, though considerable uncertainty (especially regarding the future of Russia and regional WMD proliferation) continued to

⁹⁹ Nolan 1999, 40-62.

Ottaway, David, and Steve Coll. "Trying to Unplug the War Machine." *Washington Post*, April 12, 1995: A01.

The 1994 Nuclear Posture Review. (2005, July 8). Retrieved January 28, 2015, from The Nuclear Information Project: <http://www.nukestrat.com/us/reviews/npr1994.htm>

necessitate the need for a robust deterrent force remarkably similar to the one already in place (albeit at reduced levels meeting START I and II limits). This included maintaining a triad of 14 ballistic missile submarines, 86 strategic bombers, and 450-500 ICBMs, eventually mounting no more than 3500 START II-accountable warheads (assuming of course the agreement entered into force). Notably, the United States would for the foreseeable future continue to maintain a “warhead upload hedge,” in other words additional warheads in non-operational storage that could be loaded onto MIRV-capable missiles in the event of “...the reversal of reform in Russia. A return to an authoritative military regime...armed with 25,000 nuclear weapons.”

Regarding tactical nuclear weapons, the United States would maintain a fleet of dual-capable fighter bombers capable of delivering air dropped weapons, including those allocated to NATO forces in Europe. The Navy surface fleet, consistent with the PNIs, would no longer be nuclear capable. Navy attack submarines would retain the capability to deploy nuclear cruise missiles deemed essential to extended deterrence commitments in East Asia. The presentation made sure to point out the revised tactical arsenal represented less than 10% of the Cold War force structure (though the exact numerical strength of the U.S. arsenal was not elaborated), while Russia continued to opaquely maintain anywhere from 6,000-13,000 tactical nuclear weapons.¹⁰⁰

¹⁰⁰ "Nuclear Posture Review Slides." U.S. Department of Defense. September 22, 1994. <http://www.nukestrat.com/us/reviews/npr1994.htm> (accessed January 28, 2015). "Press Conference with Secretary of Defense William J. Perry, General Shalikashvili, Chairman, JCS, Deputy Secretary of Defense John Deutch, Mr. Kenneth H. Bacon, ATSD-PA." U.S. Department of Defense. September 22, 1994. <http://www.nukestrat.com/us/reviews/dodpc092294.pdf> (accessed January 28, 2015).

In sum, the NPR – along with the National Security Strategy – largely reaffirmed the status quo existing at the end of the Bush administration. There was nothing in the results to suggest any core assumptions had changed, including those related to the deterrent relationship with Russia, the value of assured destruction, counterforce vs. countervalue targeting, or the option of first use. A valid argument could be made that these were issues requiring higher level deliberation between the President and his advisors – the job of the Pentagon is not to drive policy, but to prepare for and carry out military missions concurrent with policy guidance. Formal executive guidance to this effect had not been issued since the Reagan administration introduced its “prevailing” strategy in 1981. The Clinton administration quietly rectified this gap in 1997, three years *after* the posture review (when such guidance might have been instructive). At the time, U.S. and Russian policymakers were beginning to broach the subject of START III, and U.S. military planners cautioned that the Reagan-era planning guidance was fundamentally incompatible with the reductions being proposed. Presidential Decision Directive (PDD)-60 was not released to the public but Robert Bell, Senior Director for Defense Policy and Arms Control on the National Security Council, provided some details regarding its contents in an interview. Bell noted, “We have made an important change in terms of strategic nuclear doctrine in reorienting our presidential guidance away from any sense that you could fight and win a protracted nuclear war to a strategic posture that focuses on deterrence.” This represented an important rhetorical break from the previous Republican administrations, which either explicitly (in the case of Reagan) or implicitly (in the case of Bush, who retained the Reagan-era guidance) directed that nuclear war planning be aimed at identifying “winning” strategies and associated

capabilities for a nuclear exchange lasting well beyond the first volley of missiles – however pyrrhic the outcome might seem in the end.¹⁰¹

More significantly, the administration rejected the idea of a “launch-on-warning” readiness posture, in which nuclear weapons would be launched immediately following detection of an incoming nuclear strike (but preceding actual detonation of weapons on American soil). Launch-on-warning was never an explicit feature of American nuclear posture, but the potential for such a response was also never ruled out by U.S. policymakers. While still retaining the “technical capability” to launch on warning, the administration (according to Bell) was directing the military not to use this capability as an organizing principle – rather, the country’s nuclear forces “should be able to absorb a nuclear strike and still have enough force surviving to constitute credible deterrence.” More interestingly, Bell stated that “Our policy is to confirm that we are under nuclear attack with actual detonations before retaliating” (a policy Scott Sagan describes as “launch under attack”). This suggested a nuclear force primarily intended for assured retaliation in a worst case scenario, rather than an instrument of warfighting. Taken alone, these statements might have even suggested a doctrine of no-first-use – except that Bell added further caveats indicating the evolution in U.S. policy only went so far.¹⁰²

¹⁰¹ "Clinton Issues New Guidelines on U.S. Nuclear Weapons Doctrine." *Arms Control Today*. November 1, 1997. http://www.armscontrol.org/act/1997_11-12/pdd (accessed January 28, 2015).

Freedman, *The Evolution of Nuclear Strategy* 2003, 385-388, 431-432.

¹⁰² For additional discussion of “launch on warning”, see:

Burr, William, ed. "Launch on Warning: The Development of U.S. Capabilities, 1959-1979." *The National Security Archive*. April 2001. <http://www2.gwu.edu/~nsarchiv/NSAEBB/NSAEBB43/> (accessed January 28, 2015).

Freedman, *The Evolution of Nuclear Strategy* 2003, 252-253, 372.

Sagan, Scott. *Moving Targets: Nuclear Strategy and National Security*. Princeton: Princeton University Press, 1989, 157-159.

The administration reserved the right to first use in three situations. If the United States was involved in a conflict with a nuclear-capable adversary, “we reserve the right to use nuclear weapons first” as a potential response to aggression involving both WMD (to include biological and chemical weapons) and conventional weapons. The administration further reserved the right of first use for states “not...in good standing under the Non-Proliferation Treaty or an equivalent international convention.” Finally, nuclear weapons might be used first against an aggressor aligned with a nuclear weapon state (even if that state was in good NPT standing). These caveats also applied in situations where a U.S. ally was attacked by a nuclear armed state, or a non-nuclear state allied with a nuclear armed state. This language largely conformed to policy first articulated under the Carter administration in 1978 and reiterated by Clinton officials during the 1995 NPT Review and Extension Conference (non-nuclear weapon state NPT parties had long insisted on such assurances from the nuclear weapon states). From the standpoint of the U.S.-Russian deterrent relationship, it offered no change and remained consistent with Cold War NATO doctrine regarding first use in the European theater.¹⁰³

Thus, the only real change suggested by the unclassified statements on PDD-60 regarded the principle of launch-on-warning. Even in that case, the administration was refuting policy that never explicitly existed, and moreover would continue to hedge by maintaining the capability. Had the guidance been released before 1993, it is not clear it

¹⁰³ For further discussion of the United States and first use, see:

Bunn, George, and Roland Timerbaev. "Security Assurances to Non-Nuclear-Weapon States." *The Nonproliferation Review*, no. Fall (1993): 11-21.

Gompert, David, Kenneth Watman, and Dean Wilkening. *U.S. Nuclear Declaratory Policy*. Santa Monica: RAND, 1995.

"Proposed International Legally-Binding Negative Security Assurances (NSAs)." *Nuclear Threat Initiative*. 2015. <http://www.nti.org/treaties-and-regimes/proposed-internationally-legally-binding-negative-security-assurances/> (accessed January 28, 2015).

would have had any substantive effect on the posture review. In theory, if the Pentagon had understood (and accepted) that it was only to maintain a retaliatory capability rather than a warfighting capability, then force requirements might have been scoped differently – fewer weapons may be required if the objective is simply massively devastating punishment, versus carefully formulated counterforce targeting in a protracted exchange. That said, the posture review record indicates the military (and congressional Republicans) insisted on the necessity of the triad for maintaining an assured second strike capability (thus the pushback against ICBM-eliminating proposals). Finally, any targeting guidance associated with these statements is unavailable for public consumption given the classification of PDD-60 – meaning there is scant evidence overall to suggest the document’s launch-on-warning guidance would have changed the final NPR force calculation.

Throughout the 1990s, the United States largely stayed the course on its nuclear doctrine and force posture. There would be no further unilateral changes beyond those initiated by the George H.W. Bush Administration, and the START treaties – rather than a truly thoughtful, whole of government, geopolitically-informed reassessment of U.S. nuclear requirements – would largely continue to set the upper bounds of the U.S. arsenal. While perhaps disappointing from the perspective of arms control and disarmament advocates, this also meant the United States did not on its own introduce any disruptive changes to the balance of threat or mind vis-à-vis Russia. If nothing else, the United States held steady while Russian doctrine reoriented in response to an uncertain future.

Russian Retrenchment

The downturn in the Russian economy – coupled with the erosion of both conventional and strategic capabilities already noted – impacted doctrine as much as force balance. In June 1982, five months before Leonid Brezhnev’s death, Andrei Gromyko read a statement from the ailing leader to the UN Assembly’s Special Session on Disarmament declaring that “the Union of Soviet Socialist Republics assumes an obligation not to be the first to use nuclear weapons.” Skeptics argue the statement was nothing more than a political ploy intended to alienate the United States and the NATO alliance in an international forum (U.S. and NATO leaders maintained the option of first use given perceptions of Soviet conventional preponderance). Moreover, deployed tactical nuclear capabilities and later archival research suggested that Soviet military planners still envisioned contingencies in which first-use might be employed. It was also never clear how this policy affected the possibility for launch-on-warning; Russian early warning systems, force readiness, and command and control capabilities continued to suggest maintenance of such a capability. At the same time, Soviet military scholarship and even policy statements of the era suggested an increasing fatalism regarding the prospect of nuclear war; writings suggested many in the defense establishment felt it was impossible to contain nuclear war at a “limited level” and any exchange would prove devastating to both sides – thinking not inconsistent with a doctrine limiting nuclear use only to those situations in which an adversary has first crossed the threshold.¹⁰⁴

¹⁰⁴ Delpech, Therese. "New States of Nuclear Disarmament: A European View." In *The Nuclear Turning Point*, by Harold Feiveson, 333-340. Washington, D.C.: The Brookings Institution, 1999.
Feiveson, Harold, and Ernst Hogendoorn. "No First Use of Nuclear Weapons." *The Nonproliferation Review*, no. Summer (2003): 3.
Freedman, The Evolution of Nuclear Strategy 2003, 400-405.

Whatever Soviet intentions may have been, the Yeltsin administration began drifting from this stance by the middle of the decade. The no-first-use pledge had been reiterated during negotiations from 1991-1993 with Belarus, Kazakhstan, and Ukraine over interim custodianship of Russian nuclear weapons. However, in 1993 the administration internally circulated a document titled “The Basic Provisions of the Military Doctrine of the Russian Federation.” The document was notable in not explicitly calling out the United States as a primary adversary, instead suggesting “local” or regional threats were more salient in the post-Cold War (Russian forces disastrously invaded Chechnya the following year). It did cite threats from “...the expansion of military blocs and alliances to the detriment of the interests of the Russian Federation's military security,” and “the possibility of strategic stability being undermined as a result of the violation of international accords in the sphere of arms limitation and reduction and of the qualitative and quantitative buildup of armaments by other countries.” The Yeltsin administration appeared to hedge against expansion of a more assertive NATO, or an attempt by the United States to break out of the equilibrium codified by START.¹⁰⁵

The basic provisions contained limited nuclear posture guidance, but the lack of reference to no-first-use was conspicuous. The document stated that Russia would not use its nuclear weapons against non-nuclear weapon state signatories to the Treaty on the Nonproliferation of Nuclear Weapons (NPT), except possibly in situations in which a

“Brezhnev's Statement and Exerpts from Gromyko's Speech.” *The New York Times*. June 16, 1982. Sherr, Alan. *The Other Side of Arms Control: Soviet Objectives in the Gorbachev Era*. Boston: Unwin Hyman, 1988, 77-101.

¹⁰⁵ “The Basic Provisions of the Military Doctrine of the Russian Federation.” *Federation of American Scientists*. 1993. <http://www.fas.org/nuke/guide/russia/doctrine/russia-mil-doc.html> (accessed January 28, 2015).

Shoumikhin, Andrei. “Nuclear Weapons in Russian Strategy and Doctrine.” In *Russian Nuclear Weapons: Past, Present, and Future*, edited by Stephen Blank, 99-160. U.S. Army War College Strategic Studies Institute, 2011, 110-112.

non-nuclear aggressor was aligned with a nuclear weapons state (a caveat clearly directed at NATO). Regarding specific situations in which nuclear weapons might be used, the provisions indicated that “Deliberate actions by the aggressor which aim to destroy or disrupt the operation of the strategic nuclear forces, the early-warning system, nuclear power and atomic and chemical industry installations may be factors which increase the danger of a war using conventional weapons systems escalating into a nuclear war.”

Interesting, the document maintained continuity with previous Soviet thought in asserting that “any, including limited, use of nuclear weapons in a war by even one side may provoke the massive use of nuclear weapons and have catastrophic consequences.” While Russian policymakers reserved the right to use nuclear force, they were under no illusions (at least in print) that such force could be locally contained. While the Military Doctrine left some room for interpretation on first use, in a press conference shortly after the document was approved, Defense Minister Pavel Grachev made it clear the Yeltsin administration no longer felt bound to the communist era pledge – and further noted this brought Russia in line with U.S. doctrine.¹⁰⁶

Throughout the decade, Russia continued to make qualitative adjustments to the first use threshold reflecting increasing insecurity and distrust of the United States and NATO. The 1997 “National Security Concept” document (also referred to as the “National Security Blueprint”) suggested greater Russian unease with its position in the world, particularly regarding “attempts to create a structure of international relations based on one-sided solutions of the key problems of world politics, including solutions based on military force.” Besides expanding membership, NATO was playing an

¹⁰⁶ Lockwood, D. (1993). Russia Revises Nuclear Policy, Ends Soviet 'No-First-Use' Pledge. *Arms Control Today* (December), 19.

increasingly assertive role in Europe, including undertaking its first military intervention in Bosnia. The “Operation Deliberate Force” bombing campaign in 1995 was seen as particularly aggressive in its focus on Bosnian Serb forces for which many Russians held sympathies. The document lamented erosion of Russia’s military-industrial base, noting the country was “lagging increasingly far behind developed countries in terms of science and technology,” and that this decline risked “undermining of the state’s defense potential.”¹⁰⁷

Despite the uncertainties, the 1997 Concept expressed confidence in the Russian Federation’s “power nuclear force potential,” which created “the preconditions for ensuring reliable national security for the country in the 21st century.” Whereas the 1993 Basic Provisions had been ambiguous regarding the modern utility of the nuclear arsenal, the 1997 Concept afforded these weapons a more central role in preserving Russian integrity and deterring the encroachment of outside forces increasingly perceived as opposed, if not outright hostile to Russian interests. Nonetheless, the document indicated that Russia did “not seek to maintain parity in arms and armed forces with the leading states of the world,” but rather was “oriented toward the implementation of the principle of realistic deterrence.” Finally, regarding the nuclear threshold, the Security Concept stated that “Russia reserves the right to use all the forces and systems at its disposal, including nuclear weapons, if the unleashing of armed aggression results in a threat to the actual existence of the Russian Federation as an independent sovereign state.” The specific dimensions of such a threat to Russia’s sovereignty were not elucidated;

¹⁰⁷ Two translations of the 1997 National Security Concept are available: "Concept of National Security of the Russian Federation." *Geneva Centre for the Democratic Control of Armed Forces*. January 28, 2015. http://www.dcaf.ch/content/download/36017/527251/file/BM_Arbatov_03NatSec_Concept.pdf. "Russian National Security Blueprint." *Federation of American Scientists*. December 26, 1997. <http://www.fas.org/nuke/guide/russia/doctrine/blueprint.html> (accessed January 28, 2015).

Schelling's "threat that leaves something to chance" seemed to be embodied in the policy statement.

The 1997 National Security Concept reflected the deliberations of a Russian presidential administration whose power was increasingly tenuous in the face of continuing economic decline, internal instability, international marginalization, and the emergence of factions preferring a more nationalistic, centralized, and (as time would reveal) autocratic approach to both domestic and foreign policy. Yeltsin – ailing from heart disease and alcoholism while reeling from multiple economic and political crises – resigned the presidency in 1999, transferring interim power to Prime Minister Vladimir Putin. Only two weeks before resigning, the administration released a newly revised National Security Concept. The document was more directly critical of the United States, charging it with leading an attempt to “create a structure...based on the domination of developed western countries...providing for unilateral solution of the key problems of global politics, above all with the use of military force, in violation of the fundamental norms of international law.” Earlier in the year, NATO initiated Operation “Allied Force,” a bombing campaign intended to force an end to Yugoslav hostilities against Kosovar rebels and pave the way for a peacekeeping force. By contrast to Deliberate Force, the operation was not approved by the UN Security Council and was staunchly resisted by the Russian government. Disagreement regarding the area of operations for joint NATO-Russian peacekeepers in the wake of the bombing even led to a brief military confrontation in Pristina that recalled memories of Cold War standoffs in the 1950s and 60s. Russian observers were also alarmed by the effective combination of

western airpower and sophisticated, precision-guided conventional munitions as demonstrated in Kosovo and other regional conflicts throughout the decade.¹⁰⁸

On nuclear weapons, the 1999 document appeared to widen the potential scope of use, stating, “The main task of the Russian Federation is to deter aggressions of any scale against it and its allies, including with the use of nuclear weapons,” and that “The Russian Federation must have nuclear forces capable of delivering specified damage to any aggressor state or a coalition of states in any situation.” The inclusion of “allies” in the nuclear deterrence mission was new (though who those allies were remained vague), while the notion of “specific damage” suggested potential for limited employment short of massive retaliation. That same year, the Russian military conducted a large-scale exercise in which nuclear strikes were simulated in response to battlefield setbacks against an unnamed but conventionally superior enemy; limited nuclear strike scenarios would become an increasingly standardized component of similar exercises in the future. An article in the influential Russian military journal *Voyennaya Mysl* (aka *Military Thought*) also introduced the concept of “de-escalation” strikes, or limited nuclear strikes conducted to convey Russia’s resolve and quickly bring an end to conventional hostilities. The concept, which would receive increasing attention in Russian military circles in the 21st century, nonetheless harkened back to U.S. strategic thinking on limited war and flexible response from the 1960s. By contrast to Robert McNamara, however, it seemed contemporary Russian strategic thinkers believed that escalation control could be achieved.¹⁰⁹

¹⁰⁸ "National Security Concept of the Russia Federation." *Federation of American Scientists*. 2000. <http://www.fas.org/nuke/guide/russia/doctrine/gazeta012400.htm> (accessed January 28, 2015).

¹⁰⁹ Gordon, Michael. "Maneuvers Show Russian Reliance on Nuclear Arms." *New York Times*, July 10, 1999.

Additional elaboration was provided in April 2000 with the release of the “Russian Federation Military Doctrine,” only two weeks before Putin was elected president by popular vote. The document’s statement on nuclear weapons seemed to represent a capstone for a decade of uncertain, albeit fairly consistent evolution in strategic thought and is worth reproducing in full:

“Under present-day conditions, the Russian Federation proceeds on the basis of the need to have a nuclear potential capable of guaranteeing a set level of damage to any aggressor (state or coalition of states) under any circumstances.

The Nuclear weapons with which the Russian Federation Forces are equipped are seen by the Russian Federation as a factor in deterring aggression, safeguarding the military security of the Russian Federation and its allies, and maintaining international stability and peace.

The Russian Federation reserves the right to use nuclear weapons in response to the use of nuclear and other types of weapons of mass destruction against it and (or) its allies, as well as in response to large-scale aggression utilizing conventional weapons in situations critical to the national security of the Russian Federation.

Kipp, Jacob. "Russia's Nonstrategic Nuclear Weapons." *Military Review*, no. May-June (2001): 27-37.
Sokov, Nikolai. "Why Do States Rely on Nuclear Weapons? The Case of Russia and Beyond." *The Nonproliferation Review*, no. Summer (2002): 101-111.
Sokov, Nikolai. *Russia's New Security Concept: The Nuclear Angle*. July 1, 2004.
<http://www.nti.org/analysis/articles/russias-new-national-security-concept/> (accessed January 28, 2015).

The Russian Federation will not use nuclear weapons against states party to the Nonproliferation Treaty that do not possess nuclear weapons except in the event of an attack on the Russian Federation, the Russian Federation Armed Forces or other troops, its allies, or a state to which it has security commitments that is carried out or supported by a state without nuclear weapons jointly or in the context of allied commitments with a state with nuclear weapons.”

The Military Doctrine’s nuclear statement concisely unified several strains of thought present or hinted at in previous documents, and set a resolute tone consistent with Russian military and foreign policy developments to follow in the coming decade. It articulated a more unequivocal renunciation of the 1982 no-first-use policy by stating that “large-scale” conventional aggression might prompt a nuclear response – and not just conventional threats to Russian security, but potentially the security of its allies (the only ally specifically cited in the doctrine was Belarus). Coalition partners (read NATO partners) might be in the nuclear crosshairs if allied in their aggression with a nuclear power. Finally (though more ambiguously), the document strongly suggested Russia would maintain nuclear capabilities appropriate across a range of contingencies, allowing it to guarantee “a set level of damage to any aggressor.”¹¹⁰

Nuclear weapons would remain a strategic linchpin for Russian hedging against an uncertain future. The Putin administration would oversee a rebound in Russian economic prospects, translated into new investments in the Russian military, including its nuclear forces. Though still unable to replicate the defense spending of the Soviet era, or

¹¹⁰ "Russia's Military Doctrine." *Arms Control Today*. May 1, 2000. https://www.armscontrol.org/act/2000_05/dc3ma00 (accessed January 28, 2015).

catch up to the United States (especially following the post-9/11 U.S. defense budget expansion), Russia slowly began to resuscitate its deterrent capability through investment in a new generation of land-based ballistic missiles and slow recapitalization of the submarine fleet. In 1999, Russia resumed transoceanic strategic bomber flights to probe U.S. and NATO air defenses and demonstrate offensive capabilities – a practice common to both sides during the Cold War but halted for a time in the 1990s. Putin would also lead a new assertiveness in Russian foreign policy, one seemingly poised to conflict with an incoming U.S. administration seeking to similarly distinguish itself from its predecessor.¹¹¹

Balancing Force and Mind in the New Millennium

While Russian developments in nuclear strategic thought during the 1990s seemed provocative at first glance, it should be recognized that – at least in rhetorical substance – the shift toward a first use option and greater reliance on nuclear deterrence against conventional threats was remarkably congruent with U.S. and NATO doctrine before and (to a lesser but still significant extent) after the Cold War. Throughout the Cold War, the alliance considered itself vulnerable to the Warsaw Pact's perceived preponderance of manpower and conventional military capabilities. NATO allies still recovering from the Second World War, and in many cases committed to social democratic domestic agendas, found themselves economically and/or politically incapable of fielding militaries up to the task of conventional deterrence. Nuclear weapons, along with a threat of battlefield first use, provided an economical means to

¹¹¹ Priest, Dana. "Russia Flight Shocks West." *The Washington Post*, July 1, 1999: A1.

deter Soviet offensive designs. This was evident in the alliance's maintenance of extensive tactical nuclear capabilities up until the PNI withdrawals, most of which were held by the United States, bolstered by smaller French and British contributions. By treaty, some of these weapons were to be made available to other non-nuclear NATO allies in the event of nuclear hostilities with the Warsaw Pact. This "nuclear sharing" arrangement persists into the present day; NATO allies continue to maintain aircraft and trained aircrews capable of delivering the small arsenal of air-dropped U.S. nuclear weapons still stationed on the continent. Importantly, the alliance – and by extension the United States – continues to hold back from a no-first-use pledge, even despite growing internal disputes regarding the role of nuclear weapons in the alliance. It could be argued then that by 2000, in some regards the United States and the Russian Federation were closer than ever in regards to nuclear doctrine – though the Russian military appeared to be undertaking a fresh reassessment of how to operationalize its nuclear capabilities for a land war in its western borderlands, while the United States and NATO shifted to regionally-oriented conventional operations.¹¹²

Though the espoused doctrine of the two sides may have shown a rough congruence, the divergence in actual military capabilities remained significant at the start of the millennium, even as Russia worked to resuscitate its defense industrial complex. The deployment of a new generation of Russian ballistic submarines, the "Borei" class, is illustrative of the challenges. As previously noted, Russia's submarine deterrent decayed during the 1990s; the Borei vessels were intended to address this gap and allow the

¹¹² Freedman, *The Evolution of Nuclear Strategy* 2003, 271-314. Schulte, Paul. "Tactical Nuclear Weapons in NATO and Beyond: A Historical and Thematic Examination." In *Tactical Nuclear Weapons and NATO*, edited by Tom Nichols, Douglas Stuart and Jeffrey McCausland, 75-106. Carlisle: U.S. Army War College Strategic Studies Institute, 2012.

Russian Navy to finally retire some of its most obsolete assets. The first submarine of the class was originally intended to be launched in 2002; production delays pushed the date to 2008. Meanwhile, the new generation SS-NX-32 “Bulava” missile intended to equip the submarine suffered through a series of failed flight tests, not achieving operational capability until 2011. Greater progress could be claimed in the deployment of next generation land-based missile systems, namely the SS-27 series of road-mobile and silo-based ballistic missiles.¹¹³

While campaigning in 2000, George W. Bush and his advisors indicated an interest in deeper arsenal reductions achieved through reciprocated unilateral initiative with Russia, echoing the elder Bush’s approach through the PNIs. The incoming administration sought a new paradigm, one dispensing almost entirely with the elaborately negotiated parameters and verification requirements of past treaties – treaties that were easier to get into than out of politically, and that did not always maintain relevance into the uncertain future. Moreover, Bush seemed ready to set aside whatever animosities lingered following the Cold War; arms control was a relic of a more adversarial relationship.¹¹⁴ In a speech at the National Defense University, only several months after taking office, Bush noted optimistically that, “Today’s Russia is not yesterday’s Soviet Union. Its government is no longer communist. Its president is elected. Today’s Russia is not our enemy, but a country in transition with an opportunity to emerge as a great nation, democratic, at peace with itself and its neighbors.” Regarding nuclear weapons, he noted his commitment to “achieving a credible deterrent with the

¹¹³ Sokov, Nikolai. “Nuclear Weapons in Russian National Security Strategy.” In *Russian Nuclear Weapons: Past, Present, and Future*, edited by Stephen Blank, 187-260. Carlisle: U.S. Army War College Strategic Studies Institute, 2011.

¹¹⁴ Interview with former U.S. government official.

lowest possible number of nuclear weapons consistent with our national security needs, including our obligations to our allies. My goal is to move quickly to reduce nuclear forces.”¹¹⁵

In the same speech, Bush also emphasized that “We need a new framework that allows us to build missile defenses to counter the different threats of today’s world. To do so, we must move beyond the constraints of the 30-year-old ABM Treaty. This treaty does not recognize the present or point us to the future. It enshrines the past.” The new administration included a number of missile defense hawks whose experience dated back to well before Reagan and SDI, including Dick Cheney, Paul Wolfowitz, and of course Donald Rumsfeld. These individuals saw the cautious Clinton-era approach to missile defense as a tepid response at best to present day threats from rogue states. The Bush administration saw an urgent need for a defensive shield, even if the requisite technologies remained immature and untested. More importantly, it was willing to dispense with the ABM Treaty entirely if some kind of accommodation or amendment to the agreement couldn’t be reached with Russia.

It is still not clear how much effort was actually put into trying to reach such an accommodation. The administration reached out to Russia early in its term, seeking agreement on a range of fronts including arms control, security cooperation, and economic exchange. The events of September 11th, 2001 took place amidst these exchanges, which only served to reinforce the administration’s fixation on threats from rogue states, especially those aligned with terrorist organization. Not surprisingly

¹¹⁵ Broder, John. "Breaking Cold War Mold: Bush's Proposal to Reduce Nuclear Arsenal Injects Arms into Race for the White House." *New York Times*, May 26, 2000: A1.
"President Bush's Speech on Nuclear Strategy." *Arms Control Today*. June 1, 2001.
<http://www.armscontrol.org/print/857> (accessed January 29, 2015).

perhaps, all three states cited in Bush's "Axis of Evil" (Iran, Iraq, and North Korea) possessed indigenous ballistic missile development programs (though Iraq's was largely moribund by that point). Putin visited Bush's Texas ranch in November 2001, where proposals for amending the ABM Treaty framework were allegedly discussed and rejected by Russia. The following month, Bush announced the United States would unilaterally withdraw from the treaty in 6 months – the lead time allotted in the agreement's withdrawal clause (a characteristic feature of most arms control agreements).¹¹⁶

Russia promptly withdrew from START II the day following official U.S. withdrawal from the ABM Treaty in June 2002. Despite ratification by both signatories, the treaty never actually entered into force at any point in its tumultuous history (the Duma ratified the agreement in 2000, but its approval was contingent on a U.S. commitment to the ABM Treaty). Beyond the unsurprising demise of START II, Russian reaction to the U.S. withdrawal was otherwise calm. In a televised address shortly after the U.S. December withdrawal announcement, Putin simply noted that, "As is well known, Russia and the U.S., unlike other nuclear powers, have for a long time possessed effective means to overcome missile defenses... Therefore I fully believe that the decision taken by the president of the United States does not pose a threat to the national security of the Russian Federation." Putin's statement was characteristic of the initial Russian response to Bush's missile defense plans, emphasizing the existence of Russian technical capabilities and development programs – like maneuverable reentry vehicles – aimed at

¹¹⁶ Sanger, David. "Before and After Bush and Putin's Banter, No Agreement on Missile Defense." *New York Times*, November 16, 2001: A12.

defeating U.S. missile defenses (and never minding the fact that Russia could easily overwhelm the proposed defenses with its robust strategic missile force).¹¹⁷

Importantly, Russia did not abrogate its arms control commitment under START I, despite the Yeltsin administration's previous threats. Moreover, Putin's government still sought further reductions – if for no other reason than Russia couldn't afford to continue fielding a force consistent with START I levels and sought to preserve the balance of threat. The Russian administration still sought a legally binding treaty, however, in contrast to the reciprocated unilateralism preferred by the Bush administration. The 2002 Treaty on Strategic Offensive Reductions (also known as the "Moscow Treaty" or SORT) represented something of a middle ground between the two positions.

The START treaties – including all annexes and protocols – each numbered many hundreds of pages, most outlining the elaborate procedures and processes associated with verification. The text included detailed definitions and "counting rules" specifying what items were accountable under the terms of the agreement. Rules governing onsite inspections, supervised destruction of delivery systems, and the gathering of telemetry data were spelled out in explicit, legalistic detail. By contrast, the Moscow Treaty could easily be scaled to fit on a single readable page. On reductions and limits, the treaty simply specified that by December 2012, the "aggregate number of such warheads...does not exceed 1700-2200 for each Party. Each Party shall determine for itself the composition and structure of its strategic offensive arms, based on the established

¹¹⁷ Myers, Stephen. "Putin Says New Missile Systems Will Give Russia a Nuclear Edge." *New York Times*, November 18, 2004: A3.

Neilan, Terence. "Bush Pulls Out of ABM Treaty; Putin Calls Move a Mistake." *New York Times*, December 13, 2001.

aggregate limit for the number of such warheads.” By contrast to START I and II, no bounds were placed on how these warheads might be apportioned to specific delivery systems; each party was free to choose the appropriate mix of ICBMs, submarines, and aircraft. There were no specified limits on MIRVed missiles, heavy missiles, or submarines. Exactly what constituted a single accountable “warhead” was ambiguous. The counting rules under previous treaties could be notoriously arcane and often represented negotiated tradeoffs. Under START I, for example, each strategic bomber counted for a single accountable warhead, despite the fact that bombers on both sides could be equipped with dozens of missiles or bombs (START II would have rectified the discrepancy). SORT completely sidestepped the issue, leaving interpretation up to the respective implementing parties. Furthermore, no verification provisions were outlined, though START I and its associated verification measures were preserved until that treaty’s expiration in 2009 (at which point SORT was supposed to be completely implemented by both parties), providing continued monitoring and some measure of confidence that neither party was secretly exceeding limits.¹¹⁸

The Moscow Treaty was an easy target for critics of the Bush administration’s approach to arms control. However, for all of its arguable shortcomings, the treaty seemed indicative of a fairly dramatic reassessment of the deterrent relationship with Russia, at least on the part of Bush and his inner circle. The United States was willing to accept reductions exceeding START II targets by as much as half (assuming the parties erred in the direction of the 1700 warhead floor). The threat had ebbed to a such point that the United States could afford to divest itself from preoccupation with the qualitative

¹¹⁸ "Strategic Offensive Reductions Treaty (SORT)." *Arms Control Association*. May 24, 2002. <https://www.armscontrol.org/documents/sort> (accessed January 31, 2015).

particulars of Russian force posture – details like whether or not its heavy ICBM force conferred a decisive counterforce advantage, whether the “upload” capability of its MIRVed systems presented a treaty breakout threat, or whether the survivability of its mobile missiles and submarines signaled intent to achieve victory in an extended nuclear exchange. Russia would be permitted – in fact encouraged – to structure its arsenal as it saw fit, just as the United States would in kind. Even more significant, the United States could trust Russia at its word to follow through with the reductions (and vice versa). This coming from Bush administration officials who, in the 1970s and 80s, had publicly balked at the ambiguities and lack of accountability under the SALT agreements and served reverently under a president whose famous arms control mantra was “trust but verify.”

This did not mean, however, that the Bush administration was accepting the obsolescence of nuclear weapons, or relegating them to second-tier status weapons of last resort. Responding to a congressional mandate, the Rumsfeld Pentagon conducted its own Nuclear Posture Review, briefing the results in 2002. If anything, the process was even more opaque in comparison to the 1993/94 NPR; the only unclassified record is a 3-page forward summarizing the results. The study’s major innovation was to outline a “New Triad” of capabilities. The first leg would include the sum of America’s offensive strike capabilities – both nuclear *and* conventional. The second leg would include “active and passive” defensive systems, including ballistic missile defense. The third leg would encompass “a revitalized defense infrastructure that will provide new capabilities in a timely fashion to meet emerging threats.” The document indicated a shift in emphasis away from strategic nuclear delivery systems, emphasizing that threats from rogue states

and terrorists merited “a broader array of capability... needed to dissuade states from undertaking political, military, or technical courses of action that would threaten U.S. and allied security.” The President required “a range of options to defeat any aggressor.”¹¹⁹

Critics were quick to seize on the lack of innovation inherent in the “New” Triad. It merely rebranded defense capabilities that already existed, without suggesting any fundamental changes to the makeup or disposition of those capabilities. The Bush administration would continue to maintain the “old” triad of delivery platforms, and given the lack of delivery system constraints under SORT, the force looked much like the one settled upon by the Clinton NPR (albeit with fewer deployed warheads per delivery platform). Potentially more serious was the fact that the Bush NPR appeared to blur the lines traditionally separating conventional and nuclear capabilities; it suggested these capabilities were all part of a continuum of options available to the president in responding to threats. Though arguably this had always technically been the case, the new NPR seemed to attribute less gravitas to the decision to “go nuclear.” Indeed, there were multiple indications beyond the NPR that the Bush administration might be attempting to relax the constraints on nuclear use.¹²⁰

The first was the administration’s provocative stance on preemptive military action. The 2002 *National Security Strategy* highlighted the administration’s belief that “deterrence based only upon the threat of retaliation is less likely to work against leaders of rogue states more willing to take risks, gambling with the lives of their people, and the

¹¹⁹ "Nuclear Posture Review Report." U.S. Department of Defense. 2002.

<http://www.defense.gov/news/jan2002/d20020109npr.pdf> (accessed January 29, 2015).

¹²⁰ Bernstein, Paul. "Post-Cold War US Nuclear Strategy." In *On Limited Nuclear War in the 21st Century*, edited by Jeffrey Larsen, 80-95. Stanford: Stanford University Press, 2014, 86-89.

Guthe, Kurt. *The Nuclear Posture Review: How Is the "New Triad" New?* Washington, D.C.: Center for Strategic and Budgetary Assessments, 2002.

wealth of their nations.” The document highlighted the fact that preemptive action had always been an option available to U.S. leadership, but suggested that present circumstances – namely the nexus of rogue states, terrorism, and WMD – necessitated preemptive options more than ever. The NSS did not mention whether such preemption might involve nuclear weapons; indeed, it had precious little to say about the role of the U.S. nuclear arsenal. The 2002 *National Strategy to Combat Weapons of Mass Destruction* indicated that “The United States will continue to make clear that it reserves the right to respond with overwhelming force – including through resort to all of our options – to the use of WMD against the United States, our forces abroad, and friends and allies.” Concerned observers also pointed to certain procurement and modernization initiatives, the most controversial among these being the Robust Nuclear Earth Penetrator (RNEP). The RNEP proposal involved modification of an existing U.S. nuclear gravity bomb for greater effectiveness in destroying underground targets like leadership facilities or WMD storage bunkers – potential targets of concern in rogue adversary nations like North Korea or Iran. The penetrator initiative eventually died for lack of funding, facing scrutiny from both congressional representatives (including Republicans) and public interest groups that felt RNEP was a step toward deployment of more “useable” nuclear weapons and smacked of hypocrisy vis-à-vis U.S. nonproliferation efforts abroad.¹²¹

From a Russian standpoint, most of these developments should not have appeared particularly provocative, especially given the United States and Russia were nominal allies in the “Global War on Terrorism” and the nuclear capabilities proposed by the

¹²¹ Gormley, Dennis. "Securing Nuclear Obsolescence." *Survival* 48, no. 3 (2006): 127-148.
"National Strategy to Combat Weapons of Mass Destruction." The White House. December 2002.
<http://www.state.gov/documents/organization/16092.pdf> (accessed January 31, 2015).
"The National Security Strategy of the United States of America." The White House. 2002.
<http://www.state.gov/documents/organization/63562.pdf> (accessed January 31, 2015).

Bush administration hardly upset the strategic balance. However, certain developments following from the administration's national security policies nonetheless heightened Russian threat perceptions. Missile defense, newly elevated to a leg of the triad and amply funded through a dedicated Missile Defense Agency (MDA) within DOD, not surprisingly continued to be a sticking point and only magnified in significance as the Pentagon outlined the overall architecture of a "layered system" designed to engage ballistic missiles throughout the flight path – including "boost phase" (takeoff), mid-course phase (in exo-atmospheric ballistic flight), and terminal phase (after reentry, en route to target). Furthermore, the United States would collaborate with allies in developing and deploying the architecture. A centerpiece of the architecture was the Ground-Based Midcourse Defense (GMD) system, incorporating early warning radar systems and ground-launched hit-to-kill missiles. The MDA's plans included construction of two U.S.-based interceptor sites in Alaska and California, and a third interceptor site in Europe. Beginning in early 2007, Poland was approached to host the European interceptors, while the Czech Republic was asked to host the associated radar tracking system. Despite the potential for Russian backlash, the recent NATO inductees were open to hosting the assets as a means to deepen security cooperation with the United States and strengthen security guarantees against an increasingly assertive Russia under Putin.¹²²

Russian reaction to the European siting proposal was immediate and scathing. While the European interceptors were ostensibly intended to defend against threats emanating from the Middle East (namely Iran), Russian defense leaders saw an emerging

¹²² Coyle, Philip. "Rhetoric and Reality? Missile Defense Under Bush." *Arms Control Today*, May 1, 2002. Fitzpatrick, Mark. "A Prudent Decision on Missile Defense." *Survival* 51, no. 6 (2009/2010): 5-12.

threat to strategic stability close to their own borders. Echoing reaction to Clinton-era missile defense research, the Russian defense establishment didn't necessarily see the limited physical assets being placed in Europe as an immediate threat – but rather that the existence and continued development of such systems provided foundations for a far more capable system in the future. Foreign Minister Sergey Lavrov reflected this sentiment in early 2007, noting that the “radar in the Czech Republic will be monitoring Russian territory up to the Urals and interceptor missiles which are planned to be stationed in Poland will be capable of posing a threat to Russian deterrent arsenal. Therefore, this area – when we are told that it is not aimed at Russia, we should proceed not from intentions, but from facts, real potentials.” A year later, Lavrov suggested that “It is most likely that in the foreseeable future, we will hear talk about hundreds and even thousands of interceptor missiles in various parts of the world, including Europe. Poland is just the thin end of the wedge.” Throughout 2007 and 2008, officials suggested the Russian response would at a minimum include targeting the European missile defense sites with nuclear-capable missiles, and might even go as far as withdrawal from security cooperation and arms control frameworks like the INF Treaty (Russia did suspend its obligations under the Conventional Forces in Europe Treaty in July 2007). Provocative threats were leveled at Poland and the Czech Republic; Russia's representative to NATO reminded his “Polish colleagues” of “their recent history, which indicates that attempts to situate Poland on the line of confrontation have always led to tragedy.” It was apparent that Russia's objection to the European sites probably had as much to do with NATO expansion as strategic stability.¹²³

¹²³ Giles and Monaghan, *European Missile Defense and Russia* 2014, 12-16.

Polish and Czech support for the plan wavered in the face of Russian threats and criticism from electoral constituencies who saw the deployment as unnecessarily provocative. The Czech government eventually pulled out of the arrangement entirely, and the Bush administration provoked further Russian ire by approaching Lithuania as a potential alternative to Poland for emplacing interceptors. The administration attempted to diffuse the situation diplomatically through hurried outreach to the Russians, briefing officials on the details (and limits) of the U.S. plan, and continuing to offer assurances that the system was aimed at Middle East threats. Putin even offered to meet halfway with an alternative basing proposal, placing the interceptors on NATO's southern flank while leveraging a Russian early warning radar in Azerbaijan. Though the Russian proposal suggested potential for a cooperative solution, its technical feasibility was highly questionable and the Bush administration ultimately rejected the concept. The momentum of the European basing scheme was effectively stalled in 2007-2008, and the problem ultimately punted to the Obama administration for resolution.¹²⁴

Missile defense seized much of the spotlight in the U.S.-Russian strategic relationship during the Bush-Putin years. The other unsettling development that quietly gained momentum, though it did not result in tangible deployment of systems, was the Bush administration's exploration of "prompt global strike" capabilities. The 2002 Nuclear Posture Review noted that U.S. offensive nuclear capabilities in the first leg of the New Triad would be "integrated with new *non-nuclear strategic capabilities* that

Kramer, Andrew. "2 Leaders Rebuff Russia's Nuclear Threats." *New York Times*, February 21, 2007: A6.
Kramer, Andrew, and Thom Shanker. "Russia Steps Back from Key Arms Treaty." *New York Times*, July 14, 2007.

¹²⁴ Chivers, C.J. "Putin Proposes Alternatives for Missile Defense System." *New York Times*, June 9, 2007: A6.

Weitz, Richard. "Illusive Visions and Practical Realities: Russia, NATO, and Missile Defense." *Survival* 52, no. 4 (2010): 99-120.

strengthen the credibility of our offensive deterrence” (emphasis added). The reference to “non-nuclear strategic capabilities” was new; “strategic” capabilities traditionally referred exclusively to long-range nuclear assets. However, in the early years of the Bush administration, Pentagon studies (including the 2001 and 2006 Quadrennial Defense Reviews) began exploring the potential for a strike capability allowing the military to hit a target anywhere in the world within notice of a matter of hours— a capability that was in the past exclusive to U.S. intercontinental ballistic missiles with nuclear warheads. The concept of “prompt global strike” (PGS) naturally meshed with the Bush administration’s emphasis on a strategy of preemption in response to imminent threats from rogues states and terrorists. Bureaucratic groundwork was even undertaken at STRATCOM to incorporate PGS within its operational mission space.¹²⁵

Early proposals focused on equipping intercontinental ballistic missiles (either land- or submarine-based) with precision-guided conventional warheads, which seemed to present the fewest hurdles to implementation by leveraging existing technology (indeed, proposals for such an approach dated back to at least the 1970s). However, this approach was quickly attacked by congressional and nongovernment critics concerned that U.S. launch of a conventional ballistic missile might easily be misinterpreted by foreign (namely Russian) early warning systems as a nuclear attack; a Norwegian peaceful rocket test in 1995 had in fact provoked just such a response, putting Russian nuclear forces on temporary elevated alert. Putin himself underscored the risk in a 2006 speech to the Duma, warning that a misinterpreted launch “could spark an inadequate reaction by nuclear powers, including full-scale retaliation strikes.” Alternative proposals

¹²⁵ Nuclear Posture Review Report 2002.

that emerged included utilizing shorter range missiles with trajectories distinctly different from intercontinental ballistic missiles; more exotic “boost glide” systems in which a missile is used to launch a maneuverable, hypersonic gliding reentry vehicle toward its target; and long range hypersonic cruise missiles. No single approach was settled upon before the end of Bush’s presidency, but exploratory funding was allocated to all of these proposals and in some cases tests carried out with proof-of-concepts systems.¹²⁶

As with missile defense, the administration emphasized that PGS was a niche capability directed at threats from rogues states and terrorists; it was not intended for large-scale conflicts with a peer adversary (like Russia or China) or as a substitute for strategic nuclear capabilities. As with missile defense, Russian observers – who had been alarmed by advances in U.S. precision-guided conventional weaponry since the 1990s – reacted with skepticism, though not quite the same hyperbole. Early criticism, already noted, focused on the potential for false alarms. However, Russian defense policymakers also expressed concern that PGS might eventually be targeted at Russian nuclear forces, providing the United States (in combination with missile defense) a capability to eventually nullify Russia’s strategic nuclear forces without resort to nuclear weapons – thus lowering risk and potentially increasing incentives for preemptive attack. Anatoly Antonov, Director of Security and Disarmament in the Russian Foreign Ministry, summed up this viewpoint in a 2007 speech to NATO, stating “we see a direct link

¹²⁶ Acton, James. *Silver Bullet: Asking the Right Questions about Conventional Prompt Global Strike*. Washington, D.C.: Carnegie Endowment for International Peace, 2013.

U.S. Conventional Prompt Global Strike: Issues for 2008 and Beyond. Washington: The National Academies Press, 2008.

Podvig, Pavel. "Russia and the Prompt Global Strike Plan." *PONARS Eurasia*. December 2006. <http://www.ponarseurasia.org/memo/russia-and-prompt-global-strike-plan> (accessed January 31, 2015).

Sanger, David, and Thom Shanker. "U.S. Faces Choices on New Weapons from Fast Strikes." *New York Times*, April 22, 2010: A1.

between US plans for global missile defense and the prompt global strike concept which means the ability to strike any point on the globe within an hour of the relevant decision. This concept, when combined with global missile defense, becomes a means for world domination, politically and strategically. This is a rather serious factor which undermines the principles of mutual deterrence and mutual security and erodes the architecture of strategic stability.”¹²⁷

When George W. Bush left office in January 2009, PGS was a capability still largely in the conceptual stages. Missile defense had made further progress with the deployment of the U.S.-based GMD system and advances in theater ballistic missile defense, though these capabilities were modest at best and still fell short of providing the United States with a robust capability to defend against even limited missile threats from regional powers. Neither missile defense nor PGS presented a serious near-term challenge to the balance of threat between Russia and the United States. For all of the attention afforded the 2002 Nuclear Posture Review, U.S. doctrine and force structure still looked much like it did at the end of the 1990s (though to the Bush administration’s credit, the United States reduced the total U.S. stockpile by more than 5,000 warheads deemed excess to military requirements – a reduction total second only to his father’s PNI legacy). For all of the bluster, Russian for its part held course with the nuclear posture vision articulated in the 2000 Military Doctrine, and continued to accept the

¹²⁷ Miasnikov, Eugene. "Counterforce Capabilities of Conventional Strategic Arms, Presentation at ISODARCO XXVI Winter Course "New Military Technologies: Implications for Strategy and Arms Control"." *Center for Arms Control, Energy and Environmental Studies*. January 2013. <http://www.armscontrol.ru/pubs/en/Miasnikov-PGM-130110.pdf> (accessed January 31, 2015).

legitimacy of nuclear arms control commitments. However, it was clear that the seeds of future challenges to U.S.-Russian arms control had been sown.¹²⁸

Taking Stock of U.S.-Russian Arms Control in the Post-Cold War

Arms control developments during the Obama-Medvedev and Obama-Putin years will be briefly addressed in the final chapter on the future of arms control. At this point, it is worth reflecting on the first eighteen years of post-Cold War arms control relations between the United States and Russia, and what the case studies in this period can tell us about the theoretical framework articulated in the first three chapters. To briefly recap, the United States and Russia transitioned from the Cold War on a note of considerable optimism. Administrations on both sides leveraged pacific relations, a balance of both conventional and nuclear force, and relative symmetry in nuclear doctrines to achieve substantial arms control gains, embodied by the START I and II treaties and the PNIs – agreements that inaugurated a period of “equilibrium maintenance” between the two rivals. However, this warming period chilled by the middle of the 1990s. Russian conventional and nuclear capabilities diminished in the wake of a faltering economy, while the United States emerged as the leading military power in the world, leading an expanding coterie of NATO allies into European military interventions that unnerved the Russian defense establishment. Superior U.S. conventional capabilities and emerging missile defense programs represented a challenge to the balance of threat, though not yet one that upset the scales resolutely in U.S. favor – particularly where it came to strategic

¹²⁸ Kristensen, Hans. "How Presidents Arm and Disarm." *Federation of American Scientists*. October 15, 2014. <http://fas.org/blogs/security/2014/10/stockpilereductions/> (accessed January 31, 2015).

nuclear capabilities, where Russia could still present a threat to the United States that well exceeded the potential gains from military provocation. Russian leaders responded with doctrinal changes that put new emphasis on the role of nuclear capabilities in deterring conventional conflicts, in some regards aligning more closely with U.S./NATO postures, though arguably to a more aggressive extent. These developments did not prevent previously negotiated arms control measures from continuing apace, but new initiatives building on the progress of 1992/93 failed to materialize before the end of the decade.

The new millennium saw leadership changes on both sides of the U.S.-Russian rivalry, and initiatives to break through the arms control status quo. The George W. Bush administration appeared to offer a fresh break with the past on its assessment of the deterrent relationship with Russia, recalibrating its threat perceptions toward rogue states and terrorist organizations and rejecting the need for elaborately negotiated arms control frameworks – embodied by the negotiation of SORT, which achieved significant reductions, but relaxed most of the verification and force structuring requirements associated with predecessor treaties. The Bush administration also summarily rejected the constraints of the ABM Treaty, placing renewed emphasis on the development of capabilities to defend against missile threats from regional powers – threats that also merited a new strategic emphasis on preemptive action. Russian policymakers reacted with increasing alarm to these developments, particularly as the United States sought to emplace missile defense assets in former eastern bloc satellites. U.S. exploration of strategic conventional capabilities further stoked insecurities. However, the sum of these developments was not enough to resolutely upset the balance of force or mind, though it

created latent challenges increasingly inseparable from future progress (or backsliding) on nuclear arms control.

Comparative historical examination of the U.S.-Russia post-Cold War cases seems to largely reinforce conclusions drawn from the fsQCA. The fsQCA results suggested that “breakthrough” arms control initiatives follow from a balance of military strength between the two parties, along with some level of symmetry in doctrinal thought. This seems to be consistent with the dramatic progress made at the immediate end of the Cold War, when the Soviet Union and (for a brief moment) Russia could still claim with some legitimacy that it wielded military power quantitatively and qualitatively comparable to the United States. The fsQCA results further indicate that even if conventional parity is taken out of the equation, the combination of nuclear parity, pacific relations, and congruence in doctrine can still sustain an arms-control perpetuating equilibrium – though “breakthrough” initiatives may be much less likely. This paradigm also appears to be borne out by qualitative analysis. As the 1990s wore on and Russian capabilities deteriorated by virtue of a failing economy, it was still possible to lock in and maintain arms control gains from the already-ratified START I Treaty, but more ambitious changes (like those envisioned by START II) were no longer feasible. That said, the fsQCA does potentially gloss over significant nuances in these dynamics:

Perceptions of risk and cooperative reciprocity can be shaped by events other than direct military confrontation. It is clear from the historical record that U.S. action abroad – including both demonstrations of its military power in conflicts like the Gulf War and Kosovo, and the bolstering of its military alliances on the

European continent – exerted influence on the arms control dynamic. While overt military confrontation was avoided, and this was important to avoid completely undermining previous achievements, U.S. actions – along with the concurrent deterioration of the Russian military – nonetheless factored into an increasingly threat-conscious Russian military calculus. This led to notable shifts in Russian nuclear doctrine that while provocative, fortunately did not bring the two rivals out of alignment (and may have even brought them closer in some respects). All of this is to say that even absent militarized interstate dispute (the measure of hostility used in the QCA), major diplomatic grievances and even clumsy alliance politics can undermine an arms control process already on shaky ground because of uncertain parity in military capabilities.

By virtue of their unique destructive power, nuclear weapons allow for perceptions of a balance of threat to be maintained even when qualitative capabilities are in question. Evidence suggests that Russian nuclear capabilities deteriorated significantly in the 1990s; some scholars have even suggested that the United States may have held a first strike counterforce advantage by the end of the decade. However, there is little evidence to suggest this deterioration led Russian or U.S. policymakers to recalibrate their assumptions regarding the deterrent relationship. Nuclear weapons, by virtue of their destructive power, compel decision-makers and defense analysts to accept fairly conservative assessments of the balance of threat, often attributing the worst to an adversary's capabilities; this is particularly well-evidenced in U.S. political dialogue, from the “missile gap” of the early 1960s, to the alleged Russian counterforce missile

advantage of the 1970s and 80s, to more recent partisan debates about the significance of Russian tactical nuclear weapons (which are currently outside the scope of post-PNI arms control agreements). The balance of threat facilitating arms control processes is not wholly immune to qualitative uncertainties (as the failure of START II at least partly attests), but can potentially be sustained assuming a favorable political/military climate and congruity in the balance of mind.¹²⁹

The strategic balance cannot be calculated in purely quantitative terms; qualitative equities/inequities may exert significant influence on arms control decisions. The fsQCA is necessarily blunt in its approach to parsing military capabilities; the conventional CINC indicator in particular aggregates assets that arguably diminished in relevance following the Cold War (e.g. steel output and manpower). Russian threat perceptions in the 1990s – especially at the strategic level – seem to have been influenced more by the qualitative edge held by the United States in sophisticated technologies like precision-guided munitions and ballistic missile defense, than by any quantitative edge in more “traditional” military assets like missiles, manpower, armor, or naval vessels. The qualitative dimension of conventional capabilities, particularly capabilities with strategic potential like missile defense and prompt global strike, seems to be an important new frontier for measurement in future updates to conflict datasets like the Correlates of War – at least if these datasets are to maintain their relevance to

¹²⁹ Lieber and Press 2006.

Pincus, Walter. "Russian Tactical Weapons Still an Issue after Start Treaty Ratification." *Washington Post*, December 27, 2010.

strategic assessments in the 21st Century. More importantly from the standpoint of this study, the intersection between nuclear capabilities and conventional capabilities with strategic potential will be an increasingly salient topic for arms control research in international relations.

The achievement of intersubjective doctrinal understandings is an iterative and interactive process, often endogenous to arms control itself. Qualitative analysis of U.S./Soviet and U.S./Russian arms controls lends further credence to constructivist theories that intersubjective understandings of deterrence (and by extension deterrence stability through arms control) are shaped over time by interactions and observed behaviors – a dynamic process not easily captured through formal methodologies like fsQCA. Even in the absence of direct intellectual dialogue (particularly in the rivalry’s early years), Soviet and U.S. decisions doctrines evolved in response to one another’s actions and statements of policy. Importantly, this process of normative development was sometimes endogenous to arms control itself. Arms control negotiations provided a forum for the two countries to clarify and better understand one another’s strategic perceptions and intentions; they also encouraged the creation of epistemic expert communities on both sides that contributed to an eventual shared understanding of arms control concepts. Sometimes, as in the case of missile defense, one country’s strategic theories proved highly influential in shaping those of its rival, with implications resonating long into the future. Importantly, the implementation of arms control agreements also created new “facts on the ground” that influenced (and even constrained) subsequent doctrines and decision-making. Arms control

agreements negotiated between the United States and the Soviet Union (and later Russia) attempted to enshrine some measure of assured destruction through parity; while both sides have offered doctrinal challenges at the margin (e.g. U.S. strategic conventional capabilities, or Russian “de-escalation” strikes), both sides appear hesitant to dramatically upset the current normative paradigm.

As suggested earlier in this study, the history of U.S.-Soviet and U.S.-Russian nuclear relations exerted no small amount of influence on intellectual debates related to deterrence, nuclear strategy, and arms control. Importantly, the analysis in this chapter does not offer a substantial revision of existing analyses; rather, it provides an updated (and ideally more globally applicable) structure for explaining and understanding the events. That said, in the contemporary era other nuclear armed rivalries are just as likely to capture headlines and, more importantly, challenge the common knowledge regarding conditions that facilitate or hold back arms control. The rest of this study will therefore focus on empirical evidence from two rivalries that further illustrate the dynamic – and sometimes counterintuitive – interplay among the facilitating conditions identified in Chapter 3.

Chapter 5. Hostile Balancing: India and Pakistan

For purposes of methodological and theoretical consistency, this study examines nuclear rivalry dyads from the point at which both parties became declared nuclear powers – in other words when both openly demonstrated, through a test explosion, the ability to construct a nuclear explosive device. In the first decades of the nuclear era, this threshold of capability was generally taken for granted; once countries assembled all of the necessary technical components for a weapon, there was little reason or incentive to hold back from testing. More importantly, it was generally assumed that deterrence required a demonstrated capability to be truly credible. In the case of the five original nuclear weapon states (the United States, USSR, UK, France, and China), nuclear weapons tests represented a starting point from which the development of a functional nuclear military capability – including delivery systems, command and control, and doctrine – largely followed.

India and Pakistan are unique among the rivalry dyads examined in that both countries acquired functional, if arguably rudimentary, nuclear military capabilities well before their first official weapons tests in May 1998. Following the tests, political leaders and global media outlets reacted with surprise and alarm, lamenting the inauguration of a new arms race in what many perceived to be a dangerously unstable region of the world. The overt nuclearization of India and Pakistan appeared to be a pronouncedly retrograde development for the global nuclear nonproliferation regime, which had seemingly enjoyed a string of successes since the end of the Cold War including the disarmament of former weapons states (namely South Africa and the former Soviet republics), the near-

universalization and indefinite extension of the Nuclear Nonproliferation Treaty, and the opening-for-signature of the Comprehensive Test Ban Treaty. However, the 1998 tests simply made explicit a slow-burn arms race dating back to at least the 1970s – an arms race whose contours were in many regards shaped by the emerging nonproliferation regime it seemed to flout. In order to understand contemporary arms control dynamics on the subcontinent, it is therefore important to briefly revisit how India and Pakistan came to be nuclear powers at the close of the twentieth century.

Recurrent Conflict and the Road to Nuclear Latency

India and Pakistan gained their independence in August 1947 at the beginning of the nuclear age, barely two years after the atomic bombings of Hiroshima and Nagasaki. At the time, nuclear technology was the subject of both fearful uncertainty and unbridled optimism – the former given its destructive potential in the context of emerging superpower tensions, the latter given its potential benefits in energy, industry, and medicine. It is not surprising then that nascent scientific communities in both India and Pakistan began engaging with the nuclear sciences even before partition, recognizing that economic, social, and technical development would require at least some level of mastery in these fields. Just how this initial interest morphed into the eventual pursuit of nuclear weapons is one of the more complex, long-running, and dynamic proliferation case studies of the twentieth century.¹³⁰

¹³⁰ Comprehensive histories of both programs include: Khan, Faroz. *Eating Grass: The Making of the Pakistani Bomb*. Stanford: Stanford University Press, 2012.

Scott Sagan posits three motivational archetypes for why states seek nuclear weapons, including the pursuit of security, the pursuit of prestige, and the parochial interests of influential domestic actors (especially scientific and technical communities). India's path to the bomb straddled all three of these archetypes, with the domestic model particularly influential by comparison to other case studies. The early nuclear program owed much to the ambition and political lobbying of physicist Homi Bhabha, a vocal proponent of nuclear energy (and eventually nuclear weapons), empowered with de facto control of India's Atomic Energy Commission in 1948 by Prime Minister Jawaharlal Nehru (and later more complete control as Secretary of the ministerial Department of Atomic Energy in 1954). Bhabha carved out a highly autonomous bureaucratic niche for India's nuclear program, affording his scientists exceptional freedom to pursue their research with minimal government direction or oversight. He deftly exploited the initial openness of the nuclear powers to share nuclear education and technology in the 1950s (embodied by Eisenhower's "Atoms for Peace" and the creation of the International Atomic Energy Agency), sending thousands of Indians abroad for specialized training and importing technologies and materials for ostensibly peaceful research purposes. By the end of the decade, India operated two research reactors, including one (the Canadian-supplied CIRUS) that would eventually generate plutonium for the country's first nuclear test.¹³¹

Bhabha was also a strident critic of early attempts to control the spread of nuclear technology, including the emerging IAEA safeguards system intended to monitor

Perkovich, George. *India's Nuclear Bomb: The Impact on Global Proliferation*. Berkeley: University of California Press, 1999.

¹³¹ Sagan, Why Do States Build Nuclear Weapons? Three Models in Search of a Bomb 1996/97.

peaceful uses of nuclear material and prevent diversion to weapons programs. Bahba's feelings reflected a strain of thought that remains dominant throughout the Indian political establishment – that the nonproliferation regime, as it currently exists, merely enshrines a system of nuclear “haves” (nuclear weapon states) and “have-nots” (all other states). Absent a demonstrable commitment to nuclear disarmament on the part of weapon states, the regime is fundamentally discriminatory in its efforts to restrict access to nuclear technology on nonproliferation grounds. This argument was, and remains, particularly compelling vis-à-vis the subcontinent's post-colonial narrative. More importantly, based on this rationale, Indian policymakers felt no cognitive dissonance maintaining a nuclear explosives program while simultaneously admonishing the superpowers for lack of progress on nuclear disarmament.¹³²

The Indian nuclear establishment's early interest in nuclear explosives owed much to scientific ambition and desire to demonstrate intellectual parity with the west; there was little strategic rationale in the first fifteen years of India's existence. India and Pakistan fought their first war at Partition, wrestling over the disputed territory of Jammu and Kashmir. The results left the final status of the territory in indefinite limbo, with the two sides facing off across a UN ceasefire line and unable to agree on a mutually acceptable resolution for the region's status. However, there was little reason to believe at that time (or since) that Pakistan presented a truly existential threat; demographic and economic facts on the ground meant that Pakistan would never be able to field a military strong enough to threaten India outside of a localized confrontation like Kashmir. This

¹³² Perkovich 1999, 25-34, 103-105, 125-145.

Zuberi, N. "Nuclear Safeguards: The Servitudes of Civilian Nuclear Technology." In *Nuclear Myths and Realities: India's Dilemma*, edited by K Subrahmanyam, 1-20. New Delhi: ABC Publishing House, 1982.

reality was demonstrated the second time the two countries went to war over Kashmir in 1965. Despite attempting to initiate the war on its own terms through covert insurgent action, followed by a major military thrust aimed at cutting off Indian lines of communication, Pakistan failed to make appreciable territorial gains; in fact, Indian military forces managed to open a second front and threaten major cities in Pakistan proper before a ceasefire was brokered through UN, American, and Soviet intervention.

The Indian bomb program gained a stronger sense of strategic legitimacy in 1962, following a month-long border war with China in which India suffered a humiliating military defeat and lost 14,000 square miles of territory along its Himalayan borders. China was not yet a nuclear power at the time of the war, precluding a role for nuclear threats in the dispute; it was however only two years away from its first nuclear test. Perhaps more importantly, India received little tangible support from either the Soviet Union or the United States throughout the border crisis (which incidentally took place in parallel to the Cuban Missile Crisis), despite pleas for diplomatic and military assistance. India's "non-aligned" status allowed for a moral high ground, but it also limited the investment the superpowers were willing to put in its external affairs. Following the 1962 war, China and Pakistan also moved to deepen economic and military cooperation (including peaceful resolution of disputed borders in Pakistani-held Kashmir – completely absent India consultation). India appeared to be threatened with growing encirclement (though in times of conflict, China would prove no more interventionist an ally to Pakistan than either the United State or the Soviet Union had been to India).¹³³

¹³³ Ganguly, Sumit. "India's Pathway to Pokran II: The Prospects and Sources of New Delhi's Nuclear Weapons Program." *International Security* 23, no. 4 (1999): 151-153.
Perkovich 1999, 42-47.

Jawaharlal Nehru publicly opposed explicit Indian pursuit of nuclear weapons up until his death in 1964. However, he permitted Bahba's nuclear program to push ahead in establishing infrastructure and intellectual capabilities relevant to weapons, including spent nuclear fuel reprocessing capabilities for extracting plutonium. Nehru's Congress Party successors – first Lal Bahadur Shastri and then Indira Gandhi – remained similarly noncommittal throughout most of the 1960s, allowing the nuclear program to enjoy continued autonomy but also holding back from providing the resources and policy backing needed for a full-scale weapons program to move forward. Meanwhile, India continued to court international assistance in its still ostensibly peaceful nuclear program, securing contracts for power reactors from abroad. Significantly, the international nonproliferation regime made inroads in this period, threatening to reign in India's future nuclear options. Most notably, the NPT opened for signature in 1968, effectively codifying the have/have-not dichotomy that Indian policymakers long resisted. Indira Gandhi's government was unequivocal in denouncing the treaty in the United Nations, even as it faced domestic political turmoil; rejection of the lopsided NPT bargain was largely a non-partisan issue for Indians in the late 1960s. Indian nuclear scientists, fearing their window of opportunity closing, accelerated research on nuclear explosives – ostensibly for peaceful applications – even as the NPT began collecting signatures.¹³⁴

The 1971 India-Pakistan War was a watershed event for both countries' nuclear programs. The conflict was fought not over Kashmir, but over a schism between Pakistan's western and eastern territories; when East Pakistani factions erupted in revolt against western rule, India exploited the opportunity to intervene militarily on behalf of

¹³⁴ Perkovich 1999, 125-140, 146-160.

the rebellion. Pakistan suffered a crushing defeat, losing the entirety of East Pakistan (which became the independent nation of Bangladesh) and surrendering an army of more than 90,000 to superior Indian forces. The war put to rest any illusions that might have previously existed regarding Indo-Pakistani military parity. Acutely aware of Pakistan's vulnerability, newly ascendant President Zulfikar Ali Bhutto initiated an ambitious nuclear fuel cycle program the following year, leveraging (like India) previous investments and international cooperation in the pursuit of peaceful atomic energy; the program initially operated under peaceful auspices, but the pursuit of uranium enrichment and spent fuel reprocessing technologies was clearly aimed at developing the capacity for fissile material production. While India walked away the undisputed victor in 1971, it once again chafed at the role played by the superpowers, and particularly the United States, which cut off military and economic assistance to India during the conflict and even deployed a carrier battle group to the Bay of Bengal. The Nixon administration, as part of its Cold War balancing strategy, increasingly tilted toward strategic alignment with Pakistan, whose government opposed Soviet communism (by contrast to India's relatively friendly relationship with the U.S. adversary). Nixon also undertook his historic visit to China the following year, further reinforcing the sense of betrayal and encirclement among India's political establishment.¹³⁵

Following from these pressures, and no small amount of lobbying on the part of the nuclear establishment, India conducted its first nuclear test in 1974. Indian scientists and policymakers described the test as a "peaceful nuclear explosion" – an experiment

¹³⁵ Ahmed, Samina. "Pakistan's Nuclear Weapons Program: Turning Points and Nuclear Choices." *International Security* 23, no. 4 (1999): 183-185.
F. Khan 2012, 68-92.
Perkovich 1999, 161-170.

demonstrating the country's mastery of the atom. Indeed, by most accounts, the device tested in the Rajasthan Desert fell short of constituting a deliverable weapon system. Perhaps more tellingly, the "Smiling Buddha" test was not followed up by further explosion for another 24 years, in stark contrast to the decades of nuclear testing and design refinement that followed the first explosions of the five original weapon states. The Department of Atomic Energy only made halting progress on refining explosive designs in the decade following the test, as India's leaders continued to resist a more overt nuclear posture seemingly at odds with the country's pacifist origins and disarmament advocacy. All the same, outside observers – including Pakistan – ascribed more sinister military ambitions to the explosion. The international community of nuclear suppliers reacted with shock and condemnation, severely restricting further supply of technologies and materials to India and dealing major setbacks to the nuclear power program that continue to be felt in the present day. While the nuclear test initially bolstered Indira Gandhi's domestic political standing, it is hard in retrospect to reconcile the scientific (and possibly deterrent) gains from the experiment with the diplomatic and economic costs that followed.¹³⁶

The constriction in nuclear supply was felt not only by India. Following the 1974 test, nuclear suppliers increasingly coalesced around a policy of restricting commerce to only those states that accepted the NPT-based nonproliferation regime. Pakistan had similarly rejected the treaty, and was particularly hobbled in its ability to acquire reprocessing and uranium enrichment technologies necessary for fissile material

¹³⁶ Ganguly, *India's Pathway to Pokran II: The Prospects and Sources of New Delhi's Nuclear Weapons Program* 1999, 158-161.
Perkovich 1999, 161-189.

production. In order to achieve its aims (which after 1974 were explicitly weapons-oriented), the Pakistani nuclear program was forced to pursue a dual track strategy of developing indigenous capacities for design and production of requisite technologies, while also aggressively pursuing technical assets abroad through whatever means necessary. Abdul Qadeer Khan's theft of European centrifuge enrichment designs was only the most infamous episode of illicit procurement (A.Q. Khan would become a prominent figure in the weapons program, and later a notorious international proliferator of nuclear technology). Observers also allege that Pakistan received some level of Chinese assistance in its pursuit, though the extent of cooperation is a matter of debate. By the end of the 1970s, Pakistan was afforded some level of diplomatic cover in this endeavor by its alliance with the United States in combating the Soviet invasion of Afghanistan. While U.S. executive and congressional leaders expressed strong suspicions regarding Pakistan's nuclear activities, they were willing to allow continued military assistance and cooperation with Pakistan as long as it refrained from overt weapons-related activities (like testing) and continued to facilitate the training and arming of the Afghan mujahedeen insurgency.¹³⁷

There are no definitive dates as to when India and Pakistan both acquired a functional nuclear weapons capability. This is directly a function of the opacity of their programs (which continues into the present), made necessary for so many decades by military secrecy requirements and international nonproliferation pressures. It also reflects

¹³⁷ S. Ahmed 1999, 183-188.

Ganguly, *India's Pathway to Pokran II: The Prospects and Sources of New Delhi's Nuclear Weapons Program* 1999, 163-165.

Ganguly and Hagerty, *Fearful Symmetry: India-Pakistan Crises in the Shadow of Nuclear Weapons* 2005, 98-104.

F. Khan 2012, 124-158, 162-173, 214-215.

a point of technical debate regarding at what point – technologically and/or politically – a country effectively “becomes” a nuclear power, especially in the absence of overt testing. By the 1980s, Indira Gandhi’s return to the political stage and a growing awareness regarding Pakistan’s nuclear activities provided new impetus for India’s uncertain weapons program. Scholarly research suggests that by the end of the decade, Indian scientists had fashioned the material and components necessary to assemble some small number of nuclear bombs for delivery by aircraft; they likely also initiated research on thermonuclear designs. The defense establishment further began development of the Prithvi and Agni series of ballistic missiles, laying the groundwork for a more robust delivery capability. Pakistan is alleged to have similarly crossed the weaponization threshold during this era, even assembling components – absent fissile material – for “cold testing” of air-deliverable devices well before 1990. It also initiated development of ballistic missiles, once again looking abroad (particularly to China and North Korea) for assistance in jumpstarting the program.¹³⁸

While the degree to which the two powers were nuclear capable was debatable, the opacity on both sides nonetheless lent a nuclear dimension to hostilities between the two countries in the 1980s. Two such crises stand out in particular for the degree of tension generated, and the impetus they created for limited confidence building even absent the overt existence of nuclear weapons. In 1984, tensions ratcheted in response to rumors that India (possibly in cooperation with Israel) was preparing for a preemptive air strike against Pakistani nuclear facilities. While there is some evidence suggesting Indian leaders briefly considered such an attack earlier in the decade, there is none suggesting an

¹³⁸ F. Khan 2012, 174-190.
Perkovich 1999, 244-249, 270-273, 294-297.

attack was eminent in 1984. However, tensions between the two rivals had been steadily escalating owing not only to nuclear developments, but also violent domestic insurgencies in both countries (for which each side inevitably blamed the other) and the beginning of military skirmishes on the Siachen Glacier. Pakistani air defense assets were mobilized in response to the rumors, and Pakistani leaders threatened retaliation against Indian nuclear facilities if an attack took place. The crisis was fortunately defused before it could escalate beyond words and defensive military gestures. However, enough concern was generated that Indian Prime Minister Rajiv Gandhi initiated discussions in 1985 between the two countries' respective foreign ministries on a proposal for a "non-attack" agreement applying to declared nuclear facilities. The two sides agreed in principle on the concept that year, though a formal agreement was not signed until 1988; ratification took another 3 years, and the two sides traded lists of applicable facilities for the first time in 1992.¹³⁹

Arguably more serious than the 1984 preemptive war scare was the "Brasstacks" crisis of 1986/1987. While India quietly hedged with its latent nuclear capabilities in the 1970s and 80s, it carried out a far more overt expansion and modernization of its conventional military forces in the same period. In 1986, Indian Army Chief of Staff General Krishnaswami Sundarji sought to test these capabilities (and likely also send a message to Pakistan) through a series of ambitious military exercises, culminating in a large-scale combined arms field exercise involving the mobilization of two armored divisions, one mechanized division, six infantry divisions, and air support assets. Even

¹³⁹ F. Khan 2012, 218-221.
Ganguly and Hagerty, *Fearful Symmetry: India-Pakistan Crises in the Shadow of Nuclear Weapons* 2005, 44-67.
Perkovich 1999, 257-259.

more provocatively, much of the activity would take place near the India/Pakistan frontier. Exercise Brasstacks was greeted with alarm by Pakistan's military establishment, fearing the mobilization might actually be intended to conceal a surprise attack. Pakistani forces conducting their own exercises were kept in the field in a defensive posture, though certain maneuvers were interpreted as offensively oriented by the Indian military – which undertook reciprocal measures to strengthen its border defenses. While there was little political incentive for military hostilities at the time of Brasstacks, the mobilization and heightened alert on both sides increased the risk of inadvertent escalation toward war.

Political leaders on both sides moved relatively quickly to defuse the crisis, initiating negotiations on a phased withdrawal of forces to a peacetime footing, while beginning to identify measures to facilitate better military transparency (though an actual agreement on prior notification of military exercises, among other conventional military CBMs, was not completed until 1991). While nuclear weapons played no overt role in the Brasstacks crisis, it is difficult to imagine that they did not figure into the decision making process on both sides, and particularly the desire to avoid unnecessary escalation. More ominously, shortly following the easing of tensions in early 1987, A.Q. Khan (at that point director general of a weapons laboratory) delivered a controversial media interview in which he stated that Pakistan had mastered all of the elements necessary for nuclear weapons production; it remains unclear to this day whether the interview was

actually intended to deliver a political message, or merely the blustering of a weapons scientist seeking to reinforce his considerable cult of personality.¹⁴⁰

These pre-1998 crises, while occurring in the shadow of nuclear latency, nonetheless illustrated dynamics in the India-Pakistan arms control relationship that would remain relevant following overt nuclearization. Importantly, the impetus for serious confidence building only followed from militarized crises that prompted both sides to recognize the dangers inherent from inadvertent escalation between nuclear capable rivals – behavior consistent with a “hostile stabilization” model of arms control. Also consistent with the hostile stabilization model was a strong sense of uncertainty in the balance of threat. The conventional balance was tilted in favor of one side, and neither side could accurately gauge the capability or readiness of the other for a nuclear exchange. Finally, it is worth noting the non-existence of a balance of mind, following from an absence of stated nuclear posture on either side (though both sides were internally beginning to formulate nascent – and ultimately contradictory – doctrines, to be discussed in more detail later). As will be illustrated, the 1998 nuclear tests only shifted these dynamics in making the nuclear dimension explicit (including both capabilities and doctrine), allowing the two sides to finally broach the topic of nuclear weapons-relevant confidence building.

The 1998 Test Crisis and the Initiation of Nuclear CBMs

¹⁴⁰ Chari, Cheema and Cohen, *Four Crises and a Peace Process* 2007, 39-79.
Ganguly and Hagerty, *Fearful Symmetry: India-Pakistan Crises in the Shadow of Nuclear Weapons* 2005, 68-81.
F. Khan 2012, 221-227.
Perkovich 1999, 277-282.

The overt nuclearization of the subcontinent began with an election, again illustrating the complex interplay between internal and external proliferation factors. India's reticence to follow up the 1974 Smiling Buddha test with further explosions reflected ideological contradictions inherent in the Congress Party's nuclear platform. The leftist party of Ghandi and Nehru felt compelled by history to exert global moral leadership in advocating disarmament and refraining from participation in the nuclear arms race. At the same time, it sought greater prominence for India on the global stage through advancements in economic, technical, and military potential; nuclear capability in particular was a feature common to all five permanent members of the UN Security Council. Moreover, India faced extreme geopolitical uncertainty, including militarized borders with two rivals and no external security guarantees by virtue of non-alignment. A succession of Congress leaders and coalition allies balanced these competing impulses through a hedging strategy of nuclear latency.

The nationalist Bharatiya Janata Party (BJP) shared no such qualms by the time it was in a position to seriously challenge its ideological rival in the 1990s. As far back as 1964, the BJP's precursor (the Jana Sangh Party) introduced legislation in the Lok Sabha calling for India to develop an overt nuclear weapons capability. Party leaders advocated a more assertive and realist-oriented foreign policy for India; nuclear weapons naturally conformed to this balance-of-power narrative. When the BJP rode a wave of domestic economic and political discontent to a tenuous electoral victory in 1996 (the government lasted only 16 days), followed by a more resolute victory in 1998, the fact that India subsequently tested nuclear weapons should have come as little surprise. The party's publicly released electoral manifesto stated that, "The BJP rejects the notion of nuclear

apartheid and will actively oppose attempts to impose a hegemonistic nuclear regime. We will not be dictated to by anybody in matters of security and in the exercise of the nuclear option.” More to the point, the party would “Reevaluate the country's nuclear policy and exercise the option to induct nuclear weapons.”¹⁴¹

Evidence suggests that Prime Minister Atal Bihari Vajpayee initiated test preparations upon winning the 1996 election, but – recognizing his electoral legitimacy was questionable – decided to hold off until he possessed a stronger mandate. After claiming more secure margins in 1998, a Pakistani test of its nuclear-capable “Ghauri” missile in April provided the political pretext for Vajpayee to carry out nuclear tests the following month. The government’s initial statements on the May 13 tests were carefully measured and largely unprovocative. Vajpayee noted the testing of “a fission device, a low-yield device, and a thermonuclear device,” that the explosions were “contained” with minimal environmental impact, and congratulated the DAE scientists and engineers. His principal secretary (and later National Security Advisor) Brajesh Mishra more directly asserted that “India has a proven capability for a weaponized nuclear program” and the tests would inform development of “weapons of different yields for different applications and for different delivery systems.” Mishra’s statements drew an unequivocal military distinction between the 1998 tests and the 1974 “peaceful nuclear explosion.”¹⁴²

¹⁴¹ "BJP Manifesto 1998." Bharatiya Janata Party. 1998.
<http://bjpelectionmanifesto.com/pdf/manifesto1998.pdf> (accessed February 10, 2015).
Perkovich 1999, 81-82.

¹⁴² Burns, John. "India Sets 3 Nuclear Blasts, Defying a Worldwide Ban; Tests Bring a Sharp Outcry." *New York Times*, May 12, 1998.
Ganguly, India's Pathway to Pokran II: The Prospects and Sources of New Delhi's Nuclear Weapons Program 1999, 170-171.
Perkovich 1999, 371-376.

India conducted two more low-yield explosions on May 15; the nuclear establishment claimed all of its goals had been met and no further testing was necessary. There was even suggestion from the government that India might accept “some of the undertakings in the CTBT.” The Comprehensive Test Ban Treaty had opened for signature in 1996, and India’s open defiance of what many considered to be a growing normative consensus contributed greatly to international condemnation of the tests. U.S officials, caught off guard, lamented the proliferation consequences of India’s decision; President Bill Clinton ordered the implementation of economic sanctions on India only two days after the first tests, concurrent with the 1994 Nuclear Proliferation Prevention Act. While it seemed inevitable that Pakistan would conduct its own tests, the magnitude of the international response presented Pakistani decision makers with a very real choice. The country could respond in kind, saving political face and demonstrating its deterrent capability, but also drawing the same condemnation and sanctions now faced by India. Alternatively, Pakistan could restrain the impulse to test and claim the moral high ground while still maintaining a latent nuclear capability to deter India.¹⁴³

In the end, Pakistani Prime Minister Nawaz Sharif faced immense domestic political pressure to test, both from electoral opponents (led by Benazir Bhutto) and advocates in the military nuclear establishment. On May 28, the government announced Pakistan had conducted five tests of its own; a sixth test was conducted two days later (either one-upping India or simply matching its total since 1974, depending on

¹⁴³ F. Khan 2012, 280.

Ganguly and Hagerty, *Fearful Symmetry: India-Pakistan Crises in the Shadow of Nuclear Weapons* 2005, 130-131.

Kinzer, Stephen. "Nuclear Anxiety: In Pakistan; No Decision on Testing, U.S. is Told." *The New York Times*, May 16, 1998.

Weiner, Tim. "Nuclear Anxiety: The Blunders; U.S. Blundered on Intelligence, Officials Admit." *The New York Times*, May 13, 1998.

perspective). The tests came amidst another preemptive war scare; reports suggested that Pakistani aircraft were mobilized on May 27/28 and sensitive nuclear assets dispersed in response to rumors of an Indian or Israeli preemptive air strike (accounts differ regarding the precise nature of the perceived threat, and the extent of Pakistan's response). Sharif claimed the tests "evened the score" with India, and that "God has given us the opportunity to take critical steps for the country's defense. We have become a nuclear power." In the same speech, Sharif acknowledged and attempted to prepare the Pakistani public for the economic consequences their country now faced, citing sanctions as an opportunity to "effect (sic) a revolution in our way of life, to learn to live within our means and to stop this cynical wastage of our national resources" (he did not care to elaborate on how the coming nuclear arms race transcended "cynical wastage"). Given the country's precarious economic standing, including substantial foreign debt, Pakistan stood to suffer proportionally more under western sanctions.¹⁴⁴

The decision to test was overwhelming popular with domestic political constituencies in both countries, despite – and more likely reinforced by – international sanctions seemingly consistent with the narrative of a discriminatory international nonproliferation regime (though some opposition elements, most notably on the Indian left, did vocally oppose the tests on both moral and economic grounds). More troublingly, the tests ignited an unsettling war of words between politicians and pundits in the two countries. While most of the statements constituted little more than grandstanding, they offered no reassurance to an outside world that viewed the subcontinent through the

¹⁴⁴ Burns, John. "Nuclear Anxiety: The Overview; Pakistan, Answering India, Carries out Nuclear Tests; Clinton's Appeal Rejected." *The New York Times*, May 29, 1998.

Burns, John. "Nuclear Anxiety: The Indian Response; New Delhi's Leaders Say they don't need to Match Tests 'In Competition'." *The New York Times*, May 31, 1998.

F. Khan 2012, 280-281.

prism of its past wars, unresolved disputes, and militarized borders. Following the second battery of Indian tests, Vajpayee commented less restrainedly that (in specific reference to the claimed thermonuclear test) “We have a big bomb now” and “will not hesitate to use these weapons in self-defence.” Defense Minister George Fernandes publicly belittled the Pakistani tests, suggesting the devices exploded were primitive by comparison to India’s; he courted wider controversy by also declaring China to be India’s “enemy no. 1” and the true motivation for the tests. Home Minister L.K. Advani boasted that India’s “decisive step to become a nuclear weapons state has brought about a qualitatively new stage in Indo-Pakistan relations, particularly in finding a lasting solution to the Kashmir problem” and that Pakistan should “realise the change in the geo-strategic situation in the region and the world.” Empowered by nuclear weapons, India would be more “pro-active” in its approach to combatting militancy in Kashmir, possibly even crossing the ceasefire Line of Control (LOC) in “hot pursuit” if needed.¹⁴⁵

Benazir Bhutto, addressing a crowd of demonstrators calling for Pakistani tests in the days immediately following the Indian explosions, bellicosely suggested that “Rogue nations that defy world opinion ought to be taught a lesson. If a pre-emptive military strike is possible to neutralize India’s nuclear capability, that is the response that is necessary.” On the day following Pakistan’s first test, Foreign Minister Ayub Khan remarked that Pakistan would “retaliate with vengeance and devastating effect” against Indian aggression. A.Q. Khan noted in an interview that Pakistani warheads could be readily mated to missiles “not in months, not in weeks, but in days,” and that the

¹⁴⁵ J. Burns, *Nuclear Anxiety: The Indian Response*; New Delhi's Leaders Say they don't need to Match Tests 'In Competition' 1998.
Perkovich 1999, 420.
Ram, N. "What Wrong did this Man Do?" *Frontline*, 1999.

country's capabilities included tactical nuclear weapons intended for use against concentrations of troops – a not subtle challenge to India's conventional military superiority. Nawaz Sharif at least attempted to encourage a more sober conversation by admonishing against religious rhetoric in official statements on Pakistan's nuclear capabilities; he did not want to encourage foreign narratives suggesting the emergence of an ideologically motivated "Islamic Bomb" (to be potentially shared with Islamic allies), versus a purely national capability serving rational strategic purposes.¹⁴⁶

The official rhetoric tempered in the following weeks as both governments adjusted to the new status quo. From an arms control standpoint, the events of 1998 were ultimately significant in two regards. First, they represented a key inflection point for strategic thought in both countries. The idea of nuclear deterrence was no longer subject to the vagaries of nuclear opacity; both powers had finally shown their hand, and there could be no question that future confrontation would take place against a background of potential nuclear escalation. In addition, now that nuclear weapons existed in the open as tangible military capabilities, both countries needed to more seriously address questions of doctrine and force posture that had been – to varying degrees – left ambiguous while the nuclear programs were veiled in secrecy (these issues will be addressed in the next two sections of the chapter). Besides a strategic inflection point, the events surrounding

¹⁴⁶ Anderson, John, and Kamran Khan. "'We Are a Nuclear Power'; Pakistan Declares Intention to Use Arms in Self-Defense." *Washington Post*, May 29, 1998: A15.

Ganguly, India's Pathway to Pokran II: The Prospects and Sources of New Delhi's Nuclear Weapons Program 1999, 129.

Kifner, John. "Nuclear Anxiety: The Overview; Pakistan Sets off Atom Test, but Again Urges 'Peace'." *The New York Times*, May 31, 1998.

Kifner, John. "Nuclear Anxiety: In Pakistan; Complex Pressures, Dominated by Islam, Led to Testing." *The New York Times*, June 1, 1998.

Moore, Molly, and Kamran Khan. "Pakistani A-Tests Seen As 'Triumph for Islam'." *Washington Post*, June 15, 1998: A19.

the 1998 tests also represented the first major crisis of India and Pakistan's relationship as an overtly nuclear rivalry dyad. Although there was minimal mobilization of frontline military assets (at least by comparison to past crises), the tit-for-tat retaliatory nature of the testing and inflammatory rhetoric certainly indicated an escalation of hostility. Moreover, the tests took place amid already elevated tensions following from an intense insurgency in Indian-controlled Kashmir; tens (if not hundreds) of thousands of Indian regular and paramilitary troops were actively engaged in the territory by 1998, combatting militants that politicians claimed were directly equipped, funded, and trained by Pakistan.¹⁴⁷

The test crisis notably prompted intensive mediation efforts on the part of the United States, suggesting a potential – albeit weaker – secondary causal role for hostility dynamics in facilitating a state of hostile stabilization between nuclear rivals. Not only do hostilities between nuclear powers engender internal realization of the need for arms control (the primary causal mechanism) – they also prompt outside actors to take notice and potentially intervene, by virtue of the potentially widespread consequences of nuclear conflict. Vipin Narang has even suggested this to be an explicit dimension of policy on the part of some regional nuclear powers (especially those at an asymmetric disadvantage, like Pakistan); nuclear weapons serve as a means to highlight the seriousness of conflict and draw in external intervention. This causal dynamic was less apparent in the days of U.S.-Soviet rivalry, especially given that no single actor or coalition of actors could bring enough influence to bear on the two hegemons. However, India and Pakistan – despite their insistence on autonomy from the great powers – still

¹⁴⁷ Schofield 2000.

depended to a great extent on external relationships in 1998. The role of the United States in particular had been magnified by the end of the Cold War and Russia's withdrawal (at least in terms of interventionist diplomacy) from the subcontinent.¹⁴⁸

U.S. diplomatic intervention immediately began following India's first explosion, focusing initially on Pakistan in an attempt to head off reciprocal testing. Bill Clinton personally contacted Sharif, offering economic incentives in return for turning the other cheek. Deputy Secretary of State Strobe Talbott and U.S. Central Command chief General Anthony Zinni flew to Pakistan counseling (in Talbott's words) "restraint and maturity" in ultimately fruitless discussions with the foreign ministry, military, and Sharif himself. In the weeks immediately following Pakistan's tests, U.S. diplomacy largely focused on coordinating with international partners to condemn the tests; calling on the two parties to refrain from further testing and accept key elements of the nonproliferation regimes (including the CTBT and fissile material control); administering sanctions; and pushing for talks to resolve outstanding disputes, namely Kashmir. By July 1998, the international shaming campaign had largely played out, and U.S. mediators sought to more directly engage the rivals in a regional dialogue oriented toward arms control and conflict resolution; in addition to Talbott, veteran arms control negotiator Robert Einhorn was enlisted for the effort, reflecting a strong U.S. government sense (one that still persists today, to varying degrees) that the U.S.-Soviet Cold War experience might offer insights for the region.¹⁴⁹

¹⁴⁸ Narang, Vipin. *Nuclear Strategy in the Modern Era: Regional Powers and International Conflict*. Princeton: Princeton University Press, 2014, 13-20, 55-94.

¹⁴⁹ F. Khan 2012, 274-278.

Perkovich 1999, 287-300, 435-438.

Talbott 2004.

The ultimate influence of the U.S. diplomatic intervention in 1998 should not be overstated; the evidence, including the testimony of participants in the diplomatic process, is not suggestive that the United States had any meaningful impact on the final outcome.¹⁵⁰ The U.S. mediation team produced extensive documentation counseling the two countries on what they perceived to be essential components of a regional arms control regime that might lessen tensions and ultimately facilitate reconciliation with the global community. Some measures, such as maintaining a strict separation between conventional and nuclear systems, de-mating warheads from delivery systems, and providing notification of missile tests, were intended to prevent inadvertent escalation toward nuclear war. Other measures such as restricting ballistic missile development, accepting the CTBT, and ending fissile material production, sought to bring the countries in line with the emerging global nonproliferation consensus.

It is probably not surprising in retrospect that many of these proposals rang hollow coming from a superpower that maintained thousands of warheads mated to land- and sea-based ballistic missiles, and accepted fissile material and testing constraints only *after* conducting more than one thousand test explosions and producing a fissile material stockpile sufficient for thousands of additional weapons beyond those already produced. Some of these concepts were ultimately reflected in a Pakistani proposal for a “Strategic Restraint Regime” (SRR) in the region (though Feroz Khan, an insider at the time and preeminent scholar of the nuclear program, suggests the SSG emerged independently from an internal dialogue). The SRR proposal included (among other measures) restraints

¹⁵⁰ Interview with Robert Einhorn, former Assistant Secretary of State for Nonproliferation, June 16, 2015. Interview with Toby Dalton, Nonproliferation Policy Program Co-Director at the Carnegie Endowment for International Peace, January 27, 2015.

on missile deployment and warhead mating, an outright ban on antiballistic missiles and sea-based nuclear weapons, missile flight test notifications, and demobilization of conventional forces coupled with third party monitoring (reminiscent in some regards of the Israeli-Egyptian disengagement and monitoring in the Sinai). Indian decision makers were far less receptive not just to the U.S. proposals, but to the general idea of a bilateral arms control regime with Pakistan – especially when many in the BJP and nuclear establishment pointed to China as the true competitor. On issues of nuclear doctrine in particular, Talbott observed that “American preachments called into question their [Indian] rights to make momentous decisions in their own time, in their own way, and by their own lights – and thus constituted further evidence of our arrogance, hypocrisy, and refusal to accept them as a mature power.” When first presented with the SSG proposal, Indian diplomats reacted with skepticism and suggested the Pakistanis were speaking “the Western language,” when in fact the two powers should be “quite capable of inventing our own terminologies and developing regional security concepts rather than borrowing...from the West.” The Indian reaction closed off any prospects for unilateral restraint on the part of Pakistan, whose decisions (in the words of Robert Einhorn) were “entirely a dependent variable on India.”¹⁵¹

It is clear the United States possessed inadequate leverage to compel the two rivals, particularly India, into accepting anything close to what the Clinton administration desired. At a minimum, the two sides recognized their relationship with the United States (and the rest of the outside world) was important, and this exerted some influence on their

¹⁵¹ F. Khan 2012, 296-305.
Perkovich 1999, 435-443.
Talbott 2004.
Interview with Robert Einhorn, June 26, 2015.

desire to demonstrate a commitment to regional strategic stability. However, the ultimate impetus for post-1998 restraint and confidence building seems to have come from within. Feroz Khan suggests that arms control made “security sense for Pakistan; given its structural weaknesses and a prostrate economy, strategic competition with India was unwise.” Indian politicians continued to largely frame the conversation in global terms, emphasizing their nuclear tests were a direct response to lack of progress on nuclear disarmament writ large. For its part, Vajpayee’s government did propose bilateral talks less than a month following the tests. The entreaty was rebuffed by Pakistan because of disagreements regarding how the issue of Kashmir would be addressed (Indian policymakers preferred to marginalize the territorial dispute, while Pakistan’s government saw it as a central issue). Nonetheless, the offer suggested that India was open to a bilateral dialogue – albeit one on the region’s own terms. In July 1998, Sharif declared that "It is imperative that we address ourselves to make sure of nuclear and conventional restraint and stabilization, avoidance of conflict and confidence-building measures.”¹⁵²

In September of that year, the Prime Ministers of both countries addressed the UN General Assembly and separately indicated their countries were willing to indefinitely maintain a test moratorium consistent with the CTBT – though their statements were ambiguous regarding actual signing of the treaty, and Pakistan in particular suggested strong conditionality on its commitment (including sanctions relief). The leaders met on the margins of the meeting, agreeing to initiate bilateral negotiations that fall, with both

¹⁵² Burns, John. "Pakistani Rebuff for India, But Talks May Be Closer." *The New York Times*, July 29, 1998: A24.

Duke, Lynne. "Pakistan, India Agree To Hold Security Talks; Premiers Remain Divided on Kashmir." *Washington Post*, July 29, 1998: A24.

Kashmir and confidence building measures on the agenda. It was a remarkable about-face from the combative rhetoric of that summer. Delegations convened in both Islamabad and New Delhi in January and February, laying the groundwork for an eventual leadership summit.¹⁵³

Vajpayee made a highly symbolic gesture in traveling via a newly inaugurated bus service between the Indian city of Amritsar and Lahore, where the summit was to be held; he also paid visit to an historic monument memorializing the creation of Pakistan – an unprecedented gesture (particularly from a BJP leader) conveying legitimacy to Pakistani statehood. The two Prime Ministers capped the summit by signing a Memorandum of Understanding (MOU) that affirmed commitment to resolving the Kashmir issue, refraining from intervention in internal affairs, and “reducing the risk of accidental or unauthorised use of nuclear weapons.” The MOU further outlined a series of specific confidence building initiatives, including:

“1. The two sides shall engage in bilateral consultations on security concepts, and nuclear doctrines, with a view to developing measures for confidence building in the nuclear and conventional fields, aimed at avoidance of conflict.

2. The two sides undertake to provide each other with advance notification in respect of ballistic missile flight tests, and shall conclude a bilateral agreement in this regard.

¹⁵³ "South Asia Nuclear Crisis: India and Pakistan Statements to the United Nations General Assembly, September 1998." *Acronym Institute for Disarmament Diplomacy*. 1998. <http://www.acronym.org.uk/textonly/sasia/spsep98.htm> (accessed February 12, 2015).

3. The two sides are fully committed to undertaking national measures to reducing the risks of accidental or unauthorised use of nuclear weapons under their respective control. The two sides further undertake to notify each, other immediately in the event of any accidental, unauthorised or unexplained incident that could create the risk of a fallout with adverse consequences for both sides, or an outbreak of a nuclear war between the two countries, as well as to adopt measures aimed at diminishing the possibility of such actions, or such incidents being misinterpreted by the other. The two sides shall identify/establish the appropriate communication mechanism for this purpose.

4. The two sides shall continue to abide by their respective unilateral moratorium on conducting further nuclear test explosions unless either side, in exercise of its national sovereignty decides that extraordinary events have jeopardised its supreme interests.

5. The two sides shall conclude an agreement on prevention of incidents at sea in order to ensure safety of navigation by naval vessels, and aircraft belonging to the two sides.

6. The two sides shall periodically review the implementation of existing Confidence Building Measures (CBMs) and where necessary, set up appropriate consultative mechanisms to monitor and ensure effective implementation of these CBMs.

7. The two sides shall undertake a review of the existing communication links (e.g. between the respective Directors- General, Military Operations) with a view to upgrading and improving these links, and to provide for fail-safe and secure communications.

8. The two sides shall engage in bilateral consultations on security, disarmament and non-proliferation issues within the context of negotiations on these issues in multilateral fora.”

The list of CBMs is worth reproducing in full because it arguably represents the single most dramatic nuclear confidence building and arms control gesture undertaken on the subcontinent to date. External observers (and even many policy experts from the region) often hesitate to describe Indo-Pakistani confidence building as anything resembling “arms control.” If one assumes however the Schelling-Halperin definition of the term (as this study does), and further accounts for where nuclear relations stood prior to the agreement, then the Lahore MOU represented a significant step for the rivals. Certain measures took many more years to completely materialize. The flight test notification agreement was formalized in 2005 (though both parties began providing notifications preceding the formal agreement) and the accidents agreement in 2007; an incidents at sea (INCSEA) agreement remains elusive. It is worth noting these measures mirrored agreements that the United States and the Soviet Union only inked in the 1970s

and 1980s, twenty to thirty years after their first nuclear tests (this despite previous Indian rejection of “western” arms control paradigms).¹⁵⁴

Probably most significant among these measures (from an arms control perspective at least) was the test moratorium, which remains (despite the lack of formalized agreement) in effect to this day. It is rarely appreciated that the moratorium places significant limitations and constraints on qualitative enhancements to both arsenals, especially in light of contentious debates regarding the actual technological achievements demonstrated through the 1998 tests. The nuclear establishments in both countries boasted of test yields subsequently disputed by external interpretations of seismic data, which leveraged sophisticated monitoring capabilities put in place before 1998 to support CTBT verification. Indian weapons scientists initially claimed to have detonated a 43-kiloton thermonuclear device, a 12-kiloton fission device, and three sub-kiloton devices in the two days of tests; revised estimates from the weapons establishment in subsequent years continue to remain within this ballpark. External observers attribute much lower yields to the tests, in some cases suggesting a combined yield of less than 15 kilotons in the first battery of tests (which included the alleged thermonuclear device). Even if the thermonuclear device actually met the reported yield, the explosion was orders of magnitude smaller than hydrogen bomb tests undertaken by other nuclear powers. In the years following the tests, some DAE scientists – arguing in favor of further testing – corroborated western reports that the thermonuclear test was a “fizzle” that failed to meet design specifications. Similar uncertainties surround the

¹⁵⁴ Iyengar, PK. "Nuclear Nuances: Credible Deterrent through Testing." *Times of India*, August 22, 2000. Krepon and Thompson, *Deterrence Stability and Escalation Control in South Asia* 2013, 14. Salik, Naem. "Arms Control, Confidence Building, and Nuclear Risk Reduction - A Pakistani Perspective." In *The India-Pakistan Military Standoff: Crisis and Escalation in South Asia*, edited by Zach Davis, 215-227. New York: Palgrave Macmillan, 2011, 224-225.

Pakistani tests; scientists from that country claimed a combined yield on par with the Indian explosions, but external interpretations similarly suggested a yield of less than 20 kilotons, and are unable to even corroborate the total number of explosions claimed.¹⁵⁵

All of this is to suggest that considerable uncertainties probably remain regarding the effectiveness and reliability of Indian and Pakistani nuclear weapons. Granted, the 1998 test data (regardless of yield) was likely valuable to scientists in both countries for further refining the designs – but in the absence of follow-on testing, it is difficult to imagine that nuclear establishments in either country can definitively certify their weapons will meet specifications under operational conditions. Even in the United States, which can leverage data from more than a thousand test explosions, the idea of reliable “stockpile stewardship” (entailing maintenance of *previously tested* warhead designs) absent further testing remains politically controversial (and contributed to Senate failure to ratify the CTBT). This indicates that the Indo-Pakistani test moratorium is in fact a particularly significant arms control commitment on the part of both parties. It is further worth noting that other than a brief period from 1958-1961, the United States and the Soviet Union were never themselves able to reach such an accord, and the United States and Russia (following more than five decades of testing) only accepted a moratorium once an internationally negotiated and verifiable CTBT appeared on the horizon.

¹⁵⁵ F. Khan 2012, 280-282.

Ganguly and Hagerty, *Fearful Symmetry: India-Pakistan Crises in the Shadow of Nuclear Weapons* 2005, 124-126.

Parashar, Sachin. "Pokhran II not fully successful: Scientist." *The Times of India*. August 27, 2009.

<http://timesofindia.indiatimes.com/india/Pokhran-II-not-fully-successful-Scientist/articleshow/4938610.cms?> (accessed February 12, 2015).

Perkovich 1999, 424-435.

van der Vink, Gregory, Jeffrey Park, Richard Allen, Terry Wallace, and Christel Henet. "False Accusations, Undetected Tests and Implications for the CTB Treaty." *Arms Control Today*. May 1, 1998. http://www.armscontrol.org/act/1998_05/vimy98.

Wallace, Terry. "The May 1998 India and Pakistan Nuclear Tests." *Seismological Research Letters*, 1998: 386-393.

While the Lahore MOU represented a dramatic achievement following all that took place in 1998, any strategic stability gained from the talks proved short-lived. Only three months after signing the MOU, Indian and Pakistan engaged in their most serious military crisis since 1971. In April 1999, hundreds of fighters (accounts differ as to whether the individuals were Pakistani-allied militants, militant-disguised troops, or – more likely – some combination of the two) infiltrated the mountainous Kargil region of Indian-controlled Kashmir under cover of Pakistani artillery fire. Cross-border artillery exchanges and militant incursions were not unheard-of along the LOC during the 1990s; it was the scale and audacity of the Kargil incursion that set the incident apart. The heavily armed fighters dug into positions that threatened the Srinigar-Leh Highway, an important Indian logistics route for sustaining military operations on the contested Siachen Glacier. Pakistani objectives and the role of senior leaders (particularly Sharif) in planning and executing the incursion remain murky. It took place following a major military command shakeup that saw Chairman of the Joint Chiefs of Staff General Jehangir Karamat replaced by Pervez Musharraf. Pakistanis who defended the action in Kargil, including Musharraf, painted Kargil as a proactive defensive operation following recent clashes on the Siachen Glacier and India's own probing of the LOC. Indian analysts insisted Pakistani motives were more revisionist, attempting to change facts on the ground at the LOC and draw international attention once again to the seemingly (at least in Pakistani eyes) dormant Kashmir dispute.¹⁵⁶

¹⁵⁶ Chari, Cheema and Cohen, *Four Crises and a Peace Process* 2007, 123-130.

F. Khan 2012, 306-312.

Ganguly and Hagerty, *Fearful Symmetry: India-Pakistan Crises in the Shadow of Nuclear Weapons* 2005, 142-162.

Tellis, Ashley, C. Christine Fair, and Jamison Medby. *Conflicts Under the Nuclear Umbrella: Indian and Pakistani Lessons from the Kargil Crisis*. Santa Monica: RAND, 2001, p. 7-28.

Forward-deployed Indian units soon discovered the incursions and clashed with the fighters, leading to a larger-scale Indian army offensive to dislodge the intruders. The fighting, taking place in rugged terrain at altitudes exceeding 14,000 feet in some areas, proved more difficult than anticipated and prompted India to deploy infantry reinforcements, heavy artillery units, and combat air support in response; the operation quickly transformed from a counterinsurgency operation into a full-scale conventional military engagement. The Vajpayee government was quick to publicly blame Pakistan for initiating hostilities, and aggressively pursued diplomatic outreach to international partners with a stake in the region's strategic stability (including the United States). As tensions elevated, the international community feared nuclear escalation, despite reassurances on both sides that the present situation was far below the nuclear threshold. India notably did not allow its ground forces or aircraft to cross the LOC, despite the tactical challenges this created. For its part, Pakistan refrained from committing any regular forces to the fight, including air support, ultimately leaving the Kargil fighters at a severe disadvantage. Although both sides clearly worked to limit the scope of the conflict, some post hoc reporting and scholarship suggests that nuclear forces on one or both sides may have been placed on elevated alert (though open source evidence is fragmentary at best).¹⁵⁷

The United States was convinced enough of Pakistan's culpability that it eventually put intense pressure on Sharif and the military establishment for a withdrawal. Accounts further suggest Sharif was caught wholly off guard by the magnitude of the

¹⁵⁷ F. Khan 2012, 312-316.
Riedel, Bruce. *American Diplomacy and the 1999 Kargil Summit at Blair House*. Philadelphia: Center for The Advanced Study of India, 2002.

crisis, indicating a profound breakdown of civil-military relations and coordination. The fighters began to withdraw in July 1998 and Indian forces eventually reoccupied all of the territory seized in the incursion. Pakistan ultimately bore the brunt of international criticism for the brief but violent war, in which more than 500 Indian soldiers and unknown hundreds of militant fighters died. The war also precipitated an internal political crisis in Pakistan; in October 1998, Sharif was ousted in a military coup led by Musharraf (who Sharif had attempted to sack). In his first address to the nation, Musharraf attempted to strike a sober tone on nuclear relations, reassuring observers that “In the new nuclear environment of South Asia, we believe that both Pakistan and India have to exercise utmost restraint and responsibility...Pakistan will continue to pursue a policy of nuclear and missile restraint and sensitivity to global nonproliferation and disarmament objectives.”¹⁵⁸

Asymmetry of Mind and a Tenuous Balance of Threat

For some observers, the Kargil crisis underscored the fragility of deterrence on the subcontinent; despite the overt existence of nuclear weapons in 1999, India and Pakistan nonetheless tempted fate by going to war. For others, it suggested the utility of nuclear deterrence in stabilizing the region; the conflict stayed within local bounds, whereas in the pre-nuclear past it might very well have spiraled into a wider war. Still others posited the existence of a “stability/instability paradox.” Nuclear weapons deterred direct militarized conflict between the two powers, while simultaneously allowing for

¹⁵⁸ F. Khan 2012, 318-322.
Schofield 2000.

lower level, sub-conventional provocations (like using insurgencies and militancy to undermine one's opponent). The paradox was first identified in the context of the Cold War, where it was used to explain how the United States and the Soviet Union managed to avoid direct military conflict, but nonetheless still engaged in extremely costly proxy wars elsewhere in the world (like Vietnam and Afghanistan).¹⁵⁹

Kargil more clearly highlighted the asymmetric nature of the military relationship between Indian and Pakistan, an important factor conditioning the nature of their arms control relationship then and today. As already noted, the conventional military balance between the two powers was lopsided beginning at Partition. While Pakistan in various periods attempted to compensate on the battlefield through technological and tactical innovations, it could never hope in the long run – from a demographic, economic, or geographic perspective – to match India's overwhelming conventional military advantage. At the turn of the millennium, India fielded an active duty army of 1.1 million soldiers, compared to half that number in Pakistan. Indian armored, air force, and naval assets similarly dwarfed Pakistan's by a figure of at least 2:1. It also enjoyed greater "strategic depth," with four times more geographic space in which to deploy and maneuver military forces; the concept is especially significant in the context of two countries that share a border.¹⁶⁰

Pakistan's 1999 incursion was emblematic of a strategy for undermining India that, by the end of the decade, increasingly relied on asymmetric warfare and non-state

¹⁵⁹ Krepon, Michael. "The Stability-Instability Paradox, Misperception, and Escalation Control in South Asia." In *The Stability-Instability Paradox: Nuclear Weapons And Brinkmanship In South Asia*, edited by Michael Krepon and Chris Gagne, 1-24. Washington: Stimson Center, 2001.

¹⁶⁰ Cordesman, Anthony. *The India-Pakistan Military Balance*. Washington, D.C.: Center for Strategic and International Studies, 2002.

insurgent actors. The approach was honed during Pakistan's involvement in the Afghan war with the Soviet Union. After that conflict ended, Pakistan's military intelligence apparatus (spearheaded by the mercurial Inter-Services Intelligence, or ISI) facilitated the ascendancy of the Taliban in order to assure a friendly regime in Afghanistan and provide the army with territory (and possibly manpower) to fall back on in the event of an Indian land invasion. Militant organizations with ties to the insurgency in Kashmir were also cultivated. Infiltration and recruitment was facilitated by Indian's heavy-handed military approach to Kashmir's separatist movement, which at its start in the late 1980s was largely a local phenomenon with mostly token political support from Pakistan. By the middle of the 1990s, the movement exploded into a full-fledged insurgency and arguably a war by proxy. Pakistan's support for militancy would have devastating blowback effects after 2001, but in the 1990s it seemed a rational and cost-effective approach to counterbalancing India's conventional edge.¹⁶¹

From a classical deterrence theory standpoint, the introduction of nuclear weapons should have provided an alternative balancing mechanism that nullified conventional asymmetries and put the two rivals on more equivalent strategic footing. Estimates on the total nuclear weapons output of India and Pakistan continue to be characterized by extreme uncertainty; neither power releases official figures regarding the size of their respective arsenals. However, estimates based on projected fissile material output (and assuming utilization of known facilities) suggest a rough parity in the aggregate number of nuclear warheads potentially fielded by the two sides in the years

¹⁶¹ Kapur, S, and Sumit Ganguly. "The Jihad Paradox: Pakistan and Islamist Militancy in South Asia." *International Security* 37, no. 1 (2012): 111-141.

Riedel, Bruce. "Pakistan and Terror: The Eye of the Storm." *The Annals of the American Academy of Political Science*, no. 618 (2008): 31-45.
Schofield 2000.

since 1998 (see Figure 7 below). If one were to go by warhead numbers alone, then India and Pakistan would seem to enjoy a deterrence-stabilizing and arms control-facilitating balance of force.¹⁶²

The threat balance calculation becomes more challenging, but still not irreconcilable, when delivery systems are factored into the comparison (see Table 13, below). Following the 1998 tests, Indian and Pakistani nuclear force postures appeared similar on paper; both countries fielded a relatively equivalent mix of weapons-capable tactical combat aircraft and short-range ballistic missiles. As already noted, both countries initiated development of missile systems well before the 1998. Nonetheless, by the time of the tests – and despite the rhetoric of politicians and scientists – neither country (in the assessment of outside observers) could boast more than rudimentary short range ballistic missile capabilities (Prithvi I on the Indian side, and Hatf-1/2 on the Pakistani side). Both had initiated development and testing of more advanced intermediate range systems, but most of these would not be ready for service until well after the turn of the decade. Indian systems in particular, relying to a greater extent on indigenous development (versus Pakistan’s heavy leveraging of foreign assistance), continued to be plagued by development delays and test failures even after being declared ready for service in media reports.

More importantly, the geographic proximity of the two countries rendered Cold War range-based delivery system classifications (e.g. short vs. intermediate vs. long

¹⁶² For recent estimates, see:

Kristensen, Hans. "Pakistan's Nuclear Forces, 2011." *Bulletin of the Atomic Scientists*, 2011.

Kristensen, Hans, and Robert Norris. "Indian Nuclear Forces, 2012." *Bulletin of the Atomic Scientists*, 2012.

Kristensen, Hans, and Robert Norris. "Global Nuclear Weapons Inventories, 1945-2013." *Bulletin of the Atomic Scientists*, 2013.

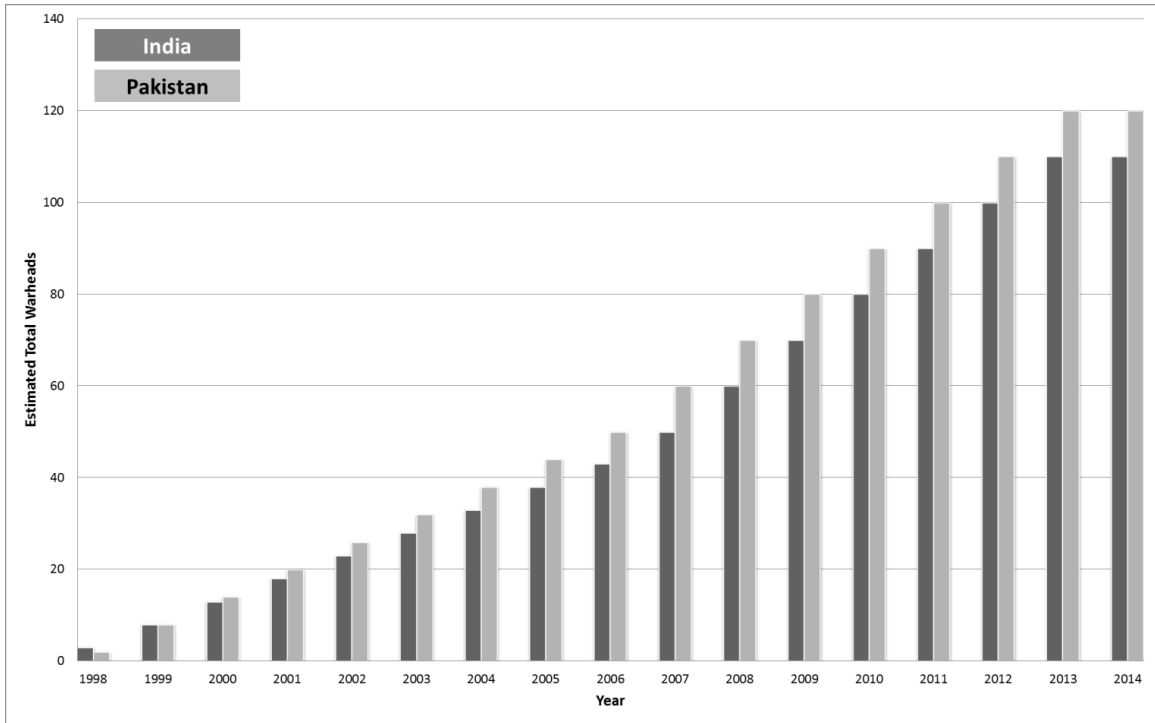


Figure 7: Estimated Warhead Arsenals of India and Pakistan, 1998-2014

range, or tactical versus strategic) largely moot. Population and industrial centers in both countries could easily be targeted with short or intermediate range systems. Even if weapons were reserved for battlefield purposes, the region’s densely packed network of population centers would probably guarantee that a “tactical” nuclear strike yielded wider “strategic” effects. Qualitative improvements in range or accuracy seemed to only matter at the theoretical margins of nuclear war planning. Politicians in both countries also claimed commitment to “minimum credible deterrence” and rejected the idea of engaging in a tit-for-tat arms race. All of this would seem to facilitate a relatively simple, and ultimately stabilizing, balance of threat calculation. However, it was clear from the outset of nuclearization that the two countries already thought about the role of their arsenals in very different ways – a fundamental asymmetry in the balance of mind with profound implications for more substantive arms control after Lahore.

System Type	System Name	Range (km)	Initial Operational Capability (est)	Other Notes
India				
Aircraft	Dassault Mirage 2000	1800	1998	
	SEPECAT Jaguar	1600	1998	
	Mikoyan Mig-27	700	1998	
Short Range Ballistic Missile	Prithvi I	150	1998	
	Prithvi II	250	?	
	Dhanush	400	In Development	Naval Prithvi
	Agni I	700	2004	
	K-15	700	In Development	SLBM
Intermediate Range (or longer) Ballistic Missile	Agni II	2000	2004	
	Agni III	3200	2010	
	Agni IV	3500	In Development	
	Agni V	5000	In Development	ICBM
Cruise Missile	Brahmos 2	300	2010	
	Brahmos 2	300	2013	
Pakistan				
Aircraft	Dassault Mirage V	2100	1998	
	Lockheed F-16	1600	1998	
Short Range Ballistic Missile	Hatf-1	100	1998	
	Abdali (Hatf-2)	180	2002	
	Nasr (Hatf-9)	60	In Development	
	Shaheen 1 (Hatf-4)	750	2003	
	Ghaznavi (Hatf-3)	250	2004	
Intermediate Range (or longer) Ballistic Missile	Ghauri (Hatf-5)	1250	2003	
	Shaheen 2 (Hatf-6)	2000	2008	
Cruise Missile	RA'AD (Hatf-8)	350	In Development	ALCM
	Babur (Hatf-7)	350	In Development	GLCM

ALCM = Air Launched Cruise Missile

GLCM = Ground Launched Cruise Missile

ICBM = Intercontinental Ballistic Missile

SLBM = Submarine Launched Ballistic Missile

Table sources:

Ballistic & Cruise Missile Threat, 2013

Khan, 2012, pp. 234-251

Kristensen & Norris, Pakistan's Nuclear Forces, 2011

Kristensen & Norris, Indian Nuclear Forces, 2012

Mistry, 2013

Table 13: Delivery Systems, India and Pakistan, 1998-Present

Both the meaning and the practical implications of “minimum credible deterrence” very much depend on the user’s interpretation of 1) the type of adversary actions or threats nuclear weapons are actually meant to deter, and 2) what it means to present a minimally “credible” threat of retaliation. On both of these points, Indian and Pakistani thinking fundamentally diverged, probably well before 1998. Indian strategic thinking before the 1970s was vague regarding the purpose to be served by nuclear weapons; it was clear that significant political prestige was attached to their development, probably more so than actual military utility. Sampooran Singh, a scientist and vocal advocate for a weapons program, reflected this in his 1971 treatise *India and the Nuclear Bomb*, suggesting that “China’s entry of the nuclear club has enhanced its national prestige and influence on the international scene... So long as nuclear power and political power are correlated elements in world politics, it is necessary that India... view nuclear power as an integral part of its defence and deterrence system.” Particularly after China tested its first nuclear weapon in 1964, domestic debates indicated a perception that India might be vulnerable to coercion or blackmail by nuclear powers in the absence of its own deterrent capability – though besides the border dispute with China, no advocate could point to a compelling reason for why any of the major powers might attempt to exert nuclear leverage against India. It was not until the emergence of the Pakistani bomb program in the 1970s (precipitated as it was by Indian military action and nuclear testing) that India faced real potential for future large-scale military confrontation with a nuclear adversary.¹⁶³

¹⁶³ Perkovich 1999, 66-15, 156.

In a 1964 conference paper, Homi Bhabha opined that “nuclear weapons coupled with an adequate delivery system can enable a State to...destroy more less totally the cities, industry and important targets in another State. It is then largely irrelevant whether the State so attacked has greater destructive power at its command. With the help of nuclear weapons, therefore, a State can acquire what we may call a position of absolute deterrence even against another having a many times greater destructive power under its control.” Bhabha’s statement, whether knowingly or unknowingly, reflected the minimum deterrence logic of Schelling’s “threat that leaves something to chance”; the mere possibility of nuclear retaliation and its potentially devastating consequences – even if only a handful of warheads reach their targets – should be enough to deter the aggression of an adversary. Parity was not necessarily a precondition for credible deterrence. This basic logic would pervade among Indian proponents of a nuclear capability, though experts inevitably disagreed on the extent of capabilities required to achieve Bhabha’s “absolute deterrence.”¹⁶⁴

Acquisition costs figured prominently in the early decades of India’s internal nuclear debate, further influencing the direction toward a minimum deterrent force. Wildly diverging estimates were traded by experts and parliamentarians alike suggesting a robust nuclear arsenal was either a) well beyond the means of India’s developing economy (and contrary to Gandhian principles), or b) could be had at relatively reasonable cost, assuming India kept its ambitions modest. Bhabha and his atomic energy establishment aggressively promoted the latter, suggesting in the 1960s that a compact arsenal (comprising some dozens of warheads) could be acquired for a price in the low

¹⁶⁴ Perkovich 1999, 60-61.

tens of millions of U.S. dollars. Bhabha and his contemporaries greatly underestimated the ultimate price of an Indian deterrent capability, failing to factor in the cost of essential components like delivery platforms (which historically far exceeded warhead development costs for weapon states) or command and control – and perhaps more significantly the costs following from the economic and political consequences of defying the emerging nonproliferation consensus. They also spoke from a place of relative ignorance regarding military nuclear strategy. India’s military removed itself from early nuclear debates, leaving the civilian nuclear establishment to seize the reins of strategic thinking on nuclear weapons; this resulted in a legacy of disjuncture between development programs and actual military requirements that continues into the present day. Following Bhabha’s death in 1966, the nuclear establishment’s senior leadership at least came to accept more realistic estimates regarding the cost of nuclear weapons, influencing the political decision to keep the program limited through the 1970s.¹⁶⁵

Other voices outside the nuclear establishment advocated more systematic thought regarding India’s deterrence needs, and suggesting India might require a more substantial suite of capabilities; these individuals became more vocal by the 1980s, spurred in part by Pakistan’s increasingly visible nuclear buildup. Krishnaswamy Subrahmanyam – a civil servant, defense analyst, and eventual director of the influential Institute for Defense Studies and Analysis (IDSA) – emerged in the 1970s as one of the most ardent proponents of a robust deterrent force. He also saw nuclear weapons largely as instruments of political leverage, insisting that “So long as nuclear weapons are treated as the international currency of power, a non-nuclear India cannot even have a regional

¹⁶⁵ Perkovich 1999, 66-83.

role, let alone a global one.” Subrahmanyam was also skeptical of western deterrence theories that rationalized counterforce arsenals or the deployment of tactical nuclear weapons, criticizing notions of escalation control and limited nuclear war as “artificially contrived” paper exercises. Nonetheless, in order to credibly deter against coercion and blackmail, Subrahmanyam argued that India required a carefully calibrated retaliatory capability include warheads, delivery platforms, and command and control systems; Subrahmanyam understood this would require years of investment and planning, and advocated against a “crash program” predicated on short term gains. Subrahmanyam would later participate in a study on nuclear weapons policy secretly initiated by Prime Minister Rajiv Gandhi in 1985, involving other defense luminaries like future Army Chief of Staff Krishnaswamy Sundarji and nuclear physicist Raja Ramanna. The task force’s conclusions were never publicly disseminated (and Rajiv ultimately chose not to implement its recommendations); the participants (later interviewed by George Perkovich) recalled conclusions suggesting – unsurprisingly – a small retaliatory arsenal, perhaps in the “low hundreds” of weapons at most. The task force also advocated in favor of a no-first-use stance, consistent with dominant opinion in the political establishment and India’s long-standing advocacy for weapon states accepting such a posture (along with negative security assurances for non-weapon states).¹⁶⁶

All of this suggests that by the time of India’s 1998 tests, the nuclear and defense establishments agreed on certain broad principles for structuring India’s future arsenal (namely minimum deterrence and no-first-use), but ultimately lacked a systematically

¹⁶⁶ Perkovich 1999, 151, 156-158, 273-276, 327.
Subrahmanyam, K. "The Myth of Deterrence." In *Nuclear Myths and Realities: India's Dilemma*, edited by K Subrahmanyam, 52-70. New Delhi: ABC Publishing House, 1985.

informed consensus on how to best proceed with institutionalizing force posture and doctrine. This could only have been compounded by the fact that the BJP was a relative newcomer where it came to actually implementing national security policy. When Brajesh Mishra released a draft nuclear doctrine in 1999 (drafted by an advisory board of government and non-government experts that included Subrahmanyam), the document seemed to not so much reflect on the party in power, but on the decades of duality in India's nuclear stance and its ambivalence regarding the military utility of nuclear weapons. The draft doctrine lamented the "virtual abandonment" of nuclear disarmament by nuclear weapon states which necessitated India acquiring an "effective, credible nuclear deterrence and adequate retaliatory capability should deterrence fail." It outlined a "retaliation only" strategy, in which:

“2.4. The fundamental purpose of Indian nuclear weapons is to deter the use and threat of use of nuclear weapons by any State or entity against India and its forces. India will not be the first to initiate a nuclear strike, but will respond with punitive retaliation should deterrence fail.

2.5. India will not resort to the use or threat of use of nuclear weapons against States which do not possess nuclear weapons, or are not aligned with nuclear weapon powers.

2.6. Deterrence requires that India maintain:

- (a) Sufficient, survivable and operationally prepared nuclear forces,
- (b) a robust command and control system,

- (c) effective intelligence and early warning capabilities, and
- (d) comprehensive planning and training for operations in line with the strategy, and
- (e) the will to employ nuclear forces and weapons.”

The incorporation of a no-first-use pledge and negative security assurance for non-weapon states were predictable; these were also the most concrete aspects defined by the draft doctrine. On force requirements, the document specified that “forces will be based on a triad of aircraft, mobile land-based missiles and sea-based assets in keeping with the objectives outlined above. Survivability of the forces will be enhanced by a combination of multiple redundant systems, mobility, dispersion and deception... The doctrine envisages assured capability to shift from peacetime deployment to fully employable forces in the shortest possible time, and the ability to retaliate effectively even in a case of significant degradation by hostile strikes.” Credibility required that “Any adversary must know that India can and will retaliate with sufficient nuclear weapons to inflict destruction and punishment that the aggressor will find unacceptable if nuclear weapons are used against India and its forces.”¹⁶⁷

The reference to a western-inspired “triad” and rapid deployment capability suggested in some respects a posture more expansive and forward leaning than many expected from India, given past nuclear debates and its rejection of the arms race; it was certainly a far cry from the dozens of low-cost weapons originally envisioned by Homi

¹⁶⁷ India's Draft Nuclear Doctrine. *Arms Control Association*. July 1, 1999. http://www.armscontrol.org/act/1999_07-08/ffja99 (accessed February 15, 2015).

Bhabha. The doctrine, loaded with bureaucratic terms of art but little specific detail, provided no guidelines for or indication of how many warheads and delivery systems would be required to permit “high survivability” and “rapid punitive response.” It did not indicate how force planning would be conducted to meet specific military requirements. In defense of the Vajpayee administration, the document was not that much vaguer or more jargon-laded than unclassified nuclear posture review documents coming from the United States. That said, just like those documents, it provided little tangible structure or rationalization for future procurement and deployment decisions, leaving the door open for scope creep and continuous movement of the goal posts. The draft doctrine proved controversial upon its release, and the Vajpayee government never formally approved it as policy. In 2003, the government distributed a press release indicating it was reviewing “the progress in operationalizing of India’s nuclear doctrine.” The release briefly summarized a nuclear doctrine largely hewing to the same line as the 2003 draft; changes included dropping the no-first-use exception for non-nuclear weapon states allied with nuclear powers, but allowing for a potential nuclear response to chemical and biological attacks. No alternative guidance has been proffered in the years since (even after power shifted back to the Congress Party), and for all intents and purposes Indian nuclear policy pronouncements and acquisition decisions seem to sync with the concepts articulate in the original draft doctrine.¹⁶⁸

¹⁶⁸ Chari, P.R. "India's Nuclear Doctrine: Confused Ambitions." *The Nonproliferation Review*, no. Fall/Winter (2000): 123-155.

"Cabinet Committee on Security Reviews Progress in Operationalizing India's Nuclear Doctrine." Prime Minister's Office. January 4, 1999.
<http://pib.nic.in/archieve/lreleng/lyr2003/rjan2003/04012003/r040120033.html> (accessed February 15, 2015).

Sagan, Scott. "The Evolution of Pakistani and Indian Nuclear Doctrine." In *Inside Nuclear South Asia*, edited by Scott Sagan, 219-264. Stanford: Stanford University Press, 2009.

India's 1999 nuclear doctrine reflected decades of intense internal debates regarding the utility and necessity of nuclear weapons, its self-perception as a rising economic and political force on the global stage, lack of unity in civilian and military nuclear policymaking, and military threats of very different magnitudes on the northern and western borders. By contrast, the evolution of Pakistan's nuclear doctrine benefitted from a clearer sense of purpose and directionality, as well as greater policy centralization. Bhutto initiated the country's fuel cycle program (and by 1974, a weapons program) in direct response to massive battlefield defeat and dismemberment by a conventionally superior Indian military. It was relatively clear from the beginning that nuclear weapons were a means to guarantee Pakistan's survival and future territorial integrity, defending it against (in Bhutto's words) "a kind of nuclear blackmail threat unparalleled elsewhere." While the rhetoric of Pakistani scientists like A.Q. Khan certainly suggested that pride played a role in their pursuit of the bomb, Naeem Salik (a retired Brigadier General and former architect of Pakistan's military nuclear command authority) emphasizes that "Other advantages such as enhanced political prestige" were "peripheral and of secondary importance." Importantly, Pakistan's powerful military apparatus played a guiding role in the nuclear program from 1977 onwards (following the military coup that deposed Bhutto), ensuring greater coordination between civilian and military decision-making than was the case in India.¹⁶⁹

¹⁶⁹ "Bhutto Seeks Nuclear Policy Assurances." *National Intelligence Daily*. Director of National Intelligence. May 30, 1974. http://www.foia.cia.gov/sites/default/files/document_conversions/89801/DOC_0000845825.pdf (accessed February 15, 2015).
Salik, Naeem. "The Evolution of Pakistan's Nuclear Doctrine." In *Nuclear Learning in South Asia: The Next Decade*, edited by Faroz Khan, 71-84. Monterey: Center on Contemporary Conflict, U.S. Naval Postgraduate School, 2014.

Unfortunately, these advantages in focus and unity of authority did not necessarily translate into a clear sense of doctrine in the years preceding 1998, even after Pakistan allegedly acquired a functional nuclear capability in the late 1980s. By most accounts, Pakistan's nuclear decision makers were oversubscribed simply procuring the requisite technologies and competencies for production of nuclear weapons and missile delivery systems. Moreover, they wrestled with the challenge of balancing calculated nuclear ambiguity (for deterrent purposes) with a contradictory official international stance of nonproliferation (for diplomatic and economic purposes). By contrast to India, where nuclear issues were actively debated in political forums and civil society, there was virtually no public discourse in Pakistan before 1998 regarding the purpose or requirements for its emerging nuclear arsenal. Only in the 1990s did military leaders begin to make serious intellectual investments in the development of a viable nuclear doctrine, initially centralizing this activity in the military Combat Development (CD) Directorate, an analytical unit which also had roles in conventional defense planning. When Musharraf became Army Chief in 1998, one of his first actions was to begin laying the groundwork for an organization dedicated solely to managing the military nuclear enterprise. The Strategic Plans Division (SPD) emerged in 1999 to perform this role, serving as a central hub for policy analysis and input to the government (namely the executive level National Command Authority and the military Strategic Forces Commands), nuclear operational planning, weapons development programs, and arms control and disarmament affairs. It is worth noting that no equivalent body exists in India; nuclear policy and doctrine (such as it is) emerges through a loosely structured deliberation between government heads, leaders of the civilian nuclear and defense

research establishments, and the armed services. A tri-service Strategic Forces Command (SFC) was created in 2003, but its responsibilities are limited to deployment and management of military nuclear forces. This difference in approach to decision-making is probably indicative by itself of the asymmetry in mind between the two rivals. For India, nuclear planning and doctrine is a decentralized and highly political process driven by democratic processes, bureaucracy, and compromise. For Pakistan, the process is centrally driven by military actors seeking to meet military requirements; it is considerably more insulated from civilian oversight and (for better or worse) the vicissitudes of public debate.¹⁷⁰

It was already noted that upon testing in 1998, A.Q. Khan specifically ascribed a battlefield role to Pakistan's nuclear arsenal. In Sharif's public address following the May 29, 1998 test, he emphasized that "These weapons are to deter aggression, be it nuclear *or conventional*" (emphasis added). In his later remarks to the UN General Assembly that fall, Sharif further cautioned that "any military aggression against Pakistan would have the most disastrous consequences." These two related elements of Pakistan's nuclear posture/doctrine – the development and deployment of tactical nuclear weapons, and potential first use in response to conventional aggression – represent the clearest division between it and India on the role of nuclear weapons in national security. The Indian arsenal exists to confer global political influence, insulate India against nuclear superpower coercion, and provide for retaliation in the event it is struck by nuclear weapons first; the Pakistani arsenal is a military instrument to be employed in the event

¹⁷⁰ Durrani, Mahmud. *Pakistan's Strategic Thinking and the Role of Nuclear Weapons*. Albuquerque: Cooperative Monitoring Center, Sandia National Laboratories, 2004, 24, 49-51.

F. Khan 2012, 321-332.

Pant, Harsh. "India's Nuclear Doctrine and Command Structure: Implications for India and the World." *Comparative Strategy* 24 (2006): 277-293.

that its conventionally superior neighbor imperils its national existence – or perhaps even if the military is simply presented with the specter of battlefield defeat.¹⁷¹

Neither Sharif's nor any subsequent government of Pakistan has articulated a nuclear doctrine in the same manner as India's 1998 and 2003 pronouncements. Guidance is said to exist, but the precise contours remain a closely held state secret. Following release of India's 1999 draft doctrine, a trio of eminent Pakistani military and foreign policy veterans responded with a newspaper op-ed that may have been produced in prior consultation with the government. The authors emphasized that, in pursuing a nuclear capability, "At no time did Pakistan contemplate use of nuclear weapons for war fighting or seek to develop capability for a pre-emptive attack." Moreover, "Apart from the obvious constraint of resources... India is too large and too well armed to be vulnerable to a disabling strike." However, the trio argued that Pakistan should scope its nuclear capability appropriate to the threat and present circumstances – "In the absence of an agreement on mutual restraints, the size of Pakistan's arsenal and its deployment pattern have to be adjusted to ward off dangers of pre-emption and interception." Further, the arsenal's design and disposition would need to be predicated on "The assumption that if the enemy launches a general war and undertakes a piercing attack threatening to occupy large territory or communication junctions, the 'weapon of last resort' would have to be invoked." The logic presented was reminiscent of U.S./NATO "flexible response" discourses from the 1950 and 60s; some observers suggest Pakistani senior

¹⁷¹ "Nuclear Anxiety; Pakistani's Words: 'To Restore the Strategic Balance'." *The New York Times*. May 29, 1998.

officers who came of age in this era may have been directly influenced by exposure to U.S. military thinking on tactical nuclear weapons.¹⁷²

A 2002 interview with (now retired, but then active) SPD head General Khalid Kidwai, conducted by representatives from an Italian NGO, was perhaps more illuminating in suggesting certain “red lines” at which nuclear use might be contemplated. Emphasizing that Pakistan’s arsenal was “aimed solely at India,” the general articulated four potential scenarios:

- a.) India attacks Pakistan and conquers a large part of its territory
- b.) India destroys a large part either of its land or air forces
- c.) India proceeds to the economic strangling of Pakistan
- d.) India pushes Pakistan into political destabilization or creates a large scale internal subversion in Pakistan

Notably, none of the scenarios outlined necessarily implied Indian first use of nuclear weapons; the latter two scenarios in particular posited nuclear use in situations potentially far removed from conventional battlefield conflict. The third scenario (economic strangulation) harkened back to Indian naval blockades in previous conflicts,

¹⁷² Krepon, Michael. "Pakistan's Nuclear Strategy and Deterrence Stability." In *Deterrence Stability and Escalation Control in South Asia*, edited by Michael Krepon and Julia Thompson, 41-64. Washington, D.C.: Stimson Center, 2013, 44-45.

Ramana, M.V., and Z. Mian. "The Nuclear Confrontation in South Asia." In *SIPRI Yearbook 2003: Armaments, Disarmament and International Security*, 195-212. Oxford: Oxford University Press, 2003, 203-204.

Sagan, *The Evolution of Pakistani and Indian Nuclear Doctrine* 2009.
N. Salik 2014, 76-77.

while the fourth (political destabilization) spoke to long-standing accusations of Indian contribution to Pakistani insurgent conflicts (albeit with no obvious sense of irony regarding Pakistan's own complicated history with non-state actors). Other Pakistani military and government commentators have since suggested various caveats or amendments regarding their country's nuclear doctrine, making it challenging to pin down where consensus policies actually exist. Indeed, this ambiguity may very well be deliberate, intended to deter aggression through keeping Indian policymakers uncertain regarding the point at which military provocations might result in a reflexive nuclear response. Indian critics suggest this provides Pakistan with nuclear cover for initiating sub-conventional provocations (like the Kargil incursion), predicated on the belief that Indian policymakers (already committed to no-first-use) will be deterred from a full-fledged conventional response that might prompt a nuclear strike. Pakistani commentators are quick to note that India's sanctimonious no-first-use policy is in fact intended to permit conventional aggression below the nuclear threshold, assuming that no adversary would rationally initiate a nuclear exchange – regardless of official rhetoric.¹⁷³

It was previously noted that estimates of Pakistani and Indian nuclear capabilities following the 1998 tests suggested approximate parity, and the slow pace of technological progress on either side contributed to a tenuous balance of threat in the first decade of the twenty-first century. However, the implications of these very different use doctrines suggest potential for longer term divergence. In 2011, Pakistan tested the Nasr/Hatf-9, a relatively short range (60km) artillery rocket with a small payload;

¹⁷³ Cotta-Ramusino, Paulo, and Maurizio Martellini. *Nuclear Safety, Nuclear Stability and Nuclear Strategy in Pakistan*. Como: Landau Network-Centro Volta, 2002.
Sagan, *The Evolution of Pakistani and Indian Nuclear Doctrine* 2009.

General Kidwai and other senior officials were present for the test. According to the *Express Tribune*, an official military statement indicated the rocket “carries nuclear warheads of appropriate yield with high accuracy” and the system is “shoot and scoot” capable (i.e. highly mobile). The system would deter Indian military planners from “considering options of limited war.” By stark contrast to the short range (and likely low yield) battlefield weapon, India in the following year tested the Agni V, a ballistic missile of allegedly “intercontinental” range and capable of targeting the whole of mainland China. The *Times of India* reported the missile to be a “canister-launch system” with “higher road mobility” and suggested it would become deadlier once “MIRV (multiple independently targetable re-entry vehicles) payloads...are developed.” In addition, the country’s first indigenously produced nuclear powered submarine (the INS Arihant) was being prepared for sea trials after its ceremonial launching three years earlier; the ballistic missile-armed vessel is intended to provide India with a seaborne assured second strike capability.¹⁷⁴

From the standpoint of future arms control, these acquisitions trends are confounding on multiple levels. First, it is not clear on either side how many delivery platforms (and associated warheads) will be required to provide the respective rivals with a “credible” and “secure” retaliatory capability; no explicit military requirements have been articulated. If Pakistan is indeed moving toward operationalizing low-yield battlefield nuclear capabilities (as the acquisition of Nasr suggests), then military

¹⁷⁴ F. Khan 2012, 249-250.

“Pakistan Successfully Test-fires Nuclear Capable Hatf-9.” *The Express Tribune*. April 20, 2011. <http://tribune.com.pk/story/152425/pakistan-test-fires-nuclear-capable-missile/> (accessed February 16, 2015).

Pandit, Rajat. "Agni-V, India's First ICBM Tested Successfully." *The Times of India*, April 19, 2012.
Sethi, Manpreet. *INS Arihant and Credible Nuclear Deterrence*. New Delhi: Centre for Air Power Studies, 2009.

planners may very well request a number of weapons considerably higher than the nuclear complex's output to date – especially if the U.S./Soviet experience with tactical weapons deployment during the Cold War is any indication. If India intends to develop both a robust long range deterrent force of land-and sea-based weapons (potentially MIRV-capable), in addition to existing short and intermediate range systems more explicitly intended to hold Pakistani targets at risk, this similarly indicates potential for a considerably larger arsenal (at least one retired Indian admiral and proponent of sea-based deterrence has calculated a need for around 400 warheads). There is little indication that either side is scoping these requirements with the bilateral strategic balance in mind. It was suggested in Chapter 2 that a balance of forces facilitates arms control by allowing parties to negotiate from a position of mutual strength; it also allows for equitable horse-trading of assets when arms limitations or reductions are being considered. In the case of India and Pakistan, acquisition trends leading to either a) considerable inequity in the number of warheads possessed by the rivals or b) a very different mix of weapon systems not easily matched or traded on a 1:1 basis, could either individually or in combination eliminate the potential for future arms control beyond confidence building and risk reduction.¹⁷⁵

Additionally, these acquisition trends have the potential to undermine an important (albeit non-formalized) element of nuclear confidence building and risk reduction on the subcontinent – the peacetime separation of warheads and delivery systems. Since becoming openly nuclear, both countries have at various times assured

¹⁷⁵ Menon, Raja. *A Nuclear Strategy for India*. New Delhi: Sage Publications, 2000, 177-231. Smith, David. "The US Experience with Tactical Nuclear Weapons: Lessons for South Asia." In *Deterrence Stability and Escalation Control in South Asia*, edited by Michael Krepon and Julia Thompson, 65-92. Washington, D.C.: Stimson, 2013.

international observers their weapon systems are kept de-alerted in this manner (and in notable contrast to the all other acknowledged nuclear weapon states except China), functionally slowing the escalation chain toward nuclear war and preventing inadvertent launches by overeager forces in the field. Moreover, reports suggest that in addition to delivery system de-mating, the fissile material cores of warheads may also be kept in a disassembled state, further impeding rapid deployment and also enhancing security against non-state actor theft of a fully functional weapon. It is not clear however, how (or if) this posture can be sustained given the acquisition trends noted. If India ultimately deploys nuclear weapons on submarines at sea (ostensibly conducting deterrent patrols), or on land in sealed containerized form, it may not be technically possible to maintain the current separation (the western experience is again potentially instructive; the United States maintained a similar posture of separation and disassembly into the 1950s, but the eventual deployment of more modern, self-contained weapon systems ultimately rendered this approach infeasible). The same may be the case for Pakistan, especially if it elects to forward deploy and disperse certain systems (like Nasr) to enhance survivability against a first strike. Given the subcontinent's history of provocation and crisis, any development that enhances the readiness posture of nuclear weapons would seem ultimately counterproductive to strategic stability.¹⁷⁶

¹⁷⁶ Cotta-Ramusino and Martellini 2002.

Mistry, Dinshaw. "Missile Proliferation and Deterrence Stability in South Asia." In *Deterrence Stability and Escalation Control in South Asia*, edited by Michael Krepon and Julia Thompson, 123-134. Washington, D.C.: Stimson, 2013, 126-132.

Pant 2006, 286.

Narang, Vipin. "Five Myths about India's Nuclear Posture." *The Washington Quarterly* 36, no. 3 (2013): 148-150.

Schlosser, Eric. *Command and Control: Nuclear Weapons, the Damascus Accident, and the Illusion of Nuclear Safety*. New York: The Penguin Press, 2013.

Taking Stock of India-Pakistan Arms Control

In December 2001, a terrorist attack on India's Parliament building sparked fresh confrontation between the two rivals. Indian security officials connected the armed gunmen, who killed nine people, with militants group allegedly supported by Pakistan (namely Lashkar-e-Taiba and Jaish-e-Mohammed, both active in the Kashmir insurgency). The Vajpayee government demanded that Pakistan crack down on the two groups, arrest and extradite key figures, and end its support for militancy; Musharraf rejected the evidence presented and initially refused to carry out any arrests. Vajpayee mobilized the Indian military, eventually moving 800,000 troops to the border with Pakistan including armored divisions, air support, and naval assets; Pakistani forces were placed on heightened alert in response. The confrontation seemed to wane by the middle of 2002, as Musharraf executed a limited crackdown on the two groups (though still refusing extradition) and the Indian government held back from more overtly threatening military maneuvers. However, a May terrorist attack on an Indian Army base in Kashmir, in which personnel family members were the main target, re-stoked tensions and prompted further military and diplomatic pressure from India. Some reporting suggests that Indian officials seriously considered options for limited military incursions, an alarming prospect in retrospect given Pakistan's ambiguous nuclear use threshold. George Fernandes ominously dismissed the prospect for such a response from Pakistan, emphasizing in a December 2001 interview that "Pakistan can't think of using nuclear weapons... We can take a strike, survive, and then hit back. Pakistan would be finished. I do not really fear that the nuclear issue would figure in a conflict." Both sides further

underscored the nuclear dimension of the confrontation by openly testing ballistic missile systems throughout 2002, even at the height of tensions.¹⁷⁷

Forces on both sides began demobilizing by fall 2002, following intense U.S. diplomatic mediation and further counterterrorism concessions on the part of Musharraf. The crisis represented the last major military confrontation between the rivals (at least to date) following the 1998 tests. The core sources of latent hostility, notably Kashmir, remained unresolved. The actions of non-state actors also continued to fuel periodic tensions, threatening a reprise of 2001/2002. However, the two sides seemed to settle into acceptance of an uneasy status quo. Nuclear proponents on both sides attributed this directly to nuclear deterrence, suggesting that both Kargil and the 2001/2002 crisis were held in check due to mutual recognition that full-scale conventional war was no longer feasible. In 2004, the Indian Congress Party displaced the BJP with a revitalized coalition and Manmohan Singh replaced Vajpayee as Prime Minister. The Indian transition also coincided with resuscitation of a “Composite Dialogue” between the two powers, addressing a host of security, economic, and cultural issues and resulting in some confidence building successes (though the measures implemented owed much to the Lahore MOU). The results and current status of that dialogue will be addressed more fully in the final chapter – but it is worth noting at this point to highlight the continued back-and-forth dynamic between crisis and confidence building, a hallmark of the relationship between the two powers dating back to the nuclear latency period.

¹⁷⁷ Chari, Cheema and Cohen, *Four Crises and a Peace Process* 2007, 149-182. Ganguly and Hagerty, *Fearful Symmetry: India-Pakistan Crises in the Shadow of Nuclear Weapons* 2005, 167-182.

Qualitative analysis of the arms control relationship between India and Pakistan, particularly in the years immediately after the nuclear test, demonstrates clearly the causal hallmarks of the “hostile stabilization” paradigm – military imbalance, militarized hostility, and imbalanced conceptions of nuclear doctrine. However, the case study suggests further nuance not immediately evidence from the fsQCA:

Episodes of militarized hostility provide both impetus and obstruction for arms control. The case study further illuminates the complicated interplay between militarized hostility and arms control; while crisis might beget opportunity for arms control, recurrent or sustained crisis can just as easily roll back progress. Episodes of crisis clearly provided impetus for dialogue and confidence building between the two rivals, since well before the overt introduction of nuclear weapons. The Lahore Memorandum was especially remarkable in emerging so quickly after the two powers openly declared their nuclear status; no other pair of rivals can claim comparable progress so soon after first testing weapons. At the same time, the momentum leading to the memorandum could not be sustained in the face of recurring conflict. The Kargil crisis and later episodes of alleged state-sponsored militancy effectively erased any good will generated; most of the arms control proposals contained in the Lahore MOU would not be formally implemented for some years following (it at all). This dynamic suggests in particular that cooperative reciprocity is a key ingredient for sustained arms control, particularly if measures are to evolve beyond basic confidence building and transparency.

External intervention may in some cases be a causal mechanism linking militarized hostility and arms control, though the relationship appears weak.

Qualitative evidence is weakly suggestive of a secondary causal mechanism for militarized hostility, in that hostility between nuclear-capable rivals can motivate external diplomatic intervention on behalf of arms control. This is particularly true on the subcontinent, where the United States especially has an interest in stability between two countries it ostensibly counts as partners (if not always explicitly allies) in meeting post-Cold War security objectives. However, the strength of this causal mechanism should not be overstated; there is no evidence to suggest that external intervention alone can bring parties to the negotiating table, particularly if those parties are insulated from coercion by nuclear capabilities. Nonetheless, it is a factor that needs to be considered, especially in an increasingly multipolar global order.

Informal arms control should not be overlooked, particularly between rivals

in a state of hostile stabilization. It is important to not simply assess arms control in terms of inked agreements; the India-Pakistan case study strongly demonstrates the utility of informal arms control measures, especially between rivals in a state of persistent hostility. The reciprocal test ban and (at least near term) commitment to separation of warheads and delivery systems place significant technical and operational constraints on regional nuclear capabilities not always appreciated by outside observers. Under past and present political conditions, it is not clear that either of these measures could ever be formally

enshrined through an agreement – but their de facto implementation in spite of this is a significant development. At the same time, the gains from informal arms control can be tenuous, as evidenced by delivery system acquisition trends on both sides that may undermine the longer term separation of warheads and delivery systems.

There are limits to the arms control-facilitating effects of purely quantitative nuclear parity. Thus far, the arms race on the subcontinent has moved at a relatively modest pace compared to the East/West dynamic of the 1950s and 60s. In addition to a slow (albeit still alarmingly significant) accumulation of warheads, the two powers (particularly India) have been slow to induct delivery systems with game-changing potential. In this way, a rough parity in nuclear capabilities has been maintained and nuclear asymmetry has not been a factor holding back arms control to this point (conventional asymmetry is another matter). Unfortunately, divergences in doctrine and associated acquisition trends may hinder possibilities for more ambitious nuclear arms control down the road – especially if India moves toward a triad of strategic nuclear capabilities, while Pakistan increasingly focuses on an arsenal oriented toward shorter ranges systems supporting battlefield operations. These developments may lead to both quantitative and qualitative asymmetries that are challenging to reconcile through traditional, reciprocity-based modes of arms limitation and reduction.

Third party nuclear rivalries are a potential spoiler for bilateral arms control. This is a factor not accounted for in the bilaterally-oriented fsQCA, but

potentially significant in the case of a rivalry like India/Pakistan. In this case, the armament decisions of one rival (India) are very much reactive to a third party competitor (China); the qualitative analysis noted how China's weapons program played a strong role in driving India to the bomb. Moreover, its present-day push for development of ICBMs and ballistic missile submarines is in large part a response to Chinese threats and capabilities – not Pakistan. However, India's arms race with China has implications for the balance of threat vis-à-vis Pakistan, especially if Indian force planners feel compelled to balance against both rivals on separate terms (i.e. building forces capable of retaliating against both powers simultaneously and in relative proportion, rather than only assuming the likelihood of a purely bilateral exchange). India and Pakistan are not the only rivalry to present such a dynamic; it is also present in the U.S.-Russia context via China (also the China-Russia context via the United States, and the U.S.-China context via Russia, depending on one's perspective). However, this third party influence is potentially more challenging in the context of the subcontinent, given the territorial proximity of all three rivals and less significant inequities in nuclear arsenal size (the United States and Russia outstrip Chinese capabilities by several orders of magnitude, largely negating Chinese influence on bilateral arms control dynamics – at least until recently).

The arms control narrative between India and Pakistan is uniquely complex among nuclear rivalry case studies, owing to a combination of proximity, history, opacity, inherent asymmetry, and the influence of external factors. For the reasons noted, it is a cautionary tale in over-generalizing based on semi-quantitative analysis alone what

it means for rivals to be in a state of “hostile stabilization.” Certain macro-level facilitating conditions may be consistent across case studies, but causal mechanisms are more nuanced when examined in light of historical evidence. The India-Pakistan case is also highly suggestive that the transition from one phase of arms control to another is not an inevitable process – in fact a range of confounding factors can potentially set rivals down contrasting paths that render arms control extremely challenging or infeasible, even if a state of relative peace can be maintained. The next chapter further illustrates how elusive this “window of opportunity” for arms control can be, evidenced by arms control dynamics between another pair of asymmetric rivals.

Chapter 6. Dually Reinforcing Asymmetry: China and the United States

Most of the analysis in this study focuses on conditional combinations facilitating movement toward arms control between strategic rivals. It is also important – perhaps equally so – to consider how different configurations of those conditions might hold back countries from arms control. The previous chapter began to address this issue, identifying how distinct asymmetries of mind and asymmetrical trends in the balance of threat might offset the potential for more substantive arms control in the future between India and Pakistan. However, there are notably three nuclear rivalry dyads among those considered in Chapter 3 that exhibit a completely null arms control outcome throughout their interaction history – the United States and China, Russia and China, and China and India. This chapter focuses on the United States and China, given both the prominence of this dyadic relationship in the 21st century and the availability of relevant qualitative data. The remaining two dyads represent fertile ground for future research, but require the attention of true regional experts capable of surmounting the current paucity of historical accounts and translated primary source material.

Even the case of the United States and China suffers from a comparative lack of data, which is not wholly surprising given the degree to which U.S.-Soviet (and later U.S.-Russia) relations dominated the global nuclear arms control discourse for most of the twentieth century. As strategic competitors, the United States and China spent most of the Cold War era at opposite ends of the development spectrum, both in terms of economic output and overall military power; there was very little foundation on which to establish a peer-to-peer strategic dialogue. That dynamic is rapidly shifting however in

the 21st Century, as China begins to match and in some regards eclipse its former Cold War adversaries in economic and military standing. It is therefore important to better understand how the United States and China, despite now fifty years of history as nuclear rivals, have managed to largely evade the pursuit of nuclear arms control. As this chapter will demonstrate, the United States and China exhibit a unique combination of diminishing hostility over time, asymmetry in nuclear forces, and completely divergent nuclear doctrines – calling into question not only the feasibility of arms control, but the basic function of arms control measures in a situation of dually reinforcing asymmetry.

China's Bomb and a Cooling Rivalry

At the time China detonated its first nuclear bomb in October 1964, U.S.-China reciprocal threat perceptions were already beginning to shift, even if only imperceptibly at first. Successive U.S. administrations still refused to acknowledge the legitimacy of the communist regime in Beijing, continuing to diplomatically recognize the Kuomintang nationalists in Taiwan as China's true government. The relationship still smarted from more than a decade of direct military confrontation, beginning with China's 1950 intervention in the Korean War and continuing through a series of military crises that saw shots traded across the Taiwan Straits, threats of military invasion (from both mainland China and Taiwan), and U.S. political commitment to intervene if China attempted reunification by force. By the end of the 1950s, the United States was committed to Taiwan's defense through a formal defense pact; U.S. military forces would be stationed on the island into the early 1970s, while the U.S. Navy maintained a constant presence

offshore. U.S. nuclear weapons were also quietly deployed to the island for deterrent purposes.¹⁷⁸

The 1964 nuclear test was not unexpected by U.S. observers, even coming as soon as it did following China's disastrous rural-industrial experiment of the "Great Leap Forward." Indeed, the tone of President Lyndon Johnson's post-test statement to the American people expressed minimal alarm regarding the implications of China's bomb for American security; it lamented more that "Scarce economic resources which should have been used to improve the well-being of the Chinese people have been used to produce a crude nuclear device which can only increase the sense of insecurity of the Chinese people." Assumptions regarding the crudeness of China's nuclear capabilities were challenged three years later when the country conducted its first thermonuclear test, reaching that particular milestone in shorter time than the other four weapon states (France itself was still a year away from its first hydrogen bomb). In 1966, the communist government demonstrated the full extent of its emerging capabilities by testing a Dongfeng-2 (DF-2, or in western nomenclature CSS-1) intermediate range ballistic missile with a live nuclear warhead; the missile's range fell well short of threatening the continental United States, but could target U.S. military forces stationed in the region.¹⁷⁹

¹⁷⁸ Elleman, Bruce. *High Seas Buffer: The Taiwan Patrol Force, 1950-1979*. Newport: U.S. Naval War College, 2012.

Lewis, John, and Xue Litai. *China Builds the Bomb*. Stanford: Stanford University Press, 1988, 11-34.

Norris, Robert, William Arkin, and William Burr. "Where They Were." *Bulletin of the Atomic Scientists* 55, no. 6 (2012): 30-31, 34.

¹⁷⁹ Lewis, Jeffrey. *The Minimum Means of Reprisal: China's Search for Security in the Nuclear Age*. Cambridge: The MIT Press, 2007, 63-64.

Lewis, Jeffrey. *Paper Tigers: China's Nuclear Posture*. Oxon: Routledge, 2014, 43-52.

"Statement by President." *The New York Times*. October 17, 1964. 10.

Despite bad blood vis-à-vis the United States, Chinese nuclear developments in the 1960s owed as much – if not more – to the country’s fraying relationship with the Soviet Union. In fact, disagreements regarding nuclear cooperation played a key role in undermining the brief and tumultuous Chinese-Soviet alliance of the 1950s. The origins of the alliance dated to the last years of Stalin’s reign. The dictator’s support for Mao Zedong’s revolutionary movement had been initially tepid (particularly during World War II, when Chiang Kai-Shek was the figurehead of allied China), but following the communists’ consolidation of power on the mainland in 1949, an overt alliance appeared both ideologically sound and mutually beneficial. China benefited from Soviet industrial and military assistance, particularly crucial after it entered the Korean War against a technologically superior U.S. military. By 1955, Mao Zedong had resolved to pursue an atomic weapons program and enlisted Soviet assistance in developing the requisite scientific competencies and technical capabilities. Chinese scientists received training in the Soviet Union, while significant technical assets – including research reactors, nuclear materials, fissile material production facilities, and most notably a single working nuclear bomb – were promised in return for Chinese strategic cooperation in Asia.¹⁸⁰

Chinese-Soviet relations were already starting to experience stress by the time the nuclear cooperation agreements were inked between 1955 and 1958. Mao found Nikita Khrushchev to be a far less agreeable alliance partner than Stalin, taking issue with the Soviet leader’s allegedly weak commitment to revolutionary ideals, de-Stalinization campaign, and diplomatic outreach to western powers (including arms control and

¹⁸⁰ Negin, Evgeny, and Yuri Smirnov. "Did the USSR Share Atomic Secrets with China?" *Parallel History Project on Cooperative Security*. 2002.
http://php.isn.ethz.ch/collections/coll_china_wapa/negin_smirnov_engl.cfm (accessed February 19, 2015).

disarmament overtures that threatened to cut China out of becoming a nuclear power before it even had a fair chance). Khrushchev himself distrusted Mao and balked at the Chinese leader's inflammatory rhetoric (including his dismissiveness of the potential consequences associated with nuclear war). The Soviet government provided only weak moral support to China during the Taiwan Strait crisis of 1954-1955, and seemed an increasingly unreliable ally in the face of the Eisenhower administration's massive retaliation doctrine. The nuclear agreement, along with the broader foundations of Sino-Soviet cooperation, collapsed by the end of the decade; China never received the bomb it had been promised and was forced to piece together an indigenous program leveraging the competencies and partial infrastructure left behind by the Soviets.¹⁸¹

By the early 1960s, Mao Zedong increasingly spoke of a two-front threat encompassing both western imperialism and Soviet communist "revisionism." The Soviet Union strengthened its military presence in the Far East during this era, and lingering border demarcation disputes threatened to boil over into armed conflict. The growing Sino-Soviet split was perceptible even in the U.S. policy community; evidence suggests the Kennedy and Johnson administrations discussed the possibility of reaching out to the Soviet Union on a coordinated (or at least tacitly consensual) preemptive strike against China's nuclear program. In 1966, Mao initiated his domestic "Cultural Revolution," mobilizing cadres of supporters to purge the country of counterrevolutionary elements and further stoking ideological opposition to the Soviet Union. In early 1969, Chinese and Soviet military forces openly clashed along the northeastern Ussuri River border, finally exposing to the world the full extent of their ideological rift. The conflict never

¹⁸¹ Lewis and Litai, *China Builds the Bomb* 1988, 60-72. Zubok 2007, 115-116, 136-137.

expanded beyond localized skirmishes, but Chinese leaders feared a more decisive Soviet military thrust was in the works. In October of that year, under murky bureaucratic circumstances, the People's Liberation Army (PLA) Second Artillery (an elite unit solely responsible for operating China's land-based ballistic missile forces) was according to some accounts placed on elevated alert in anticipation of a Soviet strike.¹⁸²

The Johnson administration, embroiled in the Vietnam War (wherein Chinese-Soviet collusion was assumed – incorrectly – to be a given), never exploited these divides to advantage. However, Richard Nixon and Henry Kissinger recognized the opportunity even preceding Nixon's electoral victory in 1969; as previously discussed in Chapter 4, outreach to China synced with their vision of new foreign policy realpolitik. The administration's subsequent rapprochement with China is well-covered in the existing literature; suffice to say it was a transformational moment for U.S.-China relations. The opening resulted in U.S. formal recognition of the communist regime as China's sole legitimate governmental authority, and paved the way for greater economic and cultural exchange. Taiwan's status was notably not resolved through the reconciliation; while the United States no longer recognized its government as a separate nation-state under the new "One China" policy, it would continue to support the island's autonomy from the mainland and provide for its defense (though to a declining extent) – setting the stage for

¹⁸² Burr, William, and Jeffrey Richelson. "Whether to 'Strangle the Baby in the Cradle': The United States and the Chinese Nuclear Program, 1960-64." *International Security* 25, no. 3 (2000/2001): 54-99.
Ford, Harold. "Calling the Sino-Soviet Split." *Studies in Intelligence* 42, no. 5 (1998-1999).
Goldstein, Lyle. "When China was a 'Rogue State': The Impact of China's Nuclear Weapons Program on U.S.-China Relations During the 1960s." *Journal of Contemporary China* 12, no. 37 (2003): 739-764.
Kuisong, Yang. "The Sino-Soviet Border Clash of 1969: From Zhenbao Island to Sino-American Rapprochement." *Cold War History* 1, no. 1 (2000): 21-52.
Lewis, John, and Xue Litai. *Imagined Enemies: China Prepares for Uncertain War*. Stanford: Stanford University Press, 2006, 48-74.
J. Lewis, Paper Tigers: China's Nuclear Posture 2014, 23-28.

future dispute. It would be a gross exaggeration to suggest that Nixon brought an end to U.S.-China strategic rivalry in East Asia; subsequent events would demonstrate that substantial differences continued to exist between the two powers. However, the opening of the relationship represented a substantial de-escalation of hostilities compared especially to the events of the 1950s, when U.S. and Chinese military forces openly clashed on the Korean peninsula and faced off across the Taiwan Strait.

The nuclear relationship was largely untouched by the new detente, focusing as it did mostly on economic and “soft power” linkages. During the administration’s 1972 visit, Kissinger briefed his Chinese counterparts on the progress of SALT negotiations with the Soviets and other U.S. global arms control initiatives; he also shared detailed U.S. intelligence information on Soviet military deployments (including nuclear forces) in the Far East. The briefings were largely a gesture of transparency, with no overt suggestion that the United States and China would benefit from a separate nuclear dialogue. However, the China opening did yield one tangible outcome of arms control relevance. In its concessions on Taiwan, the Nixon administration agreed to a gradual withdrawal of U.S. military forces from the island (many of which were logistically supporting U.S. involvement in Vietnam, which was also nearing a drawdown). Significantly, this included the removal of forward deployed U.S. nuclear weapons assigned to Air Force strike aircraft at Tainan Air Base. This did not fundamentally alter the balance of threat; the United States by that point possessed more than sufficient long-range nuclear delivery capability to hold Chinese targets at risk. Nonetheless, the withdrawal of U.S. nuclear weapons from Taiwan is the sole example to date of an at

least implicitly negotiated measure between the two powers affecting the physical disposition of deployed nuclear forces.¹⁸³

Slow Progress toward a Minimum Retaliatory Capability

At the time that Nixon and Kissinger initiated talks with the communist Chinese government, the country – by most open source estimates – likely possessed only a modest nuclear capability comprising less than a hundred nuclear and thermonuclear warheads. The delivery systems for these warheads included obsolete Soviet-design bomber aircraft with insufficient range to reach the United States, and short to intermediate range missiles (like the DF-2 tested in 1966) only capable of targeting U.S. military assets forward deployed in the region – this compared to a U.S. arsenal in 1970 that included more than 6,000 strategic warheads mated to more than 2,000 strategic delivery vehicles. In short, there was no structural balance on which to predicate an arms control dialogue (assuming political impetus for one even existed), at least beyond basic confidence building and risk reduction. China was a latecomer to the East-West arms race, and for a number of reasons it never pursued parity with its superpower rivals. First and foremost among these was a long-standing conception of nuclear weapons as largely political instruments possessing limited military utility, coupled with an associated nuclear doctrine eschewing first use and emphasizing countervalue targeting (to be

¹⁸³ Burr, William. "Nixon's Trip to China." *The National Security Archive*. December 11, 2003. <http://www2.gwu.edu/~nsarchiv/NSAEBB/NSAEBB106/> (accessed February 19, 2015).

Burr, William, ed. "How Many and Where Were the Nukes?" *The National Security Archive*. August 18, 2006. <http://www2.gwu.edu/~nsarchiv/NSAEBB/NSAEBB197/index.htm> (accessed February 18, 2015). MacMillan 2008, 240-244, 259-260.

Norris, Arkin and Burr, *Where They Were* 2012, 30-31, 34.

addressed in more detail in the following section). From a more practical standpoint, for decades China simply lacked the economic and technological resources to compete with the United States and Russia on a 1:1 basis. Political turmoil following the Great Leap Forward, the Cultural Revolution, and the succession crises of the 1970s further slowed the pace of development. When Deng Xiaoping's leadership finally managed to stabilize China domestically in the 1980s, governance priorities increasingly focused on strengthening the domestic economy and fostering stable international relations, goals at odds with an ambitious nuclear armament program.

This does not mean that Chinese leaders did not on some level recognize the need for a robust retaliatory capability; research and development on delivery systems was initiated in the same time period as the bomb program itself. However, the program did not appear to be driven by any systematic assessment of strategic and military requirements. In the words of John Lewis and Xue Litai (preeminent scholars of the Chinese nuclear program), "there were no scenarios, no detailed linkage of the weapons to foreign policy objectives, and no serious research." Central Military Commission guidelines for the nuclear weapons program drafted in 1958/1959 simply stated that "we have to concentrate our energies on developing nuclear and thermonuclear warheads with high yields and long range delivery vehicles." Decision makers understood that nuclear threats were only credible if the weapons could be physically delivered to an enemy's territory; beyond this they had very little operational guidance from which scientists and engineers could set design goals. In 1963, Zhou Enlai articulated a vision for a missile arsenal capable of reaching targets at four successive ranges encompassing Japan, the Philippines, Guam, and finally the continental United States; this at least provided a

rudimentary set of goal posts for the missile program (by the end of the decade, Soviet targets including Moscow also factored into the range requirements).¹⁸⁴

The early missile program benefitted from technology transfer preceding the collapse of Sino-Soviet cooperation, including the transfer of complete short and intermediate range missile systems that could be studied by Chinese scientists; these formed the basis for early designs like the DF-2. Longer range multistage systems capable of reaching Moscow, let alone the continental United States, would require a much heavier indigenous technical lift. At the time of Nixon's visit, the Chinese had begun deploying the 2,800km DF-3/CSS-2 (capable of targeting the Philippines) and 4,800km DF-4/CSS-3 (capable of targeting Guam and much of the Soviet Union). Development had already commenced on the 12,000-13,000km DF-5/CSS-4 (capable of reaching the continental United States); although a prototype was successfully flown at depressed range in 1971, it was not ready for operational deployment in limited numbers until 1981.

While the range figures for these missiles appeared menacing on paper (offering a certain existential deterrent value), it is also worth noting their substantial limitations. The single digit DF-series missiles were all liquid fueled. Liquid rocket fuels tend to be more volatile and less easily transportable than solid fuels; the DF-2 was ostensibly road-mobile but could not be maintained for any militarily useful length of time in a fueled state, requiring tedious preparation for launch and creating a window of vulnerability for preemptive strike. The DF-3 used a more stable propellant, but still had to be erected to a

¹⁸⁴ Lewis, John, and Hua Di. "China's Ballistic Missile Programs." *International Security* 17, no. 2 (1992): 5-40.

Lewis and Litai, *China Builds the Bomb* 1988, 70, 211-212.

launch position before fueling and other lengthy preparation procedures could take place. The larger DF-4 and DF-5 systems were ultimately confined to fixed launch sites facilitating more rapid firing at the expense of greater vulnerability to preemptive targeting; the DF-4 needed to be rolled out of a cave before launch, while the DF-5 would ultimately reside in hardened silos. All of these missiles carried a single warhead (stored separate from the missiles during peacetime, a policy that extends into the present) and were assumed by western sources to be relatively inaccurate. By comparison, the United States and the Soviet Union by the end of the 1970s had mastered solid fuel missile technologies (permitting greater mobility and readiness), increasingly accurate MIRVed warheads (maximizing the destructive power per delivery vehicle), and possessed early warning capabilities and redundant command and control systems. From a purely technical standpoint, China's first generation strategic nuclear force was arguably obsolete before it even entered service.¹⁸⁵

Chinese defense planners were acutely aware of these limitations, attempting to enhance the survivability of strategic systems through camouflage, frequent movement, and the use of decoys. In parallel to the missile program, but at a much slower pace, China's state defense industry also pursued development of a nuclear powered ballistic missile submarine. While this potentially offered the most secure second strike capability, it also presented far greater technical obstacles. A viable system required Chinese engineers to simultaneously master (among other elements) advanced submarine design and production, nuclear propulsion technology, and solid-fueled sea-launched missile

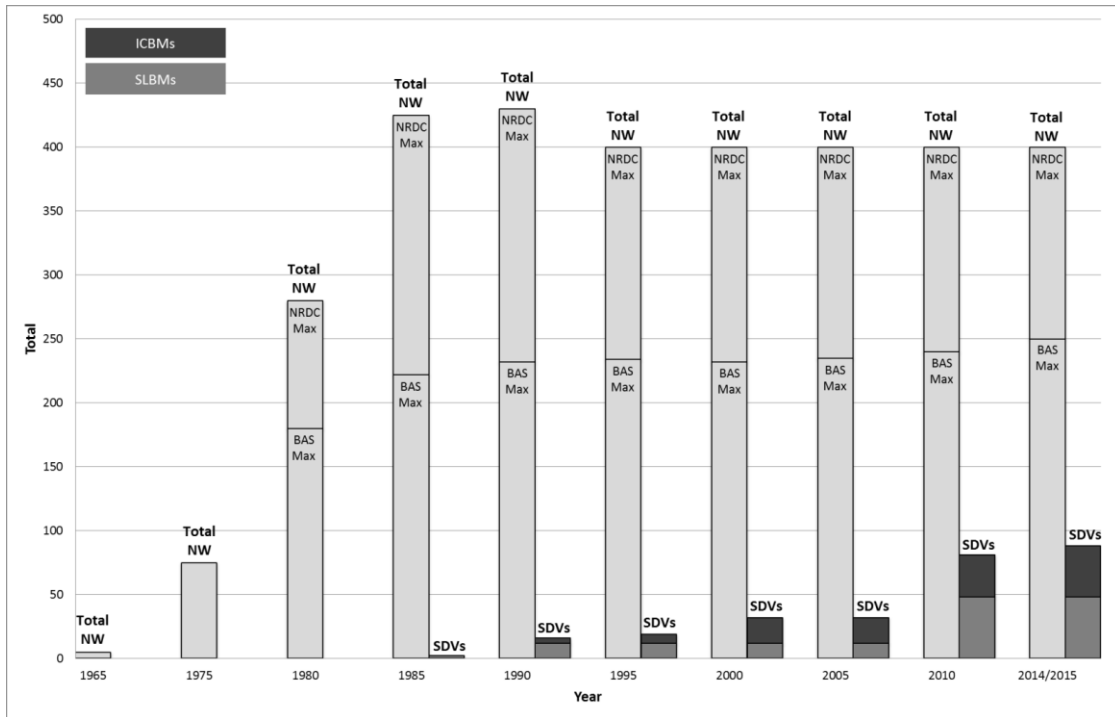
¹⁸⁵ J. Lewis, *The Minimum Means of Reprisal: China's Search for Security in the Nuclear Age* 2007, 53-87. J. Lewis, *Paper Tigers: China's Nuclear Posture* 2014, 99-119. Lewis and Di, *China's Ballistic Missile Programs* 1992. Riqiang, Wu. "Certainty of Uncertainty: Nuclear Strategy with Chinese Characteristics." *The Journal of Strategic Studies* 36, no. 4 (2013): 593-598.

technology – three areas in which the country lacked an indigenous technological base at the start of the 1960s. Once again, Soviet assistance fell short in providing a meaningful basis for the program, and the expensive submarine effort faced far greater domestic bureaucratic and economic hurdles than the land-based missile program. The Project 092 “Xia”-class submarine and JL-1 missile began testing in the early 1980s, in what most sources suggest was a campaign riddled with development problems; accounts indicate the submarine was unacceptably noisy (crippling for a second strike system whose survivability is dependent on stealth) and multiple missile tests ended in failure. It wasn’t until 1987 that a JL-1 was successfully test fired from the Project 092 vessel. Although the submarine and its missiles would be counted in U.S. strategic estimates from the late 1980s onwards, and the vessel even appeared as late as 2009 in a PLA Navy review, it is not clear if it truly ever achieved operational status (possibly serving as a proof-of-concept technology testbed and deterrent-in-being).¹⁸⁶

The majority of open source evidence suggests that by the end of the Cold War, China still possessed a relatively small retaliatory capability vis-à-vis the United States (see Figure 8 below). Stockpiled warheads (including both deployed and non-deployed systems) may have numbered in the low hundreds, though this figure – extrapolated from NGO reporting based on open source analysis – is subject to considerable debate and conjecture. In an extensively researched 2007 study, Jeffrey Lewis suggested a deployed Chinese arsenal of only 60-70 warheads by 1995 (with some indeterminate number in storage), based on U.S. DOD reporting and available delivery systems. Among those,

¹⁸⁶ Erickson, Andrew, and Lyle Goldstein. "China's Future Nuclear Submarine Force." *Naval War College Review* 60, no. 1 (2007): 55-79.

Lewis, John, and Xue Litai. *China's Strategic Seapower: The Politics of Force Modernization in the Nuclear Age*. Stanford: Stanford University Press, 1994.



BAS = Bulletin of the Atomic Scientists
 NRDC = Natural Resources Defense Council
 SDV = Strategic Delivery Vehicle
 SLBM = Submarine Launched Ballistic Missile
 ICBM = Intercontinental Ballistic Missile

Table sources:

- Archive of Nuclear Data, Natural Resources Defense Council
- Ballistic & Cruise Missile Threat, 2013
- Bulletin of the Atomic Scientists Nuclear Notebook
- Kristensen & Norris, Global Nuclear Weapons Inventories, 1945-2013
- J. Lewis, The Minimum Means of Reprisal, 2007
- Lewis J. , Paper Tigers: China's Nuclear Posture, 2014

Figure 8: China Estimated Warheads and Strategic Delivery Vehicles, 1965-2015

perhaps less than twenty could be mated to delivery systems capable of reaching the continental United States, assuming a small force of single-warhead DF-5s; even if one were to assume a MIRV capability and an operational 092 submarine at that period in time, the total Chinese strategic arsenal still represented a fraction of a percentage of U.S. capabilities. A new generation of more advanced and survivable Chinese delivery

systems was well under development by the 1990s, including road-mobile solid-fueled intercontinental ballistic missiles (the DF-31/CSS-9 series) and a successor submarine/SLBM system, but these would not see limited deployment until the first decade of the 21st century. The available evidence suggests that Chinese defense planners continued to reject the pursuit of strategic parity with their country's nuclear rivals – an outlook consistent with fundamental doctrinal precepts little changed since Mao first initiated the nuclear program forty years earlier.¹⁸⁷

The Evolution of Chinese Nuclear Doctrine

Mao Zedong, a leader of many quotations, most famously described nuclear weapons in 1946 as “a paper tiger which the U.S. reactionaries use to scare people. It looks terrible, but in fact it is not.” Consistent with his revolutionary principles (and reflecting the so far limited use of nuclear weapons to that point), he repeatedly emphasized how “the outcome of a war is decided by the people, not by one or two new weapons.” The Chairman was well known for extreme reductionism, bluster, and often contradiction in his ideological statements, and his diatribes on nuclear weapons were no exception – often provoking simplistic and alarmist assessments of Chinese nuclear intentions. In 1955, he suggested that “The United States cannot annihilate the Chinese

¹⁸⁷ “Global Nuclear Weapons Stockpiles, 1945-2002.” *Natural Resources Defense Council*. 2002.

<http://www.nrdc.org/Nuclear/nudb/datab19.asp> (accessed February 21, 2015).

J. Lewis, The Minimum Means of Reprisal: China's Search for Security in the Nuclear Age 2007, 25-74.

Kristensen, Hans, and Robert Norris. “Chinese Nuclear Forces, 2013.” *Bulletin of the Atomic Scientists*. 2013, 79-85.

Kristensen, H., & Norris, R. (2013). Global Nuclear Weapons Inventories, 1945-2013. *Bulletin of the Atomic Scientists*, 69(5), 75-81.

“Table of Chinese Nuclear Forces, 2002.” *Natural Resources Defense Council*. 2002.

<http://www.nrdc.org/Nuclear/nudb/datab17.asp> (accessed February 21, 2015).

nation with its small stack of atom bombs”; the United States might create temporary setbacks with nuclear weapons, but would ultimately be unable to overcome the sheer numbers and revolutionary insurgent zeal of the Chinese people. It was previously noted that Khrushchev was personally alarmed by Mao’s seemingly cavalier attitude, noting in his memoirs that “I tried to explain to him that one or two missiles could turn all the divisions in China to dust. But he wouldn’t even listen to my arguments and obviously regarded me as a coward.” Dim assessments of Mao’s strategic vision contributed to the Sino-Soviet split, and prompted U.S. policy discussions of a preemptive raid on Chinese nuclear facilities. A U.S. National Intelligence Estimate from 1960 suggested that the country’s “arrogant self-confidence, revolutionary fervor, and distorted view of the world may lead [Beijing] to miscalculate risks. This danger would be heightened if Communist China achieved a nuclear weapons capability.”¹⁸⁸

The very fact that the communist regime chose to pursue a nuclear weapons program at all, coupled with the substance of official policy pronouncements from the era, suggests however a more nuanced and sober grasp of the significance of nuclear weapons. The decision to acquire the bomb, and the early evolution of China’s associated nuclear doctrine, seemed to reflect two basic ground truths accepted by Mao and his compatriots in the first generation of postwar communist Chinese leadership. First, whether militarily useful or not, nuclear weapons were instruments of prestige and political influence in the postwar global order. Mao acknowledged as much in 1958, stating to the Central Military Commission (China’s national military command

¹⁸⁸ Freedman, *The Evolution of Nuclear Strategy* 2003, 259.
L. Goldstein 2003, 741.
Zubok 2007, 136.

authority) that “without it [the atomic bomb] people say you don’t count for much. Well then, good. We’ll make some. We’ll make some atom bombs, hydrogen bombs and inter-continental missiles.” Chinese officials and publications often lamented the existence of a western atomic “monopoly” and indicated their country’s efforts were aimed at breaking that monopoly – not just on behalf of China, but the oppressed masses of the world. Zhou Enlai emphasized the developmental prestige associated with atomic energy, noting “We are now in the atomic age. We have to understand atomic energy whether used for peace or war. We have to master atomic energy. We are far behind in this area.”¹⁸⁹

Second, without nuclear weapons, China would be susceptible to coercion and blackmail by the superpowers; it had experienced this firsthand in the Korean War and the Taiwan Strait Crisis. The Truman administration discussed nuclear use early in the Korea War but rejected it on both political and tactical grounds, contributing to the civil-military rift that saw the dismissal of General Douglas MacArthur. Dwight Eisenhower succeeded Truman on a pledge to end the stalemated war, and in 1953 sent signals to the Chinese leadership implying that if a negotiated settlement could not be reached, the United States “would probably make a stronger rather than a lesser military exertion and that this might well extend the area of conflict” – i.e. the war might (more explicitly) be extended to Chinese territory, and might (more ambiguously) escalate to nuclear use. Historians continue to debate the extent to which this threat impacted China’s eventual

¹⁸⁹ Enlai, Zhou. "Adress by Zhou Enlai at the Plenary Session of the Fourth Meeting of the State Council." *Wilson Center Digital Archive*. January 31, 1955. <http://digitalarchive.wilsoncenter.org/document/114333> (accessed February 20, 2015).

Freedman, *The Evolution of Nuclear Strategy* 2003, 262.

J. Lewis, *Paper Tigers: China's Nuclear Posture* 2014.

Lewis and Litai, *China Builds the Bomb* 1988, 35-36, 192.

Zedong, Mao. "Address by Mao Zedong to the Enlarged Meeting of the Central Military Commission (excerpt)." *Wilson Center Digital Archive*. June 21, 1958.

<http://digitalarchive.wilsoncenter.org/document/114345> (accessed February 20, 2015).

acceptance to negotiated concessions, but it was at least comprehended and taken seriously by the regime. Mao himself noted in 1950 that “If the U.S. Strikes with atomic bombs, we have none and can only allow it to strike. This is something we cannot resolve.” The subsequent Taiwan Strait Crisis took place during U.S. domestic debate on the Eisenhower administration’s “New Look” military policy and emerging perceptions of a “massive retaliation” approach to managing regional provocations. Again, a direct link between Chinese actions and implicit U.S. nuclear threats is tenuous, but evidence suggests Chinese officials were at least aware of their political and military weakness absent a nuclear capability.¹⁹⁰

The previously cited 1958/59 nuclear program guidelines issued by the Central Military Commission further reinforced these points, and moreover outlined basic tenets of Chinese nuclear doctrine that remained relevant long after the first test:

“1. Our country is developing nuclear weapons in order to warn our enemies against making war on us, not in order to use nuclear weapons to attack them. This is conducive to the support of the international proletarian revolutionary movement and colonial independence movement.

2. The main reasons for us to develop nuclear weapons are to defend peace, save mankind from a nuclear holocaust, and reach agreement on nuclear disarmament and the complete abolition of nuclear weapons.

¹⁹⁰ Foot, Rosemary. "Nuclear Coercion and the Ending of the Korean Conflict." *International Security* 13, no. 3 (1988-89): 92-112.

Fravel, M, and Evan Madeiros. "China's Search for Assure Retaliation: The Evolution of Chinese Nuclear Strategy and Force Structure." *International Security* 35, no. 2 (2010): 58.

Lewis and Litai, *China Builds the Bomb* 1988, 10-16.

3. To this end, we have to concentrate our energies on developing nuclear and thermonuclear warheads with high yields and long-range delivery vehicles. For the time being we have no intention of developing tactical nuclear weapons.

4. In the process of developing nuclear weapons, we should not imitate other countries. Instead, our objective should be to take steps to ‘catch up with advanced world levels’ and to ‘proceed on all phases simultaneously’.”

The first point hinted at China’s eventual no-first-use pledge (though remained non-committal); nuclear weapons would only exist to dissuade adversaries from aggression, not to serve as instruments of offensive war. The third point, previously cited, placed special emphasis on acquisition of systems with long reach and maximum destructive power, strongly implying a countervalue strategy of holding area targets deep within an adversary’s home territory at risk. The rejection of tactical nuclear weapons (at least in the near term) indicated skepticism regarding their battlefield warfighting utility, very much at odds with contemporary trends in the East/West arms race. The fourth point emphasized the prestige dimensions of Chinese nuclear capabilities; while not seeking parity, China would nonetheless seek to match the technical prowess of its contemporaries. The remaining language was consistent with China’s overall narrative of revolution and advocacy for people’s movements in the developing world. Echoing Indian political sentiments discussed in the previous chapter, Chinese leaders suggested the pursuit of nuclear weapons did not contradict their advocacy of global nuclear disarmament – it rather reflected the lack of progress on disarmament to that point and China’s need to provide for its security in a world of nuclear powers.

Immediately following the 1964 test, the Chinese government released a statement clarifying elements of its nuclear posture for the international community; the rhetoric remained consistent with past statements and the 1958/59 guidance. The statement declared its capability a “major achievement of the Chinese people in their struggle to...oppose the United States imperialist policy of nuclear blackmail and nuclear threats.” It emphasized that “The Chinese government has consistently advocated the complete prohibition and thorough destruction of nuclear weapons. Should this have been realized, China need not have developed the nuclear weapon.” The statement further castigated the United States for hypocrisy and aggression in negotiating a limited ban agreement but continuing to conduct underground nuclear tests and enhance its arsenal, deploying ballistic missile submarines to Asia, and providing nuclear weapons to its NATO allies. It reiterated Mao’s dictum that “the atom bomb is a paper tiger” and emphasized that “China is developing nuclear weapons not because we believe in the omnipotence of nuclear weapons and China is planning to use nuclear weapons...The development of nuclear weapons by China is for defense and for protecting the Chinese people from the danger of the United States’ launching a nuclear war.” Most importantly, “The Chinese government hereby solemnly declares that China will never at any time and under any circumstances be the first to use nuclear weapons.” The 1964 statement also called on the other nuclear powers to undertake a similar pledge, and proposed an international summit leading to “an agreement...that the nuclear powers...undertake not to use nuclear weapons, neither to use them against nonnuclear countries and nuclear-free zones, nor against each other.”¹⁹¹

¹⁹¹ Pollack, Jonathan. "Chinese Attitudes towards Nuclear Weapons, 1964-9." *The China Quarterly* 50, no.

China's no-first-use pledge was a first for a nuclear power, only later matched by the Soviet Union for a brief period at the end of the Cold War and later India. It has remained a prominent and defining feature of Chinese nuclear policy not just from a political standpoint, but from the standpoint of nuclear force posture and strategy. Preceding the 1980s, there is little evidence to suggest China's defense establishment developed a more sophisticated set of organizing principles for its nuclear forces beyond the pledge and very high level planning guidance from the Central Military Commission. There is certainly nothing to suggest internal doctrinal debates approaching the diversity, arcane complexity, and political volatility of those in the United States during the 1950s and 60s. Rather, the composition, disposition, and tactical direction of nuclear forces was more directly a function of indigenous technical limitations, bureaucratic infighting resulting from the Cultural Revolution, and the political directives of the Party embodied by no-first-use.¹⁹²

As China recovered from the 1970s under Deng Xiaoping's leadership, the defense establishment – still strapped for resources, but increasingly encouraged to think systematically about its strategy and needs – began to more seriously consider elements of nuclear strategy under the constraints of no-first-use, linking (in the words of Jeffrey Lewis) “policy imposed from above with operational requirements developed by the military.” The military services (including the Second Artillery) began to establish strategic studies enclaves and organize symposia for concepts to be formulated and discussed among senior officers. Previously cited efforts to enhance the survivability of

June-April (1972): 244-271.

“Statement by Peking on Nuclear Test.” *The New York Times*. October 17, 1964. 10.

¹⁹² Riqiang 2013, 599-605.

China's limited nuclear forces, particularly its few intercontinental range assets, were evidence of the shift toward operational considerations. Western insight into the intellectual underpinnings of these developments is heavily informed by two documents released in the 1980s, titled (in translation) *The Science of Second Artillery Campaigns* and *The Science of Military Strategy*. Debates about the significance and interpretations of these documents and successor editions abound (fueled by the overall opacity of Chinese defense policymaking), but M. Fravel and Evan Medeiros suggest the former document in particular "was probably the PLA's first systematic study of the use of nuclear weapons."¹⁹³

The Science of Military Strategy defined four principles governing the use of nuclear weapons, including 1) centralized command and control (within the CMC), 2) striking only after the enemy has struck (no-first-use), 3) close defense (ensuring survivability), and 4) "key point" counterstrikes (hitting strategic targets of value to the adversary). The document further emphasized quality over quantity in maintaining an "effective counterstrike capability," and the importance of mobility and distributed bases to enhance survivability. In short, it provided a basic framework for nuclear military operations consistent with forces available or projected to be available to the Second Artillery – a modest arsenal of mobile and fixed intermediate-to-long range ballistic

¹⁹³ Fravel and Madeiros 2010, 68-70.

J. Lewis, Paper Tigers: China's Nuclear Posture 2014, 20-37, 118-119.

Lewis, John, and Xue Litai. "Making China's Nuclear War Plan." *Bulletin of the Atomic Scientists* 68, no. 5 (2012): 48-51.

missiles, distributed to facilitate survivability of some number in the case of a first strike and permitting countervalue retaliation unacceptable to any rational adversary.¹⁹⁴

Subsequent documents further elaborated on some of these points, coinciding with the Second Artillery's gradual acquisition of more robust nuclear capabilities, as well as an increasingly salient *conventional* warfighting mission. By the 1980s, Deng Xiaoping became convinced that large-scale superpower war (conventional or nuclear) was extremely unlikely, and that China needed to be better prepared for smaller-scale, more information- and technology-intensive regional operations (China's hastily executed, costly, and strategically ineffectual 1979 invasion of Vietnam was a case in point regarding the PLA's lack of preparedness). Coinciding with rising tensions vis-à-vis Taiwan, the Second Artillery greatly expanded its holdings of shorter range conventional ballistic missiles, partly compensating for China's inferior airpower and providing a potent standoff threat to wield over the island and other potential aggressors. These weapons, arguably more likely to be employed than the nuclear arsenal, themselves required an operational doctrine – one defined separately but in careful coordination with the nuclear doctrine. By contrast to nuclear operations, the doctrine for conventional missions emphasized the potential for preemptive strikes, greater flexibility of targeting, and close theater coordination with other PLA services. However, it also drew on common elements such as maximizing survivability through dispersion and camouflage

¹⁹⁴ Allen, Kenneth, and Maryanne Kivlehan-Wise. "Implementing PLA Second Artillery Doctrinal Reforms." In *China's Revolution in Doctrinal Affairs: Emerging Trends in the Operational Art of the Chinese People's Liberation Army*, edited by James Mulvenon and David Finkelstein, 159-200. Alexandria: CNA Corporation, 2005, 164-167.
Fravel and Madeiros 2010, 66-72.
Lewis and Litai, *Making China's Nuclear War Plan* 2012, 55.

and maintaining centralized command and control (albeit under very different operational conditions).¹⁹⁵

Available documentation and open source reporting suggests that throughout the 1990s, the Second Artillery continued to hone its thinking on the nuclear mission, building upon existing doctrinal foundations while providing the force with a clearer sense of operational direction and purpose. Certain tenets from the 1980s guiding operations – including emphases on centralized command and control, retaliation after absorbing a first strike, survivability, and “key point” targeting – remained consistent and continued to guide investments in mobile missile systems and more modern and survivable command and control. Perhaps more importantly, updates to the *The Science of Military Campaigns* published at the turn of the century provided more tangible objectives for nuclear operations; these included paralyzing enemy command systems, weakening the enemy’s capability to wage war, sabotaging the enemy’s strategic plans, shaking the enemy’s will to fight, and stopping the escalation of nuclear war. These objectives – coupled with guidance that the Second Artillery should be prepared for protracted operations, versus a single retaliatory blow – suggested a more ambitious range of operational and targeting requirements than existing systems (namely the small DF-5 force) were presently equipped to handle. Whether these objectives were aspirational, or represented a more serious disjuncture between operational theory and real-world capability, remains unclear.¹⁹⁶

¹⁹⁵ Lewis and Di, *China's Ballistic Missile Programs* 1992, 52-55.

Lewis and Litai, *Imagined Enemies: China Prepares for Uncertain War* 2006, 127-133, 173-213.

¹⁹⁶ Chase, Michael, and Evan Medeiros. "China's Evolving Nuclear Calculus: Modernization and Doctrinal Debate." In *China's Revolution in Doctrinal Affairs: Emerging Trends in the Operational Art of the*

The revised *Science of Campaigns* document also represented (at least to some western observers) an innovation in its treatment of deterrence – a concept that for decades had been anathema to Chinese nuclear strategy. Owing to a combination of translation challenges and Maoist ideological proclivities, deterrence had historically been interpreted in highly coercive terms more akin to the English usage of “compellence” – i.e. forcing an adversary to behave in a certain way through threat of violence, versus the contemporary western understanding of using the threat of violence to dissuade an adversary from acting in the first place. Deterrence was associated with western nuclear blackmail (like that experienced at the end of the Korean War), and considered fundamentally at odds with no-first-use and a conception of nuclear weapons as political instruments.

By the 1990s, it appeared Chinese strategic thought was beginning to embrace a more nuanced interpretation of deterrence; the *Science of Campaigns* drew a distinction between “offensive” and “defensive” variations on deterrence; the former was characteristic of hegemonic powers with offensively oriented arsenals, while the latter was characteristic of less revisionist and defensive-oriented nuclear powers like China. It also described a “counter deterrence” role for China’s nuclear forces in wartime, in which demonstrated retaliatory resolve (nuclear “signaling” in western parlance) is used to counteract potential western coercive deterrence. Other writings from the era described deterrence in terms of “minimum,” “limited,” and “maximum” variations. Minimum

People's Liberation Army, edited by James Mulvenon and David Finkelstein, 119-157. Alexandria: CNA Corporation, 2005, 138-139.

Gill, Mulvenon and Stokes 2002, 546-547.

Medeiros, Evan. "Minding the Gap!: Assessing the Trajectory of the PLA's Second Artillery." In *Right Sizing the People's Liberation Army: Exploring the Contours of China's Military*, edited by Roy Kamphausen and Andrew Scobell, 143-189. Carlisle: Strategic Studies Institute of the U.S. Army War College, 2007.

deterrence implies a largely existential threat in the form of a small number of nuclear weapons. While not necessarily robust from a survivability standpoint and certainly not capable of a protracted exchange, the arsenal dissuades an adversary primarily through uncertainty and the likelihood of at least some minimum level of countervalue retaliation (arguably the existing Chinese paradigm). On the opposite end of the spectrum, maximum deterrence implies counterforce warfighting capabilities like those held by the superpowers. Limited (or in some translations “medium”) deterrence represents a middle ground between these extremes, permitting greater flexibility in response to a first strike, including response options throughout the escalation ladder and some ability to execute counterforce operations.¹⁹⁷

The existence of these distinctions and ongoing discourse in Chinese strategic studies literature has fueled western speculation regarding the country’s longer term intentions – namely whether it intends to maintain the existing paradigm of a minimalist nuclear force (minimum deterrence); is aiming for a more robust and survivable but still largely retaliatory capability (“minimum *credible* deterrence” or “assured retaliation”); or is nurturing aspirations of a larger, more diversified and capable arsenal permitting greater freedom of action and even limited warfighting potential vis-à-vis the United States (limited deterrence as previously defined). Proponents of more revisionist aims point to China’s expansion of capabilities in the new millennium, including deployment of the DF-31 series of road mobile missiles and a new generation of ballistic missile submarines (the Type 094 “Jin”-class, paired with a new JL-2 missile). These individuals

¹⁹⁷ Chase and Medeiros 2005, 128-129, 133-137.

Fravel and Madeiros 2010, 70-72, 76-80.

Johnston, Alistair. "China's New 'Old Thinking': The Concept of Limited Deterrence." *International Security* 20, no. 3 (1995-1996): 10-23.

also point to China's ongoing lack of transparency regarding numbers of deployed weapons, allegations that China's total fissile material and warhead output may be much larger than commonly reported, and statements from defense intellectuals and officials suggesting potential erosion, or at least substantial questioning, of commitment to no-first-use.¹⁹⁸

A more common line of thought, drawing on available evidence, suggests that while China has not embraced a doctrinal change and official statements on no-first-use should continue to be taken at face value, a tension at least exists within the defense establishment and could be exacerbated by international developments – particularly China's relationship with the United States and related U.S. investments in technologies potentially upsetting the strategic balance (e.g. missile defense or prompt global strike). Proponents of a continued minimalism (or at most designs on assured retaliation) point to the low numbers of weapons believed to be deployed (estimates based in large part on U.S. government reporting), and the unhurried pace at which China appears to be developing and inducting new delivery systems. These efforts are suggestive of modernization in the interest of replacing obsolete systems, matching western technical prowess, and enhancing the effectiveness and survivability of the arsenal, but not necessarily ambition for a more substantial nuclear force. Bureaucratic interests may also be at play in driving certain procurements, as constituencies in the PLA and defense-industrial sectors vie for resources and influence. These observers suggest that debate (to

¹⁹⁸ For arguments suggesting more revisionist potential, see: Arbatov, Alexei. *Engaging China in Nuclear Arms Control*. Moscow: Carnegie Moscow Center, 2014. Christensen, Thomas. "The Meaning of the Nuclear Evolution: China's Strategic Modernization and U.S.-China Relations." *Journal of Strategic Studies* 35, no. 4 (2012): 447-487. Zhang, Baohui. *China's Assertive Nuclear Posture: State Security in an Anarchic World Order*. New York: Routledge, 2015.

the extent it exists) in the Chinese literature largely represents an intellectual exercise within the strategic studies enclaves of the defense establishment, attempting to reconcile the military theory and practice of nuclear operations with the still very real constraints of no-first-use.¹⁹⁹

These observers also point to the fact that Chinese officials at the highest levels of leadership appear committed to principles longstanding since the 1964 test. In 1998, the Chinese government publicly released a first-ever defense white paper outlining national military strategy and policy; the document reiterated the country's "solemnly declared" commitment to no-first-use, called on those states with the largest nuclear arsenals to hasten reductions, and further called for bilateral no-first-use pledges among nuclear weapon states as a confidence building gesture in the direction of disarmament. Subsequent white papers have continued to hew to this line. The 2006 white paper provided some perspective on nuclear modernization, indicating that China continued to uphold "principles of counterattack in self-defense and limited development of nuclear weapons" and that its only aim is the fielding of a "lean and effective nuclear force capable of meeting national security needs." Chinese officials and arms control experts continue to echo the "lean and effective" refrain into the present day, generally refraining

¹⁹⁹ Interview with Gregory Kulacki, March 26, 2015.

Interview with Jeffrey Lewis, April 29, 2015.

For arguments suggesting the existence of a tension, see:

Chase and Medeiros 2005, 151-154.

Johnston, China's New 'Old Thinking': The Concept of Limited Deterrence 1995-1996.

Wortzel, Larry. *China's Nuclear Forces: Operations, Training, Command, Control, and Campaign Planning*. Carlisle: Strategic Studies Institute of the U.S. Army War College, 2007.

For arguments suggesting continued minimum deterrence or assured retaliation, see:

Fravel and Medeiros 2010, 75-87.

J. Lewis, Paper Tigers: China's Nuclear Posture 2014, 20-37, 136-141.

Narang, Nuclear Strategy in the Modern Era: Regional Powers and International Conflict 2014, 135-138.

from commitment to a specific model of deterrence (minimum, limited, or otherwise) as an organizing principle for their arsenal.²⁰⁰

Semantic interpretations and future prognostications aside, few observers argue that China's past and present nuclear posture and strategy bears even a passing resemblance to that of its primary nuclear rivals. The pairing of a comparatively small arsenal with a no-first-use policy stands in stark contrast with the diverse, capable, and launch-on -warning poised forces of the United States and Russia, even following the Cold War. It was previously noted that U.S. and Soviet (later Russian) nuclear doctrines evolved very much in tandem, responding to political and technical development on both sides. Through political and technical interactions, including arms control negotiations, the two sides also developed a commonly understood (if not always perfectly agreed upon) conceptual vocabulary regarding deterrence and the roles played by nuclear weapon. No such parallel process of "nuclear learning" took place between China and its rivals for the first twenty to thirty years of its emergence as a nuclear power. Especially during the tumultuous years of the Cultural Revolution, the development of Chinese nuclear capabilities and doctrines took place in relative isolation from discourse with the west or even the Soviet Union. The resulting asymmetry of both force and mind continues to have profound implications for arms control and strategic stability into the present day.

²⁰⁰ "China's National Defense." *Information Office of the State Council of the People's Republic of China*. 1998. <http://china.org.cn/e-white/5/index.htm> (accessed June 3, 2015).
"China's National Defense in 2006." *Information Office of the State Council of the People's Republic of China*. 2006. <http://www.china.org.cn/english/features/book/194421.htm> (accessed February 22, 2015).

Divisive Issues after the Cold War

The end of the Cold War was transformative for U.S.-China relations, albeit sometimes in ways less dramatic than the seemingly overnight U.S.-Russian rapprochement. Most significantly, the Soviet collapse removed what had previously been the most powerful motivator for Sino-American cooperation – a shared enemy. Without the common interest of Soviet containment, previously latent but powerfully divisive issues became harder to overlook. This first became evident in the field of human rights, following the violent communist crackdown on the Tiananmen Square protests of 1989. Successive U.S. presidential administrations dating back to Nixon had been able to gloss over human rights issues in China, benefitting from the Cold War preoccupation with security and the general ignorance of the American electorate regarding Chinese domestic politics; some U.S. officials even went so far as to suggest Deng's regime was actually making slow progress toward greater openness and accountability. The Tiananmen crackdown, which was heavily covered by international media and broadcast news, made it readily apparent that the regime remained harshly authoritarian, shocking the U.S. public and members of Congress into a new awareness. The George H.W. Bush administration, which initially hesitated against taking drastic measures in response to the violence, faced intense pressure to sanction the Chinese government for its actions.

While economic sanctions against the regime proved short-lived in the face of domestic business pressures to maintain and expand commercial ties (embodied by Most Favored Nation status debates that continued into the Clinton Administration, ultimately resolving on terms favorable to China), the low-key but significant security relationship

that had evolved between the two countries since Nixon suffered more significant consequences. The U.S. defense industry during the 1980s, blessed by the Reagan administration, had initiated modest but notable collaboration with Chinese counterparts in aerospace production and other fields; these projects became indefensible after Tiananmen, and their collapse eroded Chinese confidence in both previous and future U.S. security commitments. Military-to-military exchanges and intelligence sharing, again previously modest but still politically significant, also came to an abrupt end. Some contacts would be re-initiated at a lower level in the decades following, but not to levels matching the Cold War relationship envisioned by the Nixon administration and expanded under Ford, Carter, and Reagan.²⁰¹

More troubling from a strategic stability standpoint, geopolitical disputes over which the two sides had previously maintained delicate accommodation flared into confrontation by the middle of the decade. The authoritarian backlash in Beijing starkly contrasted with liberalizing trends in Taiwan following the death of Chiang Kai-shek's son and heir Chiang Ching-kuo. By the 1990s, Taiwan's political class had for the most part abandoned (in practice, if not always in rhetoric) Chang Kai-shek's designs for reunification with mainland China on nationalist terms – designs that previously fueled provocative, offensively oriented military policies now rendered quaint by Beijing's demographic, industrial, and military rise. Some Taiwanese leaders even began to emphasize the distinctions between native Taiwanese culture and society and that of the mainland – distinctions previously suppressed, sometimes violently, under the nationalist government in the interest of lending cultural legitimacy to their political claims. More

²⁰¹ Mann 2000, 175-225.

problematically, some political actors in the newly empowered opposition began to openly agitate for a complete divorce with the mainland by way of either de facto or de jure independence, a move distinctly at odds with the “One China” compromise painstakingly negotiated and delicately maintained by successive U.S. administrations since Nixon. Taiwan’s first democratically elected president, Lee Teng-hui, courted the support of these pro-independence elements to bolster his electoral mandate (indeed he would eventually split entirely with the nationalist Kuomintang after leaving office, in favor of an independence-leaning political movement). Lee’s political machinations, while irksome for the U.S. executive branch, benefitted from a receptive U.S. Congress increasingly disillusioned with the compromises previously negotiated with Beijing.

Since its exodus from the mainland in 1949, the Taiwanese government had benefitted from a strong lobbying arm in the United States that helped maintain a consistent level of bipartisan congressional support for its autonomy. After the Carter administration severed formal diplomatic relationship with Taiwan in 1979 (following through on the Nixon administration’s 1972 promises), which abrogated commitments under the 1955 Mutual Defense Treaty, Congress responded by passing the Taiwan Relations Act of 1979 – by way of veto-proof majorities in both houses. The Act, which infuriated Beijing, established parameters for an ongoing separate relationship with Taiwan, including an assurance that “any effort to determine the future of Taiwan by other than peaceful means, including by boycotts or embargoes” would be seen as “a threat to the peace and security of the Western Pacific area and of grave concern to the United States commitment.” Moreover, the United States would “make available to

Taiwan such defense articles and defense services in such quantity as may be necessary to enable Taiwan to maintain a sufficient self-defense capability.”²⁰²

The act presented successive U.S. administrations with the challenge of interpreting these vaguely worded commitments. In 1992, the Bush administration tested the limits of what Beijing might deem acceptable for “sufficient self-defense” when it chose to sell Taiwan 150 sophisticated F-16 fighter aircraft to bolster its aging air force. The arms deal was the most significant transfer of military equipment to Taiwan since the normalization of relations with Beijing, and not surprisingly aggravated already high post-Tiananmen tensions. China would attempt to match Taiwan’s acquisitions with purchases of increasingly sophisticated Russian military hardware in the following decade, in addition to investing in its own domestic aerospace industry. Taiwan’s U.S.-facilitated military modernization also coincided with the previously noted expansion of conventional strike missions for the PLA Second Artillery, with a growing array of short-range ballistic missiles deployed to coastal bases directly opposite Taiwan. The Washington/Beijing relationship was further tested by China’s own arms export policies, including ballistic missile sales to Saudi Arabia, Pakistan, and other countries that clashed with U.S. nonproliferation and regional strategic stability priorities in the Middle East and South Asia.²⁰³

Tensions came to a head shortly after Lee visited the United States in June 1995 (the first time a Taiwanese president had visited the United States for any reason), delivering a carefully worded speech at Cornell University in which he emphasized

²⁰² Mann 2000, 78-95.

“Taiwan Relations Act, United States Code Title 22 Chapter 48 Sections 3301 - 3316.” U.S. House of Representatives, 1979.

²⁰³ Mann 2000, 167-174, 264-273.

Taiwan's progress – independent of the mainland – as an industrial power and a new democracy. Lee expressed hope for a “peaceful reunification of China under a system of democracy,” but until that time indicated Taiwan would continue to seek a separate relationship with its international partners, including the United States. Despite efforts by the Clinton administration to downplay Lee's presence on U.S. soil, solely for purposes of the Cornell visit and with no official interactions on the agenda, the regime in Beijing reacted angrily to the perceived affront to the One China policy. Official communist news outlets noted the Taiwan issue was “explosive as a barrel of gunpowder,” and “It is extremely dangerous to warm it up, no matter whether the warming is done by the United States or by Lee Teng-hui.”²⁰⁴

The PLA conducted military exercises in the East China Sea the following month, including a demonstration of the Second Artillery's conventional ballistic missile capabilities; four short-range, solid-fueled DF-15 missiles were fired into the ocean within 80 miles of Taiwan's northeast coastline. In the following months, a series of provocative exercises were conducted including further missile tests, air and naval maneuvers, and a large-scale simulated amphibious invasion. Government statements and official propaganda made it clear the exercises were a warning against any attempt by Taiwan to seek formally recognized independence; the exercises were also timed to coincide with Taiwan's electoral process, the outcomes of which may have been influenced by the demonstration of military power (pro-independence parties fared less well than anticipated in fall elections). In the same period, the *New York Times* reported

²⁰⁴ Chen, David. "Taiwan's President Tiptoes Around Politics at Cornell." *The New York Times*, June 10, 1995.
Mann 2000, 315-338.

that an unnamed Chinese official admonished former Assistant Secretary of State Charles Freedman (then visiting China in his personal capacity) that Americans “care more about Los Angeles than they do about Taiwan,” allegedly implying a nuclear threat to the U.S. mainland if Washington intervened on Taipei’s behalf. Although Freeman himself later clarified that the statement was merely to imply China could not be coerced by U.S. nuclear threats (given its retaliatory potential), it fueled concerns about the limits of China’s no-first-use policy and whether a military altercation over Taiwan might elicit the maximum response from Beijing.²⁰⁵

Additional exercises were scheduled for early 1996, to coincide with presidential elections in which Lee was seeking a second term; these would include missile tests within 30 miles of Taiwan’s coastline. In response to these actions, the Clinton administration directed two aircraft carrier battle groups to deploy in the vicinity of Taiwan (one of the groups had to be redirected from the Arabian Sea). The naval deployments represented the largest demonstration of U.S. military power on Taiwan’s behalf since 1958. They cast light on China’s lack of serious “blue water” naval capabilities, eventually encouraging a longer-term push to offset U.S. advantage through both conventional naval acquisitions and the development of asymmetric countermeasures including long range, land-based anti-ship ballistic missiles.²⁰⁶

²⁰⁵ Freeman, Charles. "Did China Threaten to Bomb Los Angeles?" *Carnegie Endowment for International Peace Proliferation Brief*, March 22, 2001.

Tyler, Patrick. "As China Threatens Taiwan, It Makes Sure U.S. Listens." *The New York Times*, January 24, 1996.

²⁰⁶ Ross, Robert. "The 1995-96 Taiwan Strait Confrontation: Coercion, Credibility, and the Use of Force." *International Security* 25, no. 2 (2000): 87-123.

Scobell, Andrew. *Show of Force: The PLA and the 1995-1996 Taiwan Strait Crisis*. Stanford: Stanford University, 1999.

Whiting, Allen. "China's Use of Force, 1950-96, and Taiwan." *International Security* 26, no. 2 (2001): 120-123.

The Taiwan Strait crisis defused shortly following the presidential elections; Chinese military demonstrations tapered off, while the U.S. carrier groups were withdrawn to more benign maritime positions. Economic ties continued to expand throughout Clinton's second term. Nonetheless, the crisis made it apparent that even with the end of the Cold War (indeed perhaps because of it), potential still existed for militarized confrontation between the United States and China. As Chinese economic development accelerated, so did the country's military capabilities – and its efforts to project those capabilities beyond its shores in defense of historic territorial claims. Outside the Taiwan Strait, the PLA further demonstrated its reach in the South China Sea, stoking long-standing maritime border disagreements with Southeast Asian neighbors – particularly Vietnam and the Philippines (the latter a U.S. treaty ally) – through provocative naval deployments and fortification of military outposts in the contested Spratly and Paracel Islands. These deployments coincided with bold policy statements claiming sovereignty over most of the South China Sea (the infamous “nine-dashed line”). U.S. policy supported an interpretation in line with the UN Convention on the Law of the Sea, including larger territorial claims for the littoral neighbors and right of unmolested passage through international waters. Naval deployments were undertaken in accordance with this stance, setting the stage for the George W. Bush administration's first serious diplomatic crisis in April 2001, after a Chinese fighter plane collided with a U.S. EP-3 reconnaissance aircraft over the South China Sea, killing the Chinese pilot and forcing the severely damaged EP-3 to land on China's Hainan Island. Weeks of tense negotiations – in which the two sides traded accusations of responsibility for the incident – resulted in the eventual return of the American crew and the aircraft, with no clear

admission of wrong-doing by either party. Officials on both sides proved eager to move past the incident, but it was further evidence of friction as the two nuclear rivals entered the 21st century.²⁰⁷

Arms Control Engagement and Disengagement in the 1990s

The post-Cold War reemergence of militarized tension in the U.S.-China rivalry, while unsettling, also seemed – at least from the theoretical standpoint of this study – to offer incentive for engagement on arms control (if not progress toward actual agreement). Indeed, other than Nixon’s opening to China, there probably never existed a more opportune time than the 1990s and early 2000s for a bilateral arms control dialogue to be initiated. While none of the incidents described represented a crisis of Cuba- or Kargil-level proportions (nor was militarized hostility sustained to any level resembling that of the U.S.-Soviet and India-Pakistan dyads), they demonstrated the existence of risk for more serious conflict. Moreover, both sides were in a position of strategic reappraisal, forced to revisit core political and military assumptions in light of massive geostrategic shifts (namely those following from the fall of the Soviet Union), economic ascendancy (on both sides), and internal leadership changes (Xiang Zemin’s rise in China, and the first U.S. Democratic administration since 1982). However, it is notable – and more strongly consistent with the QCA analysis – that these factors proved able to overcome the profound asymmetries in both military power and nuclear doctrine still persisting between the two rivals.

²⁰⁷ Fravel, M. Taylor. *U.S. Policy Towards the Disputes in the South China Sea Since 1995*. Singapore: S. Rajaratnam School of International Studies, Nanyang Technological University, 2014.
Kan, Shirley et al. *China-U.S. Aircraft Collision Incident of April 2001: Assessments and Policy Implications*. Washington: Congressional Research Service, 2001.

The late 1990s did see the initiation of a cautious exchange between the two sides on nuclear-relevant issues – albeit one often taking place on the margins of official diplomacy and arguably lacking sustainable foundations for more productive arms control initiatives. At the highest level, the Clinton administration attempted during its time in office to initiate a policy of “comprehensive engagement” with the Chinese government on a range of issues, attempting to move past Tiananmen and rebuild some of the connections severed under the previous administration. In a 1995 speech to the Washington State China Relations Council, Secretary of Defense William Perry articulated rationale for comprehensive engagement, citing China’s economic and demographic rise, status as a nuclear power, permanent seat on the UN Security Council, and “common interests” with the United States making “dialogue more rationale than confrontation.” Dialogue would serve to “reinforce positive developments in China” and encourage it to be a “stabilizing influence in the region and the world.” Perry indicated a broad security agenda that included cooperation on WMD nonproliferation, promoting regional stability (particularly with regards to the Korean Peninsula), opening lines of communication with the PLA, and fostering transparency in China’s military intentions. The speech explicitly rejected an alternative policy of “containment” that would only “provoke reflexive and intractable Chinese opposition to U.S.-led security initiatives.”²⁰⁸

The comprehensive engagement policy, at least on the security front, yielded mixed results by the close of the decade. On nonproliferation, China ultimately joined the United States in supporting an indefinite extension of the NPT in 1995 (after acceding to

²⁰⁸ Perry, William. "U.S. Strategy: Engage China, Not Contain It. Remarks delivered to the Washington State China Relations Council, Seattle Washington." October 30, 1995. <http://www.defense.gov/Speeches/Speech.aspx?SpeechID=1023> (accessed May 27, 2015).

the treaty only three years earlier), signed the CTBT in 1996 after conducting its 45th and final nuclear test, and signed the Chemical Weapons Convention (CWC); China's acceptance of these multilateral treaty commitments came about in part through consultations and negotiations with the United States. Chinese diplomacy also played a quiet role in bringing about the Agreed Framework that temporarily halted North Korea's nuclear weapons program in the 1990s. More tentative progress was achieved on Chinese sales of proliferation-sensitive technologies abroad. While rejecting formal accession to the Missile Technology Control Regime (MTCR), the Chinese government unilaterally committed to a ban on missile exports violating the export control agreement's guidelines. The United States also secured Chinese agreement not to export certain nuclear and missile technologies to Iran. However, these concessions were only achieved under heavy U.S. diplomatic pressure (including the threat of sanctions) and observers continue to question Chinese export control commitments into the present day, particularly its ongoing relationship with repeat customers like Pakistan and Iran.²⁰⁹

These nonproliferation achievements represented progress in terms of multilateral arms control, but (with the possible exception of mutual commitment to end nuclear testing) did not alter the *bilateral* nuclear strategic stability dynamic in a manner relevant to the dependent variable of this study. Military-to-military exchanges on transparency and confidence building resulted in increased contacts between officers on both sides, but yielded little in the way of results desired by U.S. policymakers who hoped they could

²⁰⁹ Jing-Dong, Yuan, Phillip Saunders, and Stephanie Liegge. "Recent Developments in China's Export Controls: New Regulations and Challenges." *The Nonproliferation Review*, 2002: 153-167.
Medeiros, Evan. "Rebuilding Bilateral Consensus: Assessing U.S.-China Arms Control and Nonproliferation." *The Nonproliferation Review*, 2001: 131-140.
Medeiros, Evan. *Reluctant Restraint: The Evolution of China's Nonproliferation Policies and Practices, 1980-2004*. Stanford: Stanford University Press, 2007, 131-169.

influence Chinese national security policies by way of the PLA (probably overestimating the institution's collective influence on the party leadership). U.S. officials lamented a perceived lack of Chinese reciprocity in clarifying military policies, sharing information, permitting facility visits, and allowing observation of military exercises. Some progress was made in the area of naval confidence building measures, considered a priority area given tensions in the South China Sea and increasingly tense encounters between the two countries' navies. U.S. officials hoped to secure CBMs mirroring the Incidents at Sea and Dangerous Militaries Activities agreements negotiated with the Soviet Union during the Cold War; those agreements specified detailed protocols managing interactions between deployed military forces during peacetime in the interest of avoiding inadvertent escalation to a shooting war. The Military Maritime Consultative Agreement (MMCA) eventually negotiated with China provided foundation for a regular consultative process on naval issues, but fell well short of committing either party to transparency or restraint in its actions; the 2001 EP-3 incident aptly demonstrated the limits of what had been achieved.²¹⁰

Presidential summits held in 1997 and 1998, intended to promote reconciliation following the 1995/96 Taiwan crisis, yielded outcomes of more direct – albeit extremely modest – relevance to nuclear arms control. At the 1997 summit in Washington, DC the

²¹⁰ "Agreement Between the Department of Defense of the United States of America and the Ministry of National Defense of the People's Republic of China on Establishing a Consultation Mechanism to Strengthen Military Maritime Safety." 1999. <https://fas.org/nuke/control/sea/text/us-china.pdf> (accessed May 31, 2015).

Campbell, Kurt, and Richard Weitz. "The Limits of U.S.-China Military Cooperation: Lessons from 1995-1999." *The Washington Quarterly* 29, no. 1 (2005): 169-186.

Griffiths, David. *U.S. China Confidence Building: Paradigms, Precedents, and Prospects*. Newport: U.S. Naval War College, 2010.

Pollpeter, Kevin. *U.S.-China Security Management: Assessing the Military-to-Military Relationship*. Santa Monica: RAND, 2004, 14-25.

two leaders agreed to establish a communications “hotline” between the two executives (in addition to improving military-to-military communication channels), drawing inspiration from the U.S.-Soviet model more than three decades prior. The 1998 summit in Shanghai further yielded a “detargeting” agreement, in which the two leaders pledged their nuclear missiles would not be targeted at one another in peacetime (again mirroring a similar accord reached with Russia in 1994). Most assessments treat the detargeting agreement as a symbolic gesture, given the agreement’s lack of verification and the assumed ease of retargeting missiles in the digital age; a hint of progress lay in the fact that China had previously linked detargeting to a no-first-use pledge from the United States (suggesting a walking back from the hardline position).²¹¹

In addition to executive interactions and military-to-military dialogue, the 1990s also saw a period of exchange between the nuclear weapons production complexes of the two rivals. While officially sanctioned, this exchange took place largely outside the public eye (at least until the end of the decade) and at a far more interpersonal level; it yielded a technically-focused arms control dialogue that was brief but arguably unparalleled in U.S. China relations, before or since. The Chinese weapons establishment, represented by the Chinese Academy of Engineering Physics (an institution roughly analogous to the major U.S. weapons laboratories – Los Alamos, Livermore, and Sandia – combined), made initial overtures to U.S. counterparts at the

²¹¹ Campbell and Weitz 2005, 174-175.

Clinton, William. "The President's News Conference with President Jiang Zemin of China." *The American Presidency Project*. October 29, 1997. <http://www.presidency.ucsb.edu/ws/?pid=53468> (accessed May 28, 2015).

Clinton, William. "The President's News Conference With President Jiang Zemin of China in Beijing." *The American Presidency Project*. June 27, 1998. <http://www.presidency.ucsb.edu/ws/?pid=56229> (accessed May 28, 2015).

Medeiros, Reluctant Restraint: The Evolution of China's Nonproliferation Policies and Practices, 1980-2004, 2007, 154-158.

beginning of the decade, allowing a limited number of U.S. experts to visit previously closed research facilities. The Chinese motivation behind this opening remains opaque; accounts by U.S. participants suggest their counterparts acted out of some combination of scientific curiosity, pride, and desire to demonstrate China's capabilities. Evan Medeiros (a scholar of Chinese nonproliferation and arms control policies and a current official in the Obama administration), situates the opening within broader trends following Deng's reforms in the 1980s, in which Chinese government and defense institutions were allowed and encouraged to develop autonomous intellectual capacities consistent with their counterparts in the west. It also coincided with greater Chinese diplomatic participation in global nonproliferation and disarmament forums, including the UN Conference on Disarmament, the NPT, and CTBT negotiations – participation that required technical and political input from the weapons establishment. China also faced increasing criticism from the west (and particularly the United States) on its nonproliferation record, meriting a more informed and transparent response than previously offered. Finally, Chinese policymakers were growing increasingly concerned with technological developments potentially upsetting the security of its nuclear deterrent, including U.S. missile defense programs initiated under SDI and continued (in modified form) during the 1990s; Chinese policymakers stood to benefit from a better understanding of the role arms control might play in maintaining strategic stability, drawing lessons from the U.S.-USSR/Russia experience.²¹²

²¹² Hsu, Wen. "The Impact of Government Restructuring on Chinese Nuclear Arms Control and Nonproliferation Policymaking." *The Nonproliferation Review*, no. Fall (1999): 152-167.
Medeiros, Reluctant Restraint: The Evolution of China's Nonproliferation Policies and Practices, 1980-2004, 2007, 210-240.
Reed, Thomas, and Danny Stillman. *The Nuclear Express: A Political History of the Bomb and its Proliferation*. Minneapolis: Zenith Press, 2009, 220-236.

In 1994/1995, these exchanges were formalized under the aegis of the U.S.-China Lab-to-Lab Technical Exchange Program, funded in large part by the U.S. Department of Energy and taking place with interagency oversight to ensure U.S. national security interests were not compromised. Through workshops, site visits, and collaborative studies, the interactions addressed a range of nonproliferation and arms control topics of mutual interest, including verification technologies, nuclear materials management, and export control. U.S. participants gained insight into the inner workings and decision-making processes of Chinese institutions previously little understood; the interactions were suggestive that the Chinese weapons establishment was more attuned to arms control issues (particularly at a technical level) than previously assumed, as reflected by the scope and diversity of technical cooperation proposals put forward. While Chinese research and development capabilities were revealed to be relatively robust, some observers noted – with more concern – that the nuclear establishment seemed less attuned to best practices (at least as perceived by the United States) in safety and security of nuclear weapons and materials, reminiscent of tendencies observed in the former Soviet Union (though without the overlay of internal instability that motivated U.S.-Russian CTR cooperation). It seemed there was much to be gained by both sides through the interactions; moreover it provided an opportunity for specialists on both sides to overcome decades of intellectual isolation from one another – an opportunity for “nuclear learning” that might ultimately benefit the two sides reaching a balance of mind favoring future arms control.²¹³

²¹³ Hecker, Siegfried. "Adventures in Scientific Nuclear Diplomacy." *Physics Today*, July 2011: 34. Pregoner, Arian. *Technical Cooperation on Nuclear Security between the United States and China: Review of the Past and Opportunities for the Future*. Albuquerque: Sandia National Laboratories, 2011.

U.S. congressional critics of engagement feared that China in fact stood to gain much more from the exchanges than just arms control expertise and exposure to material accounting best practices. Fears of Chinese perfidy reached a nadir in 1999 with publication of the Cox Committee Report, a document drafted at the behest of a House of Representatives select committee convened to investigate allegations of Chinese espionage. While the full report remains classified, the redacted public document proved damning in its criticism of U.S. government institutions, the national laboratories, and major defense contractors for allegedly lax security allowing the Chinese to acquire sensitive information on sophisticated military technologies including nuclear weapons and ballistic missiles. The report contended that gains from espionage would allow the Chinese to develop “thermonuclear weapons on a par with our own,” and that next generation warheads and ballistic missile systems would almost certainly incorporate advancements from the information stolen. It even went so far as to suggest China might eventually modify its nuclear posture to reflect “additional doctrinal and operational options for its strategic forces that, if exercised, would be troublesome for the United States.” In the same period, and further compounding suspicions, Los Alamos scientist Wen Ho Lee was indicted for allegedly passing nuclear weapons information to China (though he would eventually be cleared of all but one lesser charge of mishandling classified information).²¹⁴

Prindle, Nancy. "The U.S.-China Lab-to-Lab Technical Exchange Program." *The Nonproliferation Review*, no. Spring/Summer (1998): 111-118.

²¹⁴ Kan, Shirley et al. *China-U.S. Aircraft Collision Incident of April 2001: Assessments and Policy Implications*. Washington: Congressional Research Service, 2001.
Report of the Select Committee on U.S. National Security and Military/Commercial Concerns with the People's Republic of China. U.S. House of Representatives, 1999, V-IX, 77.

Cox Committee critics would later claim the report exaggerated or outright manufactured its allegations; they further criticized the fact that much of the evidence was beyond public scrutiny given classification of the full report. Others – including a Democratic member of the committee – doubted the substantive value of the secrets allegedly acquired, along with China’s capacity for exploiting the information, particularly absent an active nuclear testing program. The Chinese government for its part also cried foul, taking issue with both the espionage accusations and the idea that their country’s nuclear arsenal owed its sophistication to anything more than the ingenuity of Chinese scientists. Regardless of veracity, the controversy generated by the Cox report effectively spelled the end of the lab-to-lab exchange program, at least in its original format; exchanges resumed in the following decade, but with a more limited agenda focused largely on material control and nuclear security, as well as a greater sense of hesitancy on both sides. As U.S-China relations entered a new millennium, it seemed that official arms control dialogue between the two rivals, briefly boosted by shifting geopolitical circumstances in the immediate aftermath of the Cold War’s end, had reached the limits of what could realistically be achieved.²¹⁵

²¹⁵ Faison, Seth. "China Proclaims it Designed its Own Neutron Bomb." *The New York Times*, July 15, 1999: A8.

Garwin, Richard. "Why China Won't Build U.S. Warheads." *Arms Control Association*. April 1, 1999. http://www.armscontrol.org/act/1999_04-05/rgam99 (accessed May 30, 2015)

Johnston, Alistair, W.K.H. Panofsky, Marco Di Capua, and Lewis Franklin. *The Cox Committee Report: An Assessment*. Stanford University, 1999.

Spratt, John. "Keep the Facts of the Cox Report in Perspective." *Arms Control Association*. June 1, 1999. https://www.armscontrol.org/act/1999_04-05/jsam99 (accessed May 30, 2015).

Unofficial Exchanges and a Persistent Imbalance of Mind

In May 1999, little more than two weeks before the Cox Commission report was released, U.S. bombs struck the Chinese embassy in Belgrade, killing three Chinese journalists and injuring dozens. The Clinton administration vigorously denied the embassy had been deliberately targeted, blaming the strike – carried out as it was with precision-guided munitions – on poor intelligence information. The Chinese government expressed outrage, and many observers in China expressed suspicion that the bombing was intentional. It was notable that just as Russian officials looked upon the NATO Kosovo intervention with alarm from both a geopolitical and a military technological standpoint, Chinese observers similarly drew dire conclusions about U.S. intentions and capabilities from the action. The embassy bombing represented a particularly low point for U.S.-China relations at the turn of the century, and the misunderstandings and suspicions articulated in its aftermath seemed to underscore the need for a more robust security dialogue between the two powers. As described in the previous section, official dialogue had already lost steam owing to political friction and U.S. frustration with a perceived lack of Chinese openness and reciprocity. Reacting to this lack of official discourse (though by no means fully compensating), lower-level unofficial processes involving academics, think tank experts, and eventually a growing number of sitting officials grew in prominence at the turn of the century. It is fitting to end this chapter with a description of those processes and some of their results, as the exchanges both symbolize the stagnation of official strategic dialogue between the two sides, and make clear the fundamental conceptual, political, and technical disjunctures standing in the way

of arms control – all symptomatic of a persistent, dually reinforcing asymmetry in both threat and mind.²¹⁶

Diplomatic practitioners coined the concept of “Track 2” diplomacy to describe political interactions taking place below the level of officially sanctioned (“Track 1”) dialogue between governments. Track 2 interactions are generally utilized when official negotiations on contentious issues prove, for whatever reason, infeasible; it is not surprisingly a popular tool of conflict mediation in regions like the Middle East and South Asia (though the concept’s roots date to U.S.-Soviet arms control interactions during the Cold War). Participants may include former or acting officials from the governments of disputing and mediating parties, as well as academics and subject matter experts from relevant institutions (dialogues with a heavy official presence are sometimes described as “Track 1.5”). The interactions are often facilitated by non-government organizations (though often with the support of government funding), usually taking place under “Chatham House” rules of non-attribution. Track 2 practitioners aspire for these interactions to provide a safe political space to propose and debate new solutions to intractable problems, and hopefully inform breakthroughs in the Track 1 diplomatic process. The merits and attributable successes of Track 2 are subject to considerable academic debate beyond the scope of this study. However, these dialogues in some cases

²¹⁶ Myers, Steven. "Chinese Embassy Bombing: A Wide Net of Blame." *The New York Times*, April 17, 2000.

Shambaugh, David. "China's Military Views the World: Ambivalent Security." *International Security* 24, no. 3 (1999/2000): 57-61.

– including nuclear relations between the United States and China – provide the only window into the interactive thought processes on both sides of difficult security issues.²¹⁷

Unofficial arms control exchanges with Chinese experts began soon after Deng's consolidation of power and lessening of restrictions on interactions with the west. The Stanford Center for International Security and Arms Control (CISAC) began hosting experts from Chinese institutions like the PLA and the defense-industrial Commission for Science, Technology and Industry for National Defense (COSTIND) to study arms control topics beginning in the 1980s. Frank Von Hippel, an arms control scholar and policy advocate at Princeton University, similarly invited Chinese specialists and scholars to study arms control in the United States in the 1990s. These programs, and other similar NGO-hosted research exchanges, played an important role in fostering the emerging Chinese arms control expert community and initiating relationships between these individuals and their western counterparts – relationships facilitating an intellectual exchange that, again in stark contrast to the U.S.-Soviet/Russia experience, had been practically non-existent for the first twenty years of China's weapons program. In parallel with academic visits, Chinese experts increasingly participated in non-government policy and technical forums hosted by organizations like the International School on Disarmament and Research on Conflicts (ISODARCO), the Union of Concerned Scientists, the Carnegie Endowment for International Peace, and the National Academy of Sciences. Chinese government acquiescence to these exchanges, and moreover the degree to which participation grew over time, is highly suggestive that engagement was

²¹⁷ Kaye, Dalia. *Talking to the Enemy: Track Two Diplomacy in the Middle East and South Asia*. Santa Monica: RAND, 2007, 5-28.
Wheeler, Michael. *Track 1.5/2 Security Dialogues with China: Nuclear Lessons Learned*. Alexandria: Institute for Defense Analyses, 2014, 1-3.

more than an academic exercise. Moreover, by the end of the 1990s, this expertise became institutionalized in a growing number of think tanks and studies centers like the PLA-affiliated Institute of Strategic Studies (ISS) at National Defense University (NDU); government-funded research institutes like the China Institute of International Studies (CIIS) and Chinese Institute of Contemporary International Relations (CICIR); and the MFA-affiliated China Arms Control and Disarmament Association (CACDA). Rhetoric from these organizations suggests varying degrees of autonomy and intellectual independence, though most western observers believe that the research agendas and positions taken by experts are carefully coordinated and vetted through official government channels.²¹⁸

While events in the late 1990s poisoned prospects for official arms control dialogue, they also encouraged proliferation of unofficial exchanges intended by their conveners to fill the vacuum, including a number of recurring Track 2/1.5 forums. The U.S. DOD Defense Threat Reduction Agency (DTRA) funds a pair of related exchanges – the United States-China Dialogue on Strategic Nuclear Dynamics held annually in Beijing since 2004, and the United States-China Strategic Dialogue held in Hawaii. The former process generally involves higher level officials and in recent years has tended to fit the description of a Track 1.5 process; the latter is more informal and serves as a something of a primer for the Beijing dialogue. Participants in both of these forums include a number of acting government officials from both sides, participating in personal capacities – though it is generally acknowledged (and indeed consistent with the spirit

²¹⁸ Johnston, Alistair. "Learning Versus Adaptation: Explaining Changes in Chinese Arms Control Policy in the 1980s and 1990s." *The China Journal* 35 (1996): 36-46.
Medeiros, Reluctant Restraint: The Evolution of China's Nonproliferation Policies and Practices, 1980-2004 2007, 210-240.
Wheeler 2014, 5-15.

and intention of Track 2) that participants are reporting back to their governments on the proceedings. These include U.S. representatives from the Departments of Defense, State, Energy, and various non-government think tanks, and Chinese representatives from the PLA, Ministry of Foreign Affairs, and the government-affiliated think tank community.

The DTRA-funded dialog is arguably one of the most significant in terms of official participation and the degree to which outcomes are tracked by the governments of both sides. However, significant Track 2-style interactions (often drawing from the same pool of experts on both sides) have also taken place in the context of U.S. Strategic Command's annual Strategic Deterrence Symposium, the International Institute of Strategic Studies (IISS) Shangri-La Dialogue, the Project on Nuclear Issues (PONI) Working Group on United States-China nuclear dynamics (engaging the "next generation" of experts in both countries), and the National Academy of Sciences United States-China Glossary of Nuclear Security Terms (notable for its efforts to bridge the sometimes considerable linguistic interpretations separating the respective arms control communities). The specific outputs of individual processes are already well-summarized in reports drafted by their conveners; it is more useful to focus on broader thematic arcs relevant to U.S.-China arms control dynamics, particularly as noted by participants in these discussions.²¹⁹

The First-Use Divide and Mutual Vulnerability

²¹⁹ Wheeler 2014, 5-9, 18-20.

Before the 1990s, Chinese reticence to engage with the United States (or Russia) on arms control was predicated in large part on numerical asymmetry in arsenal size; officials indicated they would be willing to discuss arms control (notably limitations or reductions) when the two superpowers drew down to levels comparable with China's modest retaliatory force. They also contended that these issues were best addressed in a multilateral international disarmament forum, versus bilateral negotiations; this was consistent with China's disarmament-oriented narrative dating back to its first nuclear test. By the turn of the century however, accounts suggest Chinese policymakers have come to view symmetry in the balance of mind – or at least a common understanding on key strategic stability issues – as an equally significant precondition for arms control.²²⁰

As already noted, the Chinese government in the 1990s pushed for a U.S. nuclear no-first-use pledge in exchange for detargeting and other arms control concessions; the issue has similarly been a point of contention in Track 2. Chinese participants contend that U.S. first-use ambiguity is intended to serve coercive purposes in the event of a military crisis (e.g. over Taiwan), forcing Chinese concessions out of fear that escalation might prompt a devastating U.S. first strike. American participants insist their policy is predicated on theories of deterrence credibility and the need to reassure allies to which the United States extends the nuclear umbrella (e.g. Japan and South Korea); moreover the circumstances under which the United States would even consider first use are incredibly narrow, as specified in official nuclear posture statements (mere coercion not

²²⁰ Frieman, Wendy. "Chinese Participation in Arms Control Regimes, 1980-1995." *The Nonproliferation Review*, no. Spring-Summer (1996): 26.

Garrett, Banning, and Bonnie Glaser. "Chinese Perspectives on Nuclear Arms Control." *International Security* 20, no. 3 (1995-1996): 71-72.

Lindsey, Eben, Michael Glosney, and Christopher Twomey. *US-China Strategic Dialogue, Phase VI*. Monterey: U.S. Navy Postgraduate School, 2011, 16-17.

being one of those circumstances). Further, American participants note intense skepticism in U.S. policy and academic circles regarding the validity of no-first-use pledges; some argue that under certain dire military circumstances, any country with nuclear weapons – regardless of declared posture – might be compelled to cross the use threshold first. They also point to statements and studies from within Chinese defense circles suggesting potential conditionality in no-first-use. At times, U.S. participants have even pressed their Chinese colleagues on the practical limits of the no-first-use policy, posing scenarios (such as a strategically crippling conventional first strike) that would seemingly render the position untenable. Some observers like Jeffrey Lewis suggest such exchanges may in fact be unnecessarily provocative, interpreted by Chinese participants as thinly veiled threats rather than mere thought exercises as intended by U.S. participants.²²¹

Accounts further suggest that while first-use continues to be a sticking point in discussions, the conversation has expanded to broader issues of deterrence and strategic stability, where further divides (or at least misunderstandings) appear to exist. Chinese participants express concern that U.S. nuclear posture and force planning continues to reflect a mentality that the United States can in fact prevail in a nuclear exchange (especially with a lesser nuclear power like China). Conversations suggest that the arms control relationship, at least from a Chinese perspective, would benefit from acknowledgement of “mutual vulnerability” – i.e. that both sides stand to absorb devastating punishment in the event of a nuclear exchange, regardless of who initiates. This type of acknowledgement appears, at least on the surface, to be untenable from the

²²¹ Glosny, Michael, and Christopher Twomey. *U.S.-China Strategic Dialogue, Phase V*. Monterey: U.S. Navy Postgraduate School, 2010, 18-20.
J. Lewis, Paper Tigers: China's Nuclear Posture 2014, 128-131.
Wheeler 2014, 20-23.

perspective of U.S. domestic politics and extended deterrence commitments – though in practice U.S. policymakers have acknowledged and arguably accepted U.S. vulnerability since at least the 1960s; mutually assured destruction based on nuclear parity has served as the tacit organizing principal for U.S.-Soviet arms control from SALT I and the ABM Treaty onwards. Nonetheless, U.S. reticence to formally acknowledge this reality, coupled with BMD and prompt global strike acquisition programs (discussed below), appears to fuel continued Chinese skepticism of U.S. commitments to strategic stability.²²²

The Limits of Transparency

Issues related to military transparency figure large in U.S. concerns expressed in both Track 2 and official policy dialogues. Estimating the PRC defense budget is a perennial wonk sport in Washington, where some analysts contend that official statements from the Chinese government vastly understate true expenditures. While China has released a number of defense white papers since the 1990s that articulate high level objectives, some U.S. observers argue that it is difficult to glean the long term intentions behind Chinese defense acquisition and research programs, including investments in sophisticated strategic systems like road mobile ballistic missiles, MIRV capabilities, a new generation of ballistic missile submarines, missile defense, and anti-satellite weapons. China's insistence on opacity regarding numbers of both nuclear

²²² Glosny and Twomey, U.S.-China Strategic Dialogue, Phase V 2010, 29.
J. Lewis, Paper Tigers: China's Nuclear Posture 2014, 131-135.
Kulacki, G. "Chickens Talking with Ducks: The U.S.-Chinese Nuclear Dialogue." *Arms Control Today*. September 30, 2011. https://www.armscontrol.org/act/2011_10/U.S._Chinese_Nuclear_Dialogue (accessed June 1, 2015).

warheads and delivery systems is argued by some to be an impediment to arms control and strategic stability, feeding fears that the PRC is in fact concealing a much larger force than it acknowledges or may eventually pursue a “sprint to parity” with the United States and Russia. Moreover, it is at odds with trends toward increasing transparency in stockpile numbers on the part of the United States and other P5 nuclear powers – transparency seen as important from both an arms control perspective and in reflecting the spirit of disarmament commitments under the Nuclear Nonproliferation Treaty.²²³

Chinese Track 2 participants and published experts argue in return that ambiguity in deployed systems is inseparable from their country’s combination of no-first-use and a “lean and effective” arsenal; one prominent general and strategic thinker has contrasted Chinese deterrence as “taking advantage of uncertainty,” while the United States “relies more on a show of force.” Given its small pool of available warheads and long range delivery systems, China cannot afford certain transparency measures (e.g. stockpile declarations or identification of deployment sites) that potentially render those systems vulnerable to first strike targeting. Chinese participants argue their country’s nuclear investments are simply geared toward enhancing the reliability, safety, and survivability of nuclear assets – and are moreover no more threatening than modernization programs being undertaken by other nuclear powers, including the United States. Interestingly, Chinese experts argue that the United States should additionally not be alarmed by research programs that may not actually be translated into deployed capabilities; in some cases China simply seeks to better understand the capabilities and limits of advanced

²²³ Chen, Sean, and John Feffer. "China's Military Spending: Soft Rise or Hard Threat?" *Asian Perspective* 33, no. 4 (2009): 46-67.
Glosny and Twomey, U.S.-China Strategic Dialogue, Phase V 2010, 17.

technologies such as BMD or MIRV. Importantly, China may be open to other types of transparency exchanges that do not compromise arsenal survivability – particularly greater transparency in nuclear doctrine and strategy (an area where Chinese participants often suggest the United States is deficient, for reasons noted above). At least one Chinese scholar has suggested that once China has achieved what it perceives to be a truly secure and robust second-strike capability, it may eventually be willing to consider transparency in declared numbers.²²⁴

BMD and Strategic Conventional Capabilities

Mirroring Russian concerns, Chinese Track 2 participants and published experts increasingly point to U.S. ballistic missile defense programs as a destabilizing development. This includes not only the U.S.-based GMD system, but collaborative missile defense programs with South Korea, Japan, and Taiwan resulting in deployment of regional assets like early warning radars, land-based theater missile defense systems, and sea-based interceptors. Though these programs vary widely in terms of bilateral objectives and technical capability (and the United States has encountered substantial difficulties trying to even minimally coordinate efforts among its often feuding allies), Chinese observers perceive an effort at encirclement. By contrast to Russia, whose large missile arsenal can easily overwhelm existing missile defense systems, the Chinese

²²⁴ Bin, Li. "China and Nuclear Transparency." In *Transparency in Nuclear Warheads and Materials: The Political and Technical Dimensions*, edited by Nicholas Zarimpas, 50-57. Oxford: Oxford University Press, 2003.

Glosny, Twomey and Jacobs, U.S.-China Strategic Dialogue: Phase VII Report 2013, 21-22.

Lindsey, Glosny and Twomey 2011, 9-11.

Wheeler 2014, 31-32.

Interview with Lewis Dunn, former U.S. Arms Control and Disarmament Agency official and U.S. Ambassador to the 1985 Nonproliferation Treaty Review Conference, May 26, 2015.

defense establishment fears that even a modestly effective missile defense capability can potentially challenge the effectiveness of its “lean” retaliatory force. Like the Russians, Chinese observers also express concern that investments and technical advancements in a limited, near term defense architecture can ultimately be leveraged in favor of a more comprehensive future system. At a less vocal level, Chinese experts have also expressed concerns about future U.S. prompt global strike capabilities, perceiving precision-guided long-range systems as a direct threat to its nuclear force. There has even been cautious suggestion that Chinese policymakers may be forced to revisit no-first-use if the United States is perceived as achieving a second-strike nullifying combination of BMD and strategic conventional capabilities. At the least, it is suggested that China will continue to scale and modernize its nuclear arsenal in direct response to these developments.²²⁵

U.S. participants in the dialogues are quick to reassure Chinese counterparts that missile defense architectures under development, both regionally and in defense of the U.S. mainland, fall well short of the capability required to nullify a Chinese retaliatory strike. Both BMD and PGS are considered niche capabilities for defense against threats from “rogue states” – particularly North Korea. For their part, U.S. participants consistently express concern about the “comingling” of Chinese conventional and nuclear ballistic missile assets, both of which are controlled by the Second Artillery. In the event of a conventional military exchange, it might be difficult to discern between these assets, potentially leading to conventional strikes that inadvertently target the nuclear arsenal – with potentially dire consequences for escalation control (concerns are also raised about

²²⁵ Glosny and Twomey, U.S.-China Strategic Dialogue, Phase V 2010, 30-34.
Glosny, Twomey and Jacobs, U.S.-China Strategic Dialogue: Phase VII Report 2013, 7-8, 14-15.
Glosny, Twomey and Jacobs, U.S.-China Strategic Dialogue: Phase VIII Report 2014, 11-12.
Lindsey, Glosny and Twomey 2011, 13-15.
Interview with former U.S. government official.

the separation or non-separation of associated command and control mechanisms). Chinese participants largely dismiss these concerns as theoretical, assuring their counterparts that appropriate separations are maintained between conventional and nuclear assets.²²⁶

Divining Intentions

At a much higher political level, and cutting across all of the issues previously raised, U.S.-China dialogues (both official and unofficial) point to a mutual sense of concern about the larger strategic intentions of the other. American concerns about Chinese defense expenditures have already been noted; these are expressed within broader debates about China's geopolitical ambitions as it comes closer to matching (and in some cases exceeding) the economic and military potential of the United States. U.S. observers question whether PLA military modernization is purely status quo defensive in nature (as Chinese Track 2 participants emphasize), or whether new military capabilities – including a more capable nuclear force – will be leveraged in support of more revisionist aims in areas like Taiwan and the South China Sea. Chinese participants similarly question the aims not just of U.S. military technological investments and modernization programs, but U.S. engagement in the Asia-Pacific writ large. While U.S. officials deny the existence of a “containment” policy with regard to China, the existence of strategic concepts like “Air-Sea Battle” (an integrated Navy-Air Force battle plan directed at defeating sophisticated, asymmetrically capable adversaries like China) and

²²⁶ Glosny, Twomey and Jacobs, U.S.-China Strategic Dialogue: Phase VIII Report 2014, 10.

the Obama administration's "rebalance" to Asia (which includes a significant reapportioning of military assets to the region) appear to exacerbate already heightened post-Cold War threat perceptions. Gregory Kulacki, a China scholar at the Union of Concern Scientists who is well-connected with Chinese arms control experts, notes that the pivot has "infuriated everybody... across all aspects of the political spectrum" in China's political and defense establishment, including progressive advocates of more robust U.S.-China engagement.²²⁷

While these insecurities and differences in perception point to a need for continuing strategic dialogue between the United States and China, it is notable that – at least to date – few official initiatives have followed from Track 2 discussions. Discussions have yielded proposals from both sides for confidence building measures, but accounts suggest that either one party or the other is quick to identify fatal faults – whether it be U.S. skepticism regarding the utility and political feasibility of a mutual vulnerability declaration, or Chinese resistance to transparency measures effecting its calculated posture of ambiguity. The dialogues do seem to have overcome some initial distrust and barriers to conversation. Chinese participation in particular has grown over the years, with a greater diversity of institutions represented and greater willingness to move beyond boiler plate talking points; some observers have even noted increase Chinese willingness to show evidence of internal disagreements on policy issues. Others express concern, however, that the Chinese government may increasingly view Track 2 interactions as a sustainable alternative to an official strategic dialogue – a position firmly at odds with U.S. preferences. Moreover, some U.S. interlocutors have also expressed

²²⁷ Glosny, Twomey and Jacobs, U.S.-China Strategic Dialogue: Phase VII Report 2013, 11-12. Interview with Gregory Kulacki, March 26, 2015.

frustration with the pace and direction of talks and have been inclined to pursue more fruitful discussions in areas like nuclear security, where the United States and China seem to share more common ambitions and (at least more recently) threat perceptions.²²⁸

Taking Stock of U.S.-China Arms Control

The U.S.-China nuclear rivalry was asymmetric from its inception. The Chinese decision to embark on a nuclear weapons program came only after the United States has already established a commanding lead in weapons production over both of its major communist rivals; this lead was further reinforced by significant inequities in economic and industrial potential. Perhaps more importantly, Chinese policymakers made an early commitment to a relatively limited nuclear force, predicated on a doctrine of no-first-use, countervalue retaliation, and explicit renunciation of the arms race; the insular nature of the regime arguably reinforced entrenchment of this doctrine, along with a wholesale rejection of western deterrence theory, by limiting opportunities for dialogue and intellectual exchange with strategic thinkers elsewhere in the world. Finally, by the time China began to operationalize its deterrent capabilities, U.S. leaders were already contemplating a rapprochement aimed at counterbalancing the Soviet Union. Thus, one of the key ingredients for the inception of arms control – militarized hostility – was largely a non-issue by the time the two sides were ready to discuss issues of strategic

²²⁸ Interview with Lewis Dunn, May 26, 2015.
Lindsey, Glosney and Twomey 2011, 7-9.
Wheeler 2014, 20-23.

importance. It is probably fair to question whether arms control really had a purpose to serve in the U.S.-China Cold War relationship.

Developments in the 1990s, however, seemed to suggest this equilibrium might not be wholly sustainable. The fall of the Soviet Union had the dual effect of removing a major competitor and nullifying strategic incentives for a tacit U.S.-China alliance. Issues that had once been subject to delicate accommodation – including Taiwan, human rights, and regional territorial disputes – could no longer be ignored for purposes of mutual interest. When militarized confrontation broke out over the status of Taiwan in the middle of decade, the crisis seemed to also beget opportunity for long-neglected strategic dialogue that might have facilitated confidence building and transparency. Official efforts bore little fruit beyond token confidence building gestures, however, and unofficial dialogues in the nearly two decades following offer little basis for future optimism.

This historical narrative is largely consistent with the relationship of “dually reinforcing asymmetry” identified through formal fsQCA; extreme disjuncture in both military force and nuclear doctrine is a consistent recipe for null arms control outcomes. Further nuances suggested by the qualitative analysis include:

Arms control outcomes may be subject to some degree of path dependency, presenting nuclear rivals with opportunity at “critical junctures” in the relationship. Paul Pierson describes path dependency as a dynamic process of “positive feedback.” As events unfold along a particular pathway, it becomes harder to divert from that pathway because “the costs of switching to some previously plausible alternative rise.” Related to this is the concept of a “critical

junction,” in which “opportunities for major institutional reforms appear, followed by long stretches of institutional instability,” in which “paths or trajectories...are then very difficult to alter.” Pierson applied these concepts to analysis of political institutions in comparative politics, but the basic concept appears valid in the context of nuclear rivalry (which itself constitutes something resembling an institutionalized relationship). The U.S.-China case study suggests at least two historical points at when an arms control dialogue may have been most feasible – the period immediately following Nixon’s visit to China in 1972 (a critical juncture for diplomacy), and then following the Taiwan crisis of the mid-1990s (a critical juncture for crisis escalation). However, critical facilitating conditions did not exist at either juncture – namely nuclear parity and doctrinal symmetry. Had one or more of those conditions existed at the time, the interaction might have been different, perhaps yielding modest arms control outcomes or at least a more productive dialogue. As it was, conditions allowed both parties to pass through these critical junctures with minimal substantive engagement on nuclear strategic stability, reinforcing status quo paradigms. Moreover, as time progressed and both parties became increasingly invested in their positions (particularly forces structures and doctrine), the costs of deviation from the status quo arguably rose. In allowing for equifinality, formal QCA allows for identification of conditional configurations suggesting critical junctures; what is not clear from the existing empirical record of nuclear rivalry (owing to limited diversity) is just how many potential critical junctions exist for the achievement of

arms control, or how temporally or causally dependent these junctures might be.²²⁹

Arms control requires a reciprocated perception of purpose and utility. The formal fsQCA does not account for whether or not dyadic rivals serve to actually benefit from arms control, either subjectively (from the standpoint of national leadership) or objectively (from the standpoint of a stable deterrence model). However, the U.S.-China case study (and arguably the India-Pakistan case study as well) is highly suggestive that arms control follows from a clear perception of utility or potential gain in the eyes of nuclear rivals. In the decades following U.S. normalization of relations with China, there is little indication from the historical record that leaders on either side perceived the need for formal or informal arms control, given the pacific nature of the rivalry and common perceptions of a primarily Soviet threat. Following the 1995/96 Taiwan crisis, this perception shifted among U.S. leaders who pushed for a dialogue on confidence building measures. The record suggests the Chinese government only reluctantly engaged on these issues, and the resulting MMCA and detargeting agreements represented modest achievements at best. Since then, Track 2 dialogues indicate a continuing Chinese skepticism regarding arms control, particularly given U.S. nuclear posture and the Obama administration's reorientation of military assets to Asia. It may not be that rivals need to see the exact same utility in arms control; at the

²²⁹ Pierson, Paul. *Politics in Time: History, Institutions, and Social Analysis*. Princeton: Princeton University Press, 2004, 20-21, 135.

least, however, each must perceive some relative gain to be achieved through restraint.

Intersubjective understandings of doctrine are built on intellectual exchange, repeated interactions, and agreed lexicons. This statement seems self-evident, but the concept is not fully represented by condition terms in the fsQCA; analysis of U.S.-China nuclear relations suggests it is a potentially pivotal facilitating condition for a productive arms control dialogue, let alone achievement of arms control itself. Even if Maoist doctrine had allowed for first-use, flexible response, and a qualitatively/quantitatively competitive arms race beginning in the 1960s, it is not clear these conditions would have made arms control any more likely for the United States and China – particularly if the Chinese strategic enclave had maintained its pre-1980s isolation. Even in the present, after 20-30 years of quiet exchange, it is not clear that U.S. and Chinese strategic thinkers still conceive of basic deterrence concepts and terms in the same manner. Issues like escalation control, calculated ambiguity, limited war, transparency, and the offense/defense balance continue to elude bilateral consensus, providing very little foundation on which to construct a common vision of deterrence stability and arms control. This seems to be a direct consequence of a lack of consistent and repeated interaction from the time the nuclear rivalry was initiated. Even tacit gestures and signaling, which played a significant role in the early years of the U.S.-Soviet rivalry, were consistently lacking until relatively recently – if for no other reason than China's nuclear policy establishment was inclined to ignore such signals for two decades and hold true to doctrinal precepts. On the one hand, this may have facilitated the

entrenchment and resiliency of a nuclear policy uniquely restrained among the P5; on the other hand, it also isolated China from engagement and shared understanding with its rivals.

The fsQCA in Chapter 3 suggested a relatively simple formula for a lack of arms control between nuclear rivals: imbalance in military capabilities coupled with disjuncture in doctrine (possibly exacerbated in some cases by the absence of militarized hostility). More detailed analysis seems to confirm these insights, though the causal mechanisms are more complex than can be conveyed via truth table combinations. Importantly, it is difficult to determine whether either one of these two factors is more strongly conditional than the other – a problem largely owing to limited diversity in the empirical record (most null arms control cases cluster in a handful of similar combination sets). However, as discussed in the next chapter, this question of relative impact may prove very relevant to understanding future nuclear rivalry interactions among the superpowers.

Chapter 7. Conclusion: Understanding and Predicting Arms Control

The contributions of this study are three-fold. First, in explaining the conditions that facilitate arms control, it bridges existing international relations theories often perceived as contending or even mutually exclusive – namely realist classical deterrence theory and more contemporary constructive narratives. The evidence presented is strongly suggestive that arms control between nuclear rivals follows from a dynamic interaction between militarized threat and doctrinal mind. In order to establish a sustainable relationship of reciprocated restraint, rivals must feel secure. In the vast majority of historical cases, this security followed from a combination of relative nuclear parity and a decline in militarized hostility; rivals were confident in both their retaliatory power and the low probability that nuclear capabilities were going to be employed in conflict. However, both QCA and historical analysis indicate that security alone is not a necessary *and* sufficient condition for arms control. Just as importantly, the evidence indicates that arms control (structurally transformative arms control in particular) owes to shared understandings of the deterrent role played by nuclear weapons as expressed through military doctrine and force posture. This intersubjective balance of mind is achieved through a variety of means including tacit gestures, explicit statements of policy, and dialogues among politicians, military strategists, and even scientific communities. Only when rivals both feel secure and agree on basic tenets of deterrence stability can they begin to reinforce and even codify that stability through arms control.

Of course, constructivists would be apt to contend that the paradigms illustrated by this study only hold true inasmuch as the actors – unitary, organizational, international

domestic, or otherwise – hold to existing normative trends. If deterrence is what states make of it, and arms control is indeed (at least in part) an expression of agreed-upon deterrent assumptions, then a paradigm shift in the former might shake the foundations of the latter. For example, if a nuclear first use “taboo” indeed exists, and if its persistence continues to be reinforced by both non-use and the efforts of non-nuclear states and epistemic disarmament communities to further delegitimize nuclear weapons, then future arms control may owe as much to the normative obsolescence of nuclear weapons as instruments of state power as to any of the structural or doctrinal factors cited in preceding chapters. Doctrinaire realists would of course be inclined to indicate that no such devaluation is likely to take place; structural power is still the basic organizing principal in international relations, and nuclear weapons continue to provide a measure of existential security for states in an uncertain and anarchic system. If arms control persists as a phenomenon, it will continue to represent balance of power maintenance on the part of security-seeking states. Neither of these narratives fundamentally contradicts the existing empirical record, and only time will tell if – at least regarding nuclear weapons and arms control – structures or norms prove more resilient.

The fact of the matter is that states (and even communities of actors within states) do think differently about the role and utility of nuclear weapons, and this variation appears to influence not only the way nuclear capabilities are operationalized, but the way that states engage one in another in conversation about limitations on further acquisition and deployment. This interplay between strategic and normative factors is important, and the second contribution of this study is in systematizing analysis of this dynamic through fuzzy set Qualitative Comparative Analysis and case study process

tracing. QCA is still a niche methodology, particularly in the field of international relations, but this study demonstrates its utility in teasing out causal complexity even when presented with a limited universe of observations.

Causality in reality is inevitably more complicated than causality in theory, and this is particularly apparent in examining the factors that influence arms control. While declining hostility is associated with more robust and lasting arms control, the evidence suggests that in some situations, military confrontation may in fact create a window of opportunity for an arms control dialogue to be initiated. This is evidenced by early U.S.-Soviet case studies and the more contemporary experience of India and Pakistan. The stabilizing incentives created by confrontation can even overcome asymmetries in military capability and nuclear doctrine. However, the opportunity created for “hostile stabilization” represents something of a critical juncture; rivals can either seize this opportunity to stabilize their relationship through negotiated, unilateral, and/or informal measures, or they can continue to move down divergent paths in terms of military acquisitions and nuclear doctrine – potentially locking in a path that strongly obstructs potential for future arms control. The United States and the Soviet Union elected for the former, while India and Pakistan seem poised for the latter.

Dynamic relationships are also evident in regards to the variable of military strength. A rough parity in nuclear capabilities, when coupled with the absence of militarized hostility and strong agreement on doctrinal issues, is essential for sustaining an arms control relationship. However, it is not clear from the record that these factors alone facilitate risk-taking on more structurally transformative arms control. Significant asymmetries in conventional military power, along with uncertainties in the qualitative

nuclear balance, may very well stifle enthusiasm for new initiative; this certainly seems to be the case for the post-Cold War U.S.-Russian arms control relationship, which has largely consisted of incremental reductions consistent with the START framework negotiated nearly three decades prior. In the modern era, qualitative variation in technical military capability – such as the acquisition of missile defense systems and strategic conventional strike capabilities – may introduce new complexities not discernable through purely aggregate comparisons.

A model of political behavior should offer some predictive leverage if it is to be of consequence to policy, and in that regard the third contribution of this study lies in its contemporary relevance. The existing arms control literature largely begins and ends with the Cold War, despite nearly thirty years of history having transpired since that period – thirty years in which new nuclear powers, new rivalries, and new arms control agreements have emerged. By incorporating data from the post-Cold War era, and focusing in-depth analysis on those case studies of most relevance to the present day, this study offers explanatory insights relevant to both the past and future of nuclear arms control. Figure 9 illustrates a modified version of the diagram introduced in Chapter 2, plotting the case studies considered in the fsQCA in rough accordance with their scores on nuclear force balance, rivalry intensity, and doctrinal symmetry. For those case studies still relevant to the present day, directional trends are indicated by the gray dashed arrows. The remainder of this chapter will focus on those trends, including their implications for both theory and policy.

The United States and Russia: Equilibrium Maintenance or Cold Stasis?

This study began with reference to the New START agreement signed by the Obama and Medvedev administrations in 2010. The treaty was intended, at least by the U.S. administration, to serve several purposes. First, it was meant to advance Obama's "Prague Agenda" of more resolute progress toward a world without nuclear weapons. Second, New START was to provide a negotiated, verifiable foundation for even deeper bilateral arms reductions. Finally, the treaty was to advance an overall "reset" of the U.S.-Russian relationship, which had been sorely tested in the years prior by disagreements on missile defense, civil unrest in former Soviet satellites, and – probably most provocatively – Russia's 2008 military incursion into Georgia.

Importantly, both sides have followed through with their commitments under the treaty, a fact undisputed by either party. However, as of 2015, prospects for subsequent reductions appear dim owing to a variety of factors. In the United States, ratification of New START proved surprisingly challenging. Despite the fact that New START largely advanced an arms control agenda and implementing approach first negotiated under Republican administrations, the congressional GOP threatened to opt out of the 2/3 majority required for ratification. By 2010, Obama faced a general congressional and electoral revolt largely related to disagreement on domestic political issues; conservative opposition to New START could to some degree be attributed to the generally uncooperative mood. In addition, moderate Republicans who had been Reagan and Bush-era supporters of arms control represented a rapidly shrinking minority. This was starkly illustrated by the 2012 Senate primary defeat of Richard Lugar, a champion of the

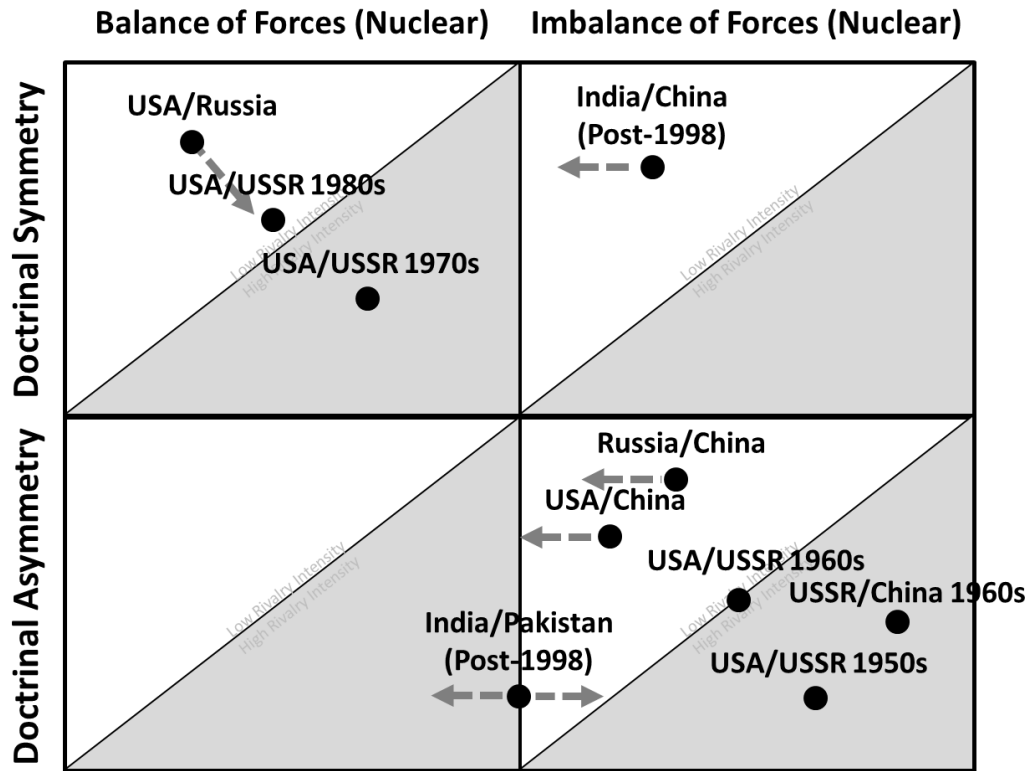


Figure 9: Case Study Condition Trends

Cooperative Threat Reduction program and bilateral arms control writ large.

Republican voices also dissented with New START on a variety of substantive issues. Among a litany of complaints, critics alleged that language and terms of the agreement potentially limited U.S. options on missile defense and prompt global strike; that the agreement came at a time when greater attention should be given to investments in the U.S. nuclear arsenal; that the relaxed verification regime would permit Russian cheating; that the agreement failed to address tactical nuclear weapons, an area where Russia maintained ambiguity and allegedly a quantitative edge; and that the treaty was inappropriate given recent Russian behavior. New START was ultimately ratified by a lame-duck Democratic congress, carried 71-26 by 56 Democrats, 13 Republicans, and 2 independents (the original START treaty had passed 93-6, with 55 Democrats and 38

Republicans in favor). Under current political circumstances, it is difficult to envision a renewed U.S. bipartisan consensus on arms control.²³⁰

Just as important (if not more so), the bilateral “reset” envisioned by the Obama administration largely failed to materialize. Despite New START and halting diplomatic cooperation on certain issues (particularly Iran), the two sides failed to bridge key post-Cold War differences that continue to fester. In September 2009, the Obama administration announced cancellation of a planned GMD interceptor site in Poland, ostensibly a confidence building gesture toward Russia. At the same time, the administration outlined a phased plan for the European component of U.S. missile defense, to include emplacement of radars, ship-based interceptors, and less capable ground-based interceptors in Romania and Poland. Program rhetoric emphasized that the U.S. system was “adaptive,” and would continue to evolve in response to emerging threats. The Medvedev government, little reassured by the new plan, registered familiar protests and outlined an alternative proposal for a “sectoral defense” limiting BMD coverage to defined geographic areas. By 2011, when the United States was ready to declare the first phase of its rollout plan complete, the two sides had still failed to reach accommodation. In December, Medvedev made it clear that “our positions remain far apart,” and that Russia would be forced to explore various countermeasures to U.S. missile defense; this included renewal of a previous threat to base short range (and potentially nuclear-capable) SS-26 ballistic missiles in the Kaliningrad Oblast opposite

²³⁰ Collina, Tom. “Senate Approves New START.” *Arms Control Today*. January 10, 2010. https://www.armscontrol.org/act/2011_01-02/NewSTART (accessed June 23, 2015).
“The START Ratification Debate Guide.” *Project on Nuclear Issues, Center for Strategic and International Studies*. n.d. <http://csis.org/program/start-ratification-debate> (accessed June 23, 2015).

Poland. He also suggested that Russia might need to reconsider its New START commitments.²³¹

Medvedev declined to seek a second presidential term in 2012, paving the way for Putin's reelection (the Russian constitution places no limits on non-consecutive terms). The strongman's campaign was characterized by harsh criticism of U.S. foreign policy, including allegations that the United States was meddling in Russian electoral politics, and his third term in office would dispel any notions that U.S.-Russian relations had tilted in a more amiable direction. In October 2012, Russian officials indicated they would not seek renewal of the Cooperative Threat Reduction program, citing disagreements on future direction and the fact that Russia no longer required U.S. financial assistance; cooperation quietly and unceremoniously ended in December 2014. While remaining largely cooperative on Iran, the two countries found new dispute following the events of the "Arab Spring," particularly in regards to the future of Syria, a longtime Soviet and later Russian client state. In late 2013, the Russian Foreign Ministry confirmed deployment of the SS-26 in Kaliningrad. In the same period, electoral turmoil in Ukraine saw the two countries back separate factions, once again drawing allegations of western meddling in Russia's sphere of interest. Russia seized upon the civil unrest as an opportunity to annex the Crimean Peninsula and back separatist violence in eastern

²³¹ Baker, Peter. "U.S.-Russian Ties Still Fall Short of 'Reset' Goal." *The New York Times*, September 2, 2013: A1.

Giles and Monaghan, *European Missile Defense and Russia 2014*, 16-25.

Hershenhorn, David. "Russia Elevates Warning About U.S. Missile Defense Plan in Europe." *The New York Times*, November 23, 2011: A20.

Sokov, Nikolai. "Medvedev's Statement on Missile Defense Might Mean Russia Postpones Further Dialogue Until 2013." *James Martin Center for Nonproliferation Studies*. December 2, 2011.

http://cns.miis.edu/stories/111202_medvedev_statement.htm#fn1 (accessed June 23, 2015).

Stent, Angela. "U.S.-Russia Relations in the Second Obama Administration." *Survival* 54, no. 6 (2012/2013): 123-138.

Ukraine; its clandestine participation in the fighting, along with a military buildup along the border, continues to stoke fears of an overt land invasion – along with wider designs on NATO’s Baltic periphery.²³²

In July 2014 the U.S. State Department released an official statement charging Russia with violating its compliance obligations under the 1987 Intermediate Range Nuclear Forces Treaty. The formal charges related to alleged testing of a ground-launched cruise missile with a maximum range of between 500km and 5500km; testing and deployment of such systems is not permissible under the agreement. Reports suggest Russian noncompliance had been suspected as early as 2008, and the Obama administration first voiced its concerns on the record in 2011. Allegations have also been raised outside of official channels that Russia may have, in 2011 and 2012, tested a ballistic missile at treaty-limited ranges – though there is considerable debate as to whether the missile tested was actually an INF-limited system, or an ICBM tested at depressed trajectory (activity that might arguably violate the spirit, if not the letter of the treaty). Russian officials have vigorously denied the State Department allegation, and further charged the United States itself with noncompliance, noting the existence of intermediate range systems used as targets in missile defense tests, U.S. deployment of armed drones that might violate the treaty’s range requirements according to certain legal readings, and finally concern that launchers being constructed for missile defense interceptors in Europe may also be used to house intermediate range cruise missiles.

Noncompliance allegations aside, Russian officials have registered displeasure with the

²³² Bender, Bryan. "Russia Ends U.S. Nuclear Security Alliance." *The Boston Globe*, January 19, 2015.
Herszenhorn, David. "Russia Won't Renew Pact on Weapons with the U.S." *The New York Times*, October 12, 2012: A10.
Roth, Andrew. "Deployment of Missiles is Confirmed by Russia." *The New York Times*, December 16, 2013: A10.

INF Treaty since at least 2005, alleging that it unfairly restrains Russia at a time that many of its regional neighbors (most notably China) are deploying highly capable intermediate-range systems. Notably in 2007, both Russia and the United States made a call for globalization of INF in the UN General Assembly; the idea has largely fallen on deaf ears.²³³

Finally, on issues of nuclear doctrine, is it unclear where Russia stands regarding the role of nuclear weapons in certain aspects of national security policy, and in particular the role they might play in conflicts short of full-scale war. Some observers suggest that doctrinal changes introduced by Putin's government, beginning with the 2000 National Security Concept, represented a significant departure from historical Soviet and Yeltsin-era policies – namely by seriously contemplating “limited” use in regional scenarios. Relatedly, the relevance of “de-escalation strikes” remains controversial; experts disagree on the extent to which the Russian military has actually embraced or operationalized the concept (at least one indicates it is a “central” component).²³⁴ Others worry that Russia's ambiguity is ultimately intended to provide cover for conventional aggression in areas like Georgia and Ukraine, deterring military intervention by western powers wary of courting nuclear retaliation. Russia's 2010 military doctrine actually seemed to reign in

²³³ "Adherence to and Compliance with Arms Control, Nonproliferation, and Disarmament Agreements and Commitments." Washington: U.S. Department of State, 2015.

Cooper, David. "Globalizing Reagan's INF Treaty: Easier Said than Done?" *The Nonproliferation Review* 20, no. 1 (2013): 145-163.

Pifer, Steven. *The INF Treaty, Russian Compliance and the U.S. Policy Response*. July 17, 2014.

<http://www.brookings.edu/research/testimony/2014/07/17-inf-treaty-russia-compliance-us-policy-response-pifer> (accessed June 24, 2015).

Wolf, Amy. *Russian Compliance with the Intermediate Range Nuclear Forces (INF) Treaty: Background and Issues for Congress*. Washington: Congressional Research Service, 2015.

²³⁴ Interview with Nikolai Sokov, April 9, 2015.

Interview with Pavel Podvig, May 19, 2015.

Interview with Steven Pifer, former Special Assistant to the President and Senior Director for Russia, Ukraine, and Eurasia on the National Security Council, June 16, 2015.

red lines to some degree, noting that conventional aggression would only prompt nuclear retaliation if threatening the “very existence of the state.” The statement seemed to parallel language in the 2010 U.S. Nuclear Posture Review noting “a narrow range of contingencies in which U.S. nuclear weapons might play a role in deterring conventional attack,” namely under “extreme circumstances to defend the vital interests of the United States or its allies and partners.”²³⁵

These events collectively suggest potential for backward drift in U.S.-Russian arms control relations, away from the equilibrium maintenance of the past two decades and toward a relationship characterized by continued nuclear parity, increasing (if not yet militarily overt) hostility, and an uncertain balance of mind on nuclear doctrine. In some respects this mirrors the “cold balancing” paradigm of U.S.-Soviet relations in the 1970s and 1980s, except that modern-day Russia is in a position of considerable conventional military and economic inferiority by comparison to the United States (Putin has made some progress in resuscitating Russian conventional capabilities, but the military is still a shadow of its Cold War predecessor, increasingly turning to asymmetric warfare to project its power in areas like eastern Ukraine). Importantly, neither side appears willing at the moment to walk away from existing arms control arrangements, including even the troubled INF Treaty. However, initiatives for a New START follow-on have stalled; neither bilateral relations nor domestic politics in either country seem conducive to new agreements addressing either lower numbers or additional systems, like tactical nuclear weapons. Under current circumstances, a “cold stasis” seems most plausible for the

²³⁵ "Nuclear Posture Review Report." U.S. Department of Defense, 2010.
Sokov, Nikolai. "Why Russia Calls a Limited Nuclear Strike 'De-escalation'." *Bulletin of the Atomic Scientists*, March 13, 2014.
"The Military Doctrine of the Russian Federation." *Carnegie Endowment for International Peace*. 2014. http://carnegieendowment.org/files/2010russia_military_doctrine.pdf (accessed June 25, 2015).

foreseeable future – an arms control paradigm in which the nuclear balance remains locked in at preexisting levels, but parties lack the incentives of peace and mutual strength on which to predicate further reductions or restructuring.

India and Pakistan: Hostile Stabilization, or drift toward a Dually Reinforcing Asymmetry?

On November 26, 2008, ten militants slipped into the city of Mumbai, unleashing four days of violence that killed more than 160 people and paralyzed the Indian financial capital. In terms of casualties, the assault was comparable to previous acts of mass terrorism, including relatively recent bombings in Mumbai (2006) and New Delhi (2005). It was exceptional however for the brazen mode of attack (assault by armed gunmen in broad daylight), the diversity of targets hit (including public transportation, popular tourist hotels, and a Jewish community center), the duration, and the international media attention garnered. As with numerous other attacks, Indian authorities quickly pointed the finger at their neighbor; evidence would implicate Lashkar-e-Taiba, a Pakistan-based perpetrator of previous attacks with alleged connections to the ISI. The Singh government pressured Pakistan for cooperation on investigating the attack and prosecuting those responsible, implicitly suggesting that failure to cooperate might result in a more unilateral response. The Bush administration attempted to mediate these interactions, which ultimately bore little fruit. In the days and weeks after the attack, rumors abounded that India might conduct airstrikes on terrorist camps in Pakistan, or possibly even attempt a conventional ground operation. In the end, neither side undertook

a significant military mobilization. By contrast to 2001/2002, there was no buildup at the border and no official rhetoric implying risks of nuclear escalation.²³⁶

The attack did result in suspension of the Composite Dialogue, a bilateral negotiating process first proposed in 1997, derailed by Kargil in 1999, and then resuscitated in 2004. Through four successive rounds, the high level talks had addressed a range of issues including security and confidence building measures; disputed territory including Kashmir, Siachen, and Sir Creek; economic cooperation; and counterterrorism, among other issues. The dialogue was unique and arguably promising in that it attempted to address the full spectrum of interconnected issues valued by both sides. The talks yielded a number of modest victories, including codification of an agreement on pre-notification of ballistic missile tests and an agreement on reducing risks related to nuclear weapons accidents. No tangible progress was made on divisive territorial issues, although some accounts suggest the two sides may have come close to agreement on a framework for resolving Kashmir.²³⁷ Pakistani Prime Minister Yousuf Gillani reached out to the Singh government for a resumption of talks in 2009, but was rebuffed on grounds that counterterrorism issues remained to be resolved. The two sides agreed to resume dialogue in 2010, but subsequent talks failed to achieve progress on par with the 2004-2008 negotiations. More significantly, Manmohan Singh's government was voted out of office in 2014, yielding power once again to the BJP under Narendra Modi; it remains to be

²³⁶ Nayak, Polly, and Michael Krepon. *The Unfinished Crisis: US Crisis Management after the 2008 Mumbai Attacks*. Washington: The Henry L. Stimson Center, 2012.

²³⁷ Interview with Toby Dalton, January 27, 2015.

Sajad, Padder. *The Composite Dialogue Between India and Pakistan: Structure, Process, and Agency*. Heidelberg: South Asia Institute, Heidelberg University, 2012.

seen if the Modi government, which has taken a harder rhetorical line on security issues, will be inclined to revive the process or opt for a new approach.²³⁸

On nuclear issues, the two sides have not progressed much further than the achievements of Lahore in 1999. The reciprocal test hiatus remains in place, though it is not clear how much this can be attributed to mutual restraint, versus fear of recriminations from the west. In 2005 the Bush administration, in an effort to fortify ties with India, announced a deal on civil nuclear cooperation allowing India access to U.S. reactor technologies and uranium exports. In exchange, India agreed to (among other measures) place a subset of its civil nuclear facilities (particularly those using U.S.-origin materials) under IAEA safeguards, cooperate on nonproliferation and nuclear security initiatives, and – at least in the initial reporting of the agreement – continue to refrain from nuclear testing. The final, formalized agreement seemed to significantly water down the testing quid pro quo; the United States has the option to terminate cooperation under such circumstances, but cessation would not be automatic. In any case, the Indian government must weigh these potential, unpredictable costs against the benefits to be gained from any future testing.²³⁹

Not surprisingly, Pakistani leaders strongly protested the U.S.-India agreement.

Chief among concerns cited was a belief that imports from the west would allow India to

²³⁸ Barry, Ellen, and Suhasini Raj. "India and Pakistan in 'Common Agenda.'" *The New York Times*, May 27, 2014: A9.

"India-Pakistan Relations: Recent Developments." *India Ministry of External Affairs*. 2012. <http://mea.gov.in/Portal/ForeignRelation/pakistan-august-2012.pdf> (accessed June 24, 2015).

²³⁹ "Agreement for Cooperation Between the Government of the United States of America and the Government of India Concerning Peaceful Uses of Nuclear Energy (123 Agreement)." *Council on Foreign Relations*. August 2007. <http://www.cfr.org/india/agreement-cooperation-between-government-united-states-america-government-india-concerning-peaceful-uses-nuclear-energy-123-agreement/p15459> (accessed June 25, 2015)."

Kerr, Paul. *U.S. Nuclear Cooperation with India: Issues for Congress*. Washington: Congressional Research Service, 2012.

devote a greater portion of its domestic uranium resources to fissile material production for weapons, allowing India to surge ahead in the arms race. Most reports suggest this advantage has yet to materialize; Pakistan is credited by several sources as matching, and possibly slightly exceeding India in warhead production, if not yet aggregate fissile material output (though secrecy on both sides makes it impossible to credibly confirm production totals). Since 1998, Pakistan has increased its plutonium production potential through a dramatic expansion of its Khushab research facility, home to the country's first indigenously designed heavy water reactor; at least three additional units have been added as of 2015, and a fifth may be planned. These reactors are not subject to IAEA safeguards; a report from the Washington-based Institute for Science and International Security alleges (based on statements from an unnamed former Pakistani official) that the reactors are intended to produce plutonium for "smaller, shorter range nuclear weapons, including tactical nuclear-tipped missiles."²⁴⁰

Although Pakistan has still not released an official statement of nuclear doctrine, it appears the nuclear establishment is determined to acquire capabilities relevant at all rungs of the escalation ladder. At a recent Washington nuclear policy conference, General Kidwai (now retired) described Pakistan's doctrine as one of "full spectrum deterrence," intended to block all of the "avenues for serious military operations by the other side."

The Nasr missile system previously discussed is intended to provide a measured response

²⁴⁰ Ahmed, Mansoor. "Trends in Technological Maturation and Strategic Modernization: The Next Decade." In *Nuclear Learning in South Asia: The Next Decade*, edited by Feroz Khan, Ryan Jacobs and Emily Burke, 58-70. Monterey: U.S. Naval Postgraduate School, 2014.

Albright, David, and Serena Kelleher-Vergantini. "New Construction at Pakistan's Khushab Reactor Site." *Institute for Science and International Security*. May 19, 2015. http://isis-online.org/uploads/isis-reports/documents/New_Construction_at_Pakistan_May_19_2015_Final.pdf (accessed June 25, 2015)

F. Khan 2012, 202, 395.

Kristensen and Norris, *Pakistan's Nuclear Forces*, 2011.

Kristensen and Norris, *Indian Nuclear Forces*, 2012.

to set levels of Indian conventional escalation. On this issue, Kidwai made explicit reference to India's "Cold Start" doctrine, a conventional military battle plan rolled out in 2004 intended to facilitate rapid mobilization of Indian military units for a short-notice combined-arms offensive into Pakistani territory – ostensibly a response option in the event of future provocations (to potentially include state-sponsored terrorist attacks). Some observers argue that Cold Start is also intended to preempt diplomatic intervention by western powers, allowing India to achieve limited objectives before international pressure forces de-escalation. There is debate regarding the degree to which Cold Start represents a fully operationalized doctrine, as well as whether or not Indian officials would really be willing to tempt fate through such action. Nonetheless, Cold Start appears to be a central preoccupation of Pakistani nuclear strategists.²⁴¹

At the other end of the spectrum, Pakistan tested the Shaheen-III ballistic missile in 2015, a 2750km system intended (in Kidwai's words) to reach India military sites in the Andaman and Nicobar Islands. The retired general also indicated that Pakistan was likely to develop submarine-launched weapons for purposes of a secure second-strike capability (observers also suggest that sea-based weapons may be intended to tactically counter Indian naval superiority).²⁴² With the exception of Nasr, these systems are largely mirrored by developments in India, though New Delhi's focus is increasingly leaning toward the strategic end of the use spectrum, consistent with an avowed policy of "massive retaliation" in the event an adversary strikes first (despite resistance to western

²⁴¹ "A Conversation with Khalid Kidwai (Transcript)." *Carnegie Endowment for International Peace*. March 23, 2015. <http://carnegieendowment.org/files/03-230315carnegieKIDWAI.pdf> (accessed June 25, 2015).

Joshi, Shashank. "The Mythology of Cold Start." *The New York Times*, November 4, 2014.
Ladwig, Walter. "A Cold Start for Hot Wars? The Indian Army's New Limited War Doctrine." *International Security*, 2007/2008: 158-190.

²⁴² Interview with Toby Dalton, January 27, 2015.

proselytizing on strategic restraint, both sides are more than willing to borrow terminology and concepts from 1960s deterrence literature). The Agni series missiles, while slow to reach operational service, are claimed to provide India with the ability to hold targets at risk out to at least 3,000km; designers claim the still-experimental Agni-V will provide India with reach out to 5,000km or more. The nuclear-powered *Arihant* submarine has yet to advance beyond testing, but the experience is ultimately intended to inform a fleet of vessels providing India its own sea-based deterrent. Perhaps most provocatively from the standpoint of strategic stability, the Indian defense research establishment is investing considerable money and effort in ballistic missile defense capabilities, both theater-level and strategic. Despite questions of effectiveness – especially against an adversary with a diversity of delivery systems, including cruise missiles – Pakistani observers have expressed concern at the implications for assuredness of their own deterrent.²⁴³

These developments would seem to reinforce perpetuation of the status quo, namely conventional imbalance, rough numerical nuclear parity, militarized tension, and complete disjuncture in nuclear doctrine – a causal recipe for continued “hostile stabilization.” Military tensions have cooled since Mumbai, though instability in Pakistan and lack of resolution on Kashmir suggests a continued propensity for crisis; it’s unclear empirically how long a cycle of episodic violence and reactive confidence building can be sustained before one or both sides (more likely India) abandon further negotiated

²⁴³ Auner, Eric. “Indian Missile Defense Program Advances.” *Arms Control Today*. January 15, 2013. https://www.armscontrol.org/act/2013_01-02/Indian-Missile-Defense-Program-Advances (accessed January 25, 2015).

Jaspal, Zafar. "The Introduction of Ballistic Missile Defense in South Asia." In *Nuclear Learning: The Next Decade in South Asia*, 120-130. Monterey: U.S. Naval Postgraduate School, 2014.

Kristensen and Norris, *Indian Nuclear Forces*, 2012 2012.
Mistry 2013.

restraint. Even if something resembling détente can be sustained, conditions suggest the two sides will at best drift toward a state of dually reinforcing asymmetry, characterized by at least qualitatively imbalanced nuclear forces and continued asymmetry in doctrine. This latter scenario suggests a certain degree of strategic stability (if the U.S.-China and USSR/Russia-China case studies offer any precedent), but very little basis for arms control.

The United States and China: Dually Reinforcing Asymmetry or Uncharted Territory?

Of the three case studies explored in this study, the arms control and strategic stability relationship between the United States and China has arguably exhibited the most continuity in recent years. The conditions that have held back arms control throughout the historic duration of the rivalry, namely a radically asymmetric nuclear and doctrinal balance, continue to hold true. Disagreements on Taiwan and contested maritime boundaries remain unresolved, presenting risks of conflict and escalation; however, the two powers have managed for the most part to avoid overt military confrontation beyond occasional aerial and maritime encounters. Discussions of confidence building and arms control remain stalled at the Track 2 level, though some headway has been made in cooperation on nuclear security matters.

Beginning in 2014, China conducted tests of a hypersonic “boost-glide” vehicle launched by a missile. The United States has conducted tests of similar technology, supporting the conventional prompt global strike program. China however may be

considering the technology as a delivery platform for nuclear warheads, possibly as a means to counter U.S. missile defenses. In 2015, the Pentagon's annual report to Congress on Chinese military developments for the first time indicated China was equipping its DF-5 ICBMs with multiple independently targeted reentry vehicles. The same report indicated that the next-generation road mobile DF-41 ICBM, still under development, might also be MIRV-capable. It is difficult at this point to assess the significance of these technological developments, namely whether they represent pet projects of an ambitious and well-funded military-industrial complex; evolutionary developments toward a more survivable "lean and effective" arsenal, still scoped for a posture of minimally assured retaliation; or signs of a shift in Chinese doctrinal thinking. Jeffrey Lewis has suggested that MIRV deployment on the DF-5 may have simply followed from a Chinese decision to retire the missile's original 1970s-vintage warhead in favor of a more compact design; the missile's considerable throw weight allowed for multiple warheads to be accommodated, and MIRVing the missile may have seemed a logical evolutionary choice.²⁴⁴

At least for the time being signs point to a continuation of dually reinforcing asymmetry between the United States and China, providing little incentive for arms control cooperation. There is, however, potential for a more intriguing outcome in the longer term. One of the unique aspects of QCA is that the researcher is presented with the logical remainders – combinations of conditions and outcomes not observed in the

²⁴⁴ Acton, James. *China's Offensive Missile Forces: Testimony before the U.S.-China Economic and Security Review Commission*. Washington: Carnegie Endowment for International Peace, 2015. *Annual Report to Congress: Military and Security Developments Involving the People's Republic of China 2015*. Office of the Secretary of Defense, 31-33.
Lewis, Jeffrey. "Great, Now China's Got Multiple Nuclear Warhead Missiles?" *Foreign Policy*. May 26, 2015. <http://foreignpolicy.com/2015/05/26/china-new-multiple-nuclear-warhead-missiles-arms-race-deterrence/> (accessed June 25, 2015).

empirical record. Referring back to Figure 9, it is notable that of the case studies considered, none have exhibited a combination of military balance, low rivalry intensity, and asymmetric doctrine (the lower left quadrant). India and Pakistan have come closest, particularly if one ignores conventional asymmetries and qualitative differences in nuclear force structure. For the most part, however, this combination is territory uncharted in the empirical record. There is reason, however, to believe that certain dyads may move in this direction sometime in the future. If the United States and Russia can overcome their current differences and undertake further rounds of nuclear reduction (either cooperatively or unilaterally), at the same time as China modestly expands its strategic arsenal, then these countries may over time enter a realm of “asymmetric balance” – numerically (if not qualitatively) balanced nuclear forces, but asymmetric doctrines. At this point it is unclear what to expect in terms of arms control under such conditions.

As discussed in Chapter 6, the Chinese government has previously stated it would be willing to more seriously consider the idea of arms control under conditions of more equitable force balance. Assuming that China continues to deploy a deterrent mix of ICBMs and missile submarines, its forces will also bear a qualitative resemblance to those of the United States and Russia (minus the bomber component, though over time this capability has diminished in both countries). However, even in the presence of a rough structural balance, it is not clear whether a substantive arms control process can take place when rivals view fundamental issues of deterrence and strategic stability so differently. When the United States and the Soviet Union inked the SALT agreements in the 1970s, they did not agree in totality on doctrinal issues, particularly on limited war

and sub-strategic uses of nuclear weapons. When INF and START were negotiated, the Soviet Union – in rhetoric at least – espoused a doctrine of no-first-use. However, even in retrospect those doctrinal differences still do not seem as stark as those separating present-day China from the United States.

Perhaps even more importantly, at the point that these three countries reach parity, it is hard to imagine arms control taking place on a purely bilateral basis; the nuclear rivalry will have taken on a more explicitly trilateral character. This study is grounded in existing theories of deterrence and arms control, most of which abstract nuclear weapons and warfare in relative analytical isolation, and almost always at a dyadic level of interaction. One of the major limitations of the fsQCA model presented in Chapter 3 (or any dyadic rivalry analysis) is the fact that arms control relationships are analyzed in purely bilateral terms, despite the existence of clearly multilateral dynamics. It has been defensible to explain these dynamics away given that up until now, countries have primarily managed their nuclear rivalries (via arms control or otherwise) on a bilateral basis. The profound structural inequities between certain rival pairs (China vs. the United States and Soviet Union, or China vs. India) helped facilitate such an approach; peer competitors needed to be handled very differently from asymmetric competitors. Directional threat perceptions also mattered; during the Cold War for example, the United States and Soviet Union considered one another to be the greater threat by comparison to China.

More recently, however, Russian commentators have expressed increasing concern regarding the size and opacity of China's nuclear arsenal, suggesting that even a hypothetical New START follow-on might be contingent on some level of Chinese

engagement in the process. While China is not mentioned in official Russian military strategy documents or statements, those who have interacted with Russians in unofficial forums note that China is something of a “threat that should not be named” – but a threat that nonetheless increasingly preoccupies Russian strategists. To further complicate matters, strategic stability dialogues with both Russian and China increasingly suggest that future nuclear arms control may be inextricably linked to compromises on certain conventional systems – particularly ballistic missile defense and prompt global strike.²⁴⁵

These developments do not necessarily threaten the theoretical or empirical relevance of this study; indeed they reinforce the notion that future nuclear arms control will continue to be influenced by a dynamic interplay between existing and emerging military capabilities, rivalry intensity, and doctrine. However, future analysis will almost certainly require a combination of further theoretical innovation and more agile analytical tools. Subsequent theory development will need to account for dynamics in which a multitude of peer or near-peer nuclear competitors may exist. Rivalries may be “symmetrically triadic” as in the case of the United States, Russia, and China, wherein all parties perceive directed and proportionately menacing nuclear threats from one another; asymmetric groupings may also exist where rivalries and alliances coexist within a group of competitors (Pakistan/India/China, or India/China/United States, for example). In either of these examples, negotiated arms control between any pair of rivals will

²⁴⁵ “2013 Carnegie International Nuclear Policy Conference, Morning Plenary Session: Prague 2.0? Deterrence, Disarmament, and Nonproliferation in Obama’s Second Term (Transcript).” *Carnegie Endowment for International Peace*. 2013. <http://carnegieendowment.org/files/0410carnegie-morning-plenary.pdf> (accessed June 26, 2015).

Arbatov, Alexei, and Vladimir Dvorkin. *The Great Strategic Triangle*. Moscow: Carnegie Moscow Center, 2013.

Interview with Steven Pifer, June 26, 2015.

Interview with Nikolai Sokov, April 9, 2015.

inevitably involve calculations and tradeoffs regarding the balance of threat and mind relative to the third. Conventional weapons with strategic effects, increasingly relevant to the nuclear equation as arsenals draw down to lower (and potentially more preemptively vulnerable) numbers, may lead to mixed conventional/nuclear doctrinal innovations that cannot be so easily compared in terms of first-use thresholds and flexible response options. Analysis of these complex, multicausal interactions – still involving a relatively small number of actors – will continue to evade the utility of popular statistical tools. Alternative methodologies like QCA will likely need to be augmented or enhanced by insights and analytical approaches from cutting edge fields like network theory and agent-based modeling.

It has been seventy years since nuclear weapons were first tested and used in warfare. It is truly remarkable that since 1945, no country has elected to employ nuclear weapons in conflict. This is despite multi-trillion dollar investments in nuclear arsenals comprising tens of thousands of warheads and delivery systems optimized for a range of contingencies, and despite heated brinkmanship that at times has seen nuclear-armed rivals engage in mass military mobilizations and even open war. In fact, in aggregate terms the global nuclear stockpile continues to steadily decline – this despite ongoing militarized disputes, new proliferation, nuclear modernization programs, and a general lack of global momentum toward anything resembling disarmament. These trends of non-use and aggregate reduction certainly owe something to a combination of deterrence, transformational developments in international politics, and the limited utility of nuclear weapons in addressing contemporary security challenges. At a more fundamental level, however, these trends have been facilitated by a balancing of threat and mind among

nuclear-armed strategic rivals – an often tumultuous process of strategic and normative alignment that will continue to shape arms control developments into the 21st century.

Appendix 1: fsQCA Truth Tables

	Conditions					Number of Cases	Consistency	Outcome
	Nuclear Balance (NB)	Conv Balance (CB)	Rivalry Intensity (RI)	First Use Policy (1ST)	Doctrine Flex (FX)			
1	1	1	1	1	1	0	N/A	REM
2	1	1	1	1	0	0	N/A	REM
3	1	1	1	0	1	1	1.00	1
4	1	1	1	0	0	0	N/A	REM
5	1	1	0	1	1	3	1.00	1
6	1	1	0	1	0	1	1.00	1
7	1	1	0	0	1	2	1.00	1
8	1	1	0	0	0	0	N/A	REM
9	1	0	1	1	1	0	N/A	REM
10	1	0	1	1	0	3	0.79	1
11	1	0	1	0	1	0	N/A	REM
12	1	0	1	0	0	2	0.43	0
13	1	0	0	1	1	0	N/A	REM
14	1	0	0	1	0	3	0.63	0
15	1	0	0	0	1	0	N/A	REM
16	1	0	0	0	0	9	0.25	0
17	0	1	1	1	1	0	N/A	REM
18	0	1	1	1	0	0	N/A	REM
19	0	1	1	0	1	0	N/A	REM
20	0	1	1	0	0	4	0.90	1
21	0	1	0	1	1	4	1.00	1
22	0	1	0	1	0	0	N/A	REM
23	0	1	0	0	1	0	N/A	REM
24	0	1	0	0	0	0	N/A	REM
25	0	0	1	1	1	0	N/A	REM
26	0	0	1	1	0	0	N/A	REM
27	0	0	1	0	1	0	N/A	REM
28	0	0	1	0	0	0	N/A	REM
29	0	0	0	1	1	2	0.67	0
30	0	0	0	1	0	0	N/A	REM
31	0	0	0	0	1	0	N/A	REM
32	0	0	0	0	0	3	0.32	F

Table 14: Truth Table, Arms Control Commitment

	Conditions					Number of Cases	Consistency	Outcome
	Nuclear Balance (NB)	Conv Balance (CB)	Rivalry Intensity (RI)	First Use Policy (1ST)	Doctrine Flex (FX)			
1	1	1	1	1	1	0	N/A	REM
2	1	1	1	1	0	0	N/A	REM
3	1	1	1	0	1	1	0.60	0
4	1	1	1	0	0	0	N/A	REM
5	1	1	0	1	1	3	0.45	0
6	1	1	0	1	0	1	0.45	0
7	1	1	0	0	1	2	0.45	0
8	1	1	0	0	0	0	N/A	REM
9	1	0	1	1	1	0	N/A	REM
10	1	0	1	1	0	3	0.74	0
11	1	0	1	0	1	0	N/A	REM
12	1	0	1	0	0	2	0.93	1
13	1	0	0	1	1	0	N/A	REM
14	1	0	0	1	0	3	0.79	1
15	1	0	0	0	1	0	N/A	REM
16	1	0	0	0	0	9	0.93	1
17	0	1	1	1	1	0	N/A	REM
18	0	1	1	1	0	0	N/A	REM
19	0	1	1	0	1	0	N/A	REM
20	0	1	1	0	0	4	0.62	0
21	0	1	0	1	1	4	0.41	0
22	0	1	0	1	0	0	N/A	REM
23	0	1	0	0	1	0	N/A	REM
24	0	1	0	0	0	0	N/A	REM
25	0	0	1	1	1	0	N/A	REM
26	0	0	1	1	0	0	N/A	REM
27	0	0	1	0	1	0	N/A	REM
28	0	0	1	0	0	0	N/A	REM
29	0	0	0	1	1	2	0.76	1
30	0	0	0	1	0	0	N/A	REM
31	0	0	0	0	1	0	N/A	REM
32	0	0	0	0	0	3	0.90	1

Table 15: Truth Table, No Arms Control Commitment

Works Cited

- "2013 Carnegie International Policy Conference, Morning Plenary Session: Prague 2.0? Deterrence, Disarmament, and Nonproliferation in Obama's Second Term." *Carnegie Endowment for International Peace*. 2013. <http://carnegieendowment.org/files/0410carnegie-morning-plenary.pdf> (accessed June 26, 2015).
- "A Conversation with Khalid Kidwai (Transcript)." *Carnegie Endowment for International Peace*. March 23, 2015. <http://carnegieendowment.org/files/03-230315carnegieKIDWAI.pdf> (accessed June 25, 2015).
- "A National Security Strategy of Engagement and Enlargement." The White House. 1995. <http://www.au.af.mil/au/awc/awcgate/nss/nss-95.pdf> (accessed June 21, 2015).
- Achen, Christopher, and Duncan Snidal. "Rational Deterrence Theory and Comparative Case Study Challenges." *World Politics* 41, no. 2 (1989): 143-169.
- Acton, James. *China's Offensive Missile Forces: Testimony before the U.S.-China Economic and Security Review Commission*. Washington: Carnegie Endowment for International Peace, 2015.
- Acton, James. *Silver Bullet: Asking the Right Questions about Conventional Prompt Global Strike*. Washington, D.C.: Carnegie Endowment for International Peace, 2013.
- "Adherence to and Compliance with Arms Control, Nonproliferation, and Disarmament Agreements and Commitments." Washington: U.S. Department of State, 2015.
- Adler, Emanuel. "The Emergence of Cooperation: National Epistemic Communities and the International Evolution of the Idea of Arms Control." *International Organization* 46, no. 1 (1992): 101-145.
- "Agreement Between the Department of Defense of the United States of America and the Ministry of National Defense of the People's Republic of China on Establishing a Consultation Mechanism to Strengthen Military Maritime Safety." 1999. <https://fas.org/nuke/control/sea/text/us-china.pdf> (accessed May 31, 2015).
- "Agreement for Cooperation Between the Government of the United States of America and the Government of India Concerning Peaceful Uses of Nuclear Energy (123 Agreement)." *Council on Foreign Relations*. August 2007. <http://www.cfr.org/india/agreement-cooperation-between-government-united-states-america-government-india-concerning-peaceful-uses-nuclear-energy-123-agreement/p15459> (accessed June 25, 2015).
- Ahmed, Mansoor. "Trends in Technological Maturation and Strategic Modernization: The Next Decade." In *Nuclear Learning in South Asia: The Next Decade*, edited by Feroz Khan, Ryan Jacobs and Emily Burke, 58-70. Monterey: U.S. Naval Postgraduate School, 2014.

- Ahmed, Samina. "Pakistan's Nuclear Weapons Program: Turning Points and Nuclear Choices." *International Security* 23, no. 4 (1999): 178-204.
- Albright, David, and Serena Kelleher-Vergantini. "New Construction at Pakistan's Khushab Reactor Site." *Institute for Science and International Security*. May 19, 2015. http://isis-online.org/uploads/isis-reports/documents/New_Construction_at_Pakistan_May_19_2015_Final.pdf (accessed June 25, 2015).
- Allen, Kenneth, and Maryanne Kivlehan-Wise. "Implementing PLA Second Artillery Doctrinal Reforms." In *China's Revolution in Doctrinal Affairs: Emerging Trends in the Operational Art of the Chinese People's Liberation Army*, edited by James Mulvenon and David Finkelstein, 159-200. Alexandria: CNA Corporation, 2005.
- Allison, Graham, and Frederic Morris. "Armament and Arms Control: Exploring the Determinants of Military Weapons." *Daedalus* 104, no. 3 (1975): 99-129.
- Anderson, John, and Kamran Khan. "'We Are a Nuclear Power'; Pakistan Declares Intention to Use Arms in Self-Defense." *Washington Post*, May 29, 1998: A15.
- Annual Report to Congress: Military and Security Developments Involving the People's Republic of China 2015*. Office of the Secretary of Defense, 2015.
- Arbatov, Alexei. *Engaging China in Nuclear Arms Control*. Moscow: Carnegie Moscow Center, 2014.
- Arbatov, Alexei. *Implications of the START II Treaty for U.S.-Russian Relations*. Washington: Henry L. Stimson Center, 1993.
- Arbatov, Alexei, and Vladimir Dvorkin. *The Great Strategic Triangle*. Moscow: Carnegie Moscow Center, 2013.
- Archive of Nuclear Data*. n.d. <http://www.nrdc.org/nuclear/nudb/datainx.asp> (accessed June 17, 2015).
- Aspin, Les. *Report of the Bottom-Up Review*. Washington, D.C.: Department of Defense, 1993.
- Auner, Eric. "Indian Missile Defense Program Advances." *Arms Control Today*. January 15, 2013. https://www.armscontrol.org/act/2013_01-02/Indian-Missile-Defense-Program-Advances (accessed June 25, 2015).
- Axelrod, Robert. *The Evolution of Cooperation*. New York: Basic Books, 2006.
- Baker, Peter. "U.S.-Russian Ties Still Fall Short of 'Reset' Goal." *The New York Times*, September 2, 2013: A1.
- "Ballistic & Cruise Missile Threat." National Air and Space Intelligence Center, 2013.

- Barry, Ellen, and Suhasini Raj. "India and Pakistan in 'Common Agenda'." *The New York Times*, May 27, 2014: A9.
- Bender, Bryan. "Russia Ends U.S. Nuclear Security Alliance." *The Boston Globe*, January 19, 2015.
- Bernstein, Paul. "Post-Cold War US Nuclear Strategy." In *On Limited Nuclear War in the 21st Century*, edited by Jeffrey Larsen, 80-95. Stanford: Stanford University Press, 2014.
- "Bhutto Seeks Nuclear Policy Assurances." *National Intelligence Daily*. Director of National Intelligence. May 30, 1974.
http://www.foia.cia.gov/sites/default/files/document_conversions/89801/DOC_0000845825.pdf (accessed February 15, 2015).
- Bin, Li. "China and Nuclear Transparency." In *Transparency in Nuclear Warheads and Materials: The Political and Technical Dimensions*, edited by Nicholas Zarimpas, 50-57. Oxford: Oxford University Press, 2003.
- "BJP Manifesto 1998." Bharatiya Janata Party. 1998.
<http://bjpelectionmanifesto.com/pdf/manifesto1998.pdf> (accessed February 10, 2015).
- Blair, Bruce, and Clifford Gaddy. "Russia's Aging War Machine: Economic Weakness and the Nuclear Threat." *The Brookings Review* 17, no. 3 (1999): 10-13.
- Brady, Henry, and David Collier. *Rethinking Social Inquiry*. New York: Rowman & Littlefield, 2004.
- Brennan, D.G. "Setting and Goals of Arms Control." *Daedalus* 89, no. 4 (1960): 681-707.
- "Brezhnev's Statement and Excerpts from Gromyko's Speech." *The New York Times*. June 16, 1982.
- Broad, William, and David Sanger. "U.S. Ramping Up Major Renewal in Nuclear Arms." *New York Times*, September 22, 2014: A1.
- Broder, John. "Breaking Cold War Mold: Bush's Proposal to Reduce Nuclear Arsenal Injects Arms into Race for the White House." *New York Times*, May 26, 2000: A1.
- Brodie, Bernard. "Implications for Military Policy." In *The Absolute Weapon: Atomic Power and World Order*, edited by Bernard Brodie, 57-89. New Haven: Yale Institute of International Studies, 1946.
- . *Strategy in the Missile Age*. Santa Monica: RAND Corporation, 1959.
- . *The Absolute Weapon*. San Diego: Harcourt, 1946.
- Brodie, Bernard. "War in the Atomic Age." In *The Absolute Weapon: Atomic Power and World Order*, edited by Bernard Brodie, 14-56. New Haven: Yale Institute of International Studies, 1946.

- Bunn, George, and Roland Timerbaev. "Security Assurances to Non-Nuclear-Weapon States." *The Nonproliferation Review*, no. Fall (1993): 11-21.
- Burns, John. "India Sets 3 Nuclear Blasts, Defying a Worldwide Ban; Tests Bring a Sharp Outcry." *New York Times*, May 12, 1998.
- . "Nuclear Anxiety: The Indian Response; New Delhi's Leaders Say they don't need to Match Tests 'In Competition'." *The New York Times*, May 31, 1998.
- . "Nuclear Anxiety: The Overview; Pakistan, Answering India, Carries out Nuclear Tests; Clinton's Appeal Rejected." *The New York Times*, May 29, 1998.
- . "Pakistani Rebuff for India, But Talks May Be Closer." *The New York Times*, July 29, 1998: A24.
- Burns, Richard Dean. *The Evolution of Arms Control*. New York: Roman and Littlefield, 2009.
- Burr, William. "Nixon's Trip to China." *The National Security Archive*. December 11, 2003. <http://www2.gwu.edu/~nsarchiv/NSAEBB/NSAEBB106/> (accessed February 19, 2015).
- Burr, William, and Jeffrey Richelson. "Whether to 'Strangle the Baby in the Cradle': The United States and the Chinese Nuclear Program, 1960-64." *International Security* 25, no. 3 (2000/2001): 54-99.
- "Cabinet Committee on Security Reviews Progress in Operationalizing India's Nuclear Doctrine." Prime Minister's Office. January 4, 1999. <http://pib.nic.in/archieve/lreleg/lyr2003/rjan2003/04012003/r040120033.html> (accessed February 15, 2015).
- Campbell, Kurt, and Richard Weitz. "The Limits of U.S.-China Military Cooperation: Lessons from 1995-1999." *The Washington Quarterly* 29, no. 1 (2005): 169-186.
- Carnesale, Albert, and Richard Haass. *Superpower Arms Control: Setting the Record Straight*. Cambridge: Ballinger Publishing, 1987.
- Carter, April. *Success and Failure in Arms Control Negotiations*. Oxford: Oxford University Press, 1989.
- Cerniello, Craig. "Rumsfeld Panel Releases Report on Missile Threat to U.S." *Arms Control Today*, June 1, 1998.
- Chari, P.R. "India's Nuclear Doctrine: Confused Ambitions." *The Nonproliferation Review*, no. Fall/Winter (2000): 123-155.
- Chari, P.R., Pervaiz Cheema, and Stephen Cohen. *Four Crises and a Peace Process*. Washington, D.C.: Brookings Institution Press, 2007.
- Chase, Michael, and Evan Medeiros. "China's Evolving Nuclear Calculus: Modernization and Doctrinal Debate." In *China's Revolution in Doctrinal Affairs: Emerging Trends in the*

Operational Art of the People's Liberation Army, edited by James Mulvenon and David Finkelstein, 119-157. Alexandria: CNA Corporation, 2005.

Chen, David. "Taiwan's President Tiptoes Around Politics at Cornell." *The New York Times*, June 10, 1995.

Chen, Sean, and John Feffer. "China's Military Spending: Soft Rise or Hard Threat?" *Asian Perspective* 33, no. 4 (2009): 46-67.

"China's National Defense." *Information Office of the State Council of the People's Republic of China*. 1998. <http://china.org.cn/e-white/5/index.htm> (accessed June 3, 2015).

"China's National Defense in 2006." *Information Office of the State Council of the People's Republic of China*. 2006. <http://www.china.org.cn/english/features/book/194421.htm> (accessed February 22, 2015).

Chivers, C.J. "Putin Proposes Alternatives for Missile Defense System." *New York Times*, June 9, 2007: A6.

Christensen, Thomas. "The Meaning of the Nuclear Evolution: China's Strategic Modernization and U.S.-China Relations." *Journal of Strategic Studies* 35, no. 4 (2012): 447-487.

"Clinton Issues New Guidelines on U.S. Nuclear Weapons Doctrine." *Arms Control Today*. November 1, 1997. http://www.armscontrol.org/act/1997_11-12/pdd (accessed January 28, 2015).

Clinton, William. "The President's News Conference with President Jiang Zemin of China." *The American Presidency Project*. October 29, 1997. <http://www.presidency.ucsb.edu/ws/?pid=53468> (accessed May 28, 2015).

—. "The President's News Conference With President Jiang Zemin of China in Beijing." *The American Presidency Project*. June 27, 1998. <http://www.presidency.ucsb.edu/ws/?pid=56229> (accessed May 28, 2015).

Collina, Tom. "Senate Approves New START." *Arms Control Today*. January 10, 2010. https://www.armscontrol.org/act/2011_01-02/NewSTART (accessed June 23, 2015).

"Concept of National Security of the Russian Federation." *Geneva Centre for the Democratic Control of Armed Forces*. January 28, 2015. http://www.dcaf.ch/content/download/36017/527251/file/BM_Arbatov_03NatSec_Concept.pdf.

Cooper, David. "Globalizing Reagan's INF Treaty: Easier Said than Done?" *The Nonproliferation Review* 20, no. 1 (2013): 145-163.

Cordesman, Anthony. *The India-Pakistan Military Balance*. Washington, D.C.: Center for Strategic and International Studies, 2002.

- Corin, Eli. "Presidential Nuclear Initiatives: An Alternative Paradigm for Arms Control." *Nuclear Threat Initiative*. March 1, 2004. <http://www.nti.org/analysis/articles/presidential-nuclear-initiatives/> (accessed January 24, 2015).
- Cotta-Ramusino, Paulo, and Maurizio Martellini. *Nuclear Safety, Nuclear Stability and Nuclear Strategy in Pakistan*. Como: Landau Network-Centro Volta, 2002.
- Coyle, Philip. "Rhetoric and Reality? Missile Defense Under Bush." *Arms Control Today*, May 1, 2002.
- Delpech, Therese. "New States of Nuclear Disarmament: A European View." In *The Nuclear Turning Point*, by Harold Feiveson, 333-340. Washington, D.C.: The Brookings Institution, 1999.
- "Did the USSR Share Atomic Secrets with China?" *Parallel History Project on Cooperative Security*. 2002.
http://php.isn.ethz.ch/collections/coll_china_wapa/negin_smirnov_engl.cfm (accessed February 19, 2015).
- Diehl, Paul. "Arms Races and Escalation: A Closer Look." *Journal of Peace Research* 42, no. 2 (1983): 205-212.
- Diehl, Paul, and Jean Kingston. "Messenger or Message? Military Buildups and the Initiation of Conflict." *The Journal of Politics* 49, no. 3 (1987): 801-813.
- Diehl, Paul, and Mark Crescenzi. "Reconfiguring the Arms Race-War Debate." *Journal of Peace Research* 35, no. 1 (1998): 111-118.
- Downs, George, and David Rocke. "Tacit Bargaining and Arms Control." *World Politics* 39, no. 3 (1987): 297-325.
- . *Tacit Bargaining, Arms Races, and Arms Control*. Ann Arbor: University of Michigan Press, 1990.
- Downs, George, David Rocke, and Randolph Siverson. "Arms Races and Cooperation." *World Politics* 38, no. 1 (1985): 118-146.
- Duke, Lynne. "Pakistan, India Agree To Hold Security Talks; Premiers Remain Divided on Kashmir." *Washington Post*, July 29, 1998: A24.
- Durrani, Mahmud. *Pakistan's Strategic Thinking and the Role of Nuclear Weapons*. Albuquerque: Cooperative Monitoring Center, Sandia National Laboratories, 2004.
- Elleman, Bruce. *High Seas Buffer: The Taiwan Patrol Force, 1950-1979*. Newport: U.S. Naval War College, 2012.
- Enlai, Zhou. "Adress by Zhou Enlai at the Plenary Session of the Fourth Meeting of the State Council." *Wilson Center Digital Archive*. January 31, 1955.
<http://digitalarchive.wilsoncenter.org/document/114333> (accessed February 20, 2015).

- Erickson, Andrew, and Lyle Goldstein. "China's Future Nuclear Submarine Force." *Naval War College Review* 60, no. 1 (2007): 55-79.
- Evangelista, Matthew. *Innovation and the Arms Race: How the United States and the Soviet Union Develop New Military Technologies*. Ithaca: Cornell University Press, 1988.
- Evangelista, Matthew. "The Paradox of State Strength: Transnational Relations, Domestic Structures, and Security Policy in Russia and the Soviet Union." *International Organization* 49, no. 1 (1995): 1-38.
- Executive Summary of the Report of the Commission to Assess the Ballistic Missile Threat to the United States*. Washington, D.C.: U.S. Congress, 1998.
- Faison, Seth. "China Proclaims it Designed its Own Neutron Bomb." *The New York Times*, July 15, 1999: A8.
- Fearon, James. "Domestic Political Audiences and the Escalation of International Disputes." *The Journal of Conflict Resolution* 88, no. 3 (1997): 577-592.
- Fearon, James. "Signaling Foreign Policy Interests: Tying Hands versus Sinking Costs." *The Journal of Conflict Resolution* 28, no. 1 (1984): 63-84.
- Fearon, James. "Signaling versus the Balance of Power and Interests: An Empirical Test of a Crisis Bargaining Model." *The Journal of Conflict Resolution* 38, no. 2 (1997): 236-269.
- Feiveson, Harold, and Ernst Hogendoorn. "No First Use of Nuclear Weapons." *The Nonproliferation Review*, no. Summer (2003): 1-9.
- Fitzpatrick, Mark. "A Prudent Decision on Missile Defense." *Survival* 51, no. 6 (2009/2010): 5-12.
- Foot, Rosemary. "Nuclear Coercion and the Ending of the Korean Conflict." *International Security* 13, no. 3 (1988-89): 92-112.
- Ford, Harold. "Calling the Sino-Soviet Split." *Studies in Intelligence* 42, no. 5 (1998-1999).
- Fravel, M, and Evan Madeiros. "China's Search for Assure Retaliation: The Evolution of Chinese Nuclear Strategy and Force Structure." *International Security* 35, no. 2 (2010): 48-87.
- Fravel, M. Taylor. *U.S. Policy Towards the Disputes in the South China Sea Since 1995*. Singapore: S. Rajaratnam School of International Studies, Nanyang Technological University, 2014.
- Freedman, Lawrence. *Deterrence*. Oxford: Polity Press, 2004.
- . *The Evolution of Nuclear Strategy*. Basingstoke: Palgrave Macmillan, 2003.
- Freeman, Charles. "Did China Threaten to Bomb Los Angeles?" *Carnegie Endowment for International Peace Proliferation Brief*, March 22, 2001.

- Frieman, Wendy. "Chinese Participation in Arms Control Regimes, 1980-1995." *The Nonproliferation Review*, no. Spring-Summer (1996): 15-30.
- Furhmann, Matthew. "Spreading Nuclear Temptation: Proliferation and Peaceful Nuclear Cooperation Agreements." *International Security* 34, no. 1 (2009): 7-41.
- Ganguly, Sumit. "India's Pathway to Pokran II: The Prospects and Sources of New Delhi's Nuclear Weapons Program." *International Security* 23, no. 4 (1999): 148-177.
- Ganguly, Sumit, and Devin Hagerty. *Fearful Symmetry: India-Pakistan Crises in the Shadow of Nuclear Weapons*. Seattle: University of Washington Press, 2005.
- Garrett, Banning, and Bonnie Glaser. "Chinese Perspectives on Nuclear Arms Control." *International Security* 20, no. 3 (1995-1996): 43-78.
- Garthoff, Raymond. *Detente and Confrontation: American-Soviet Relations from Nixon to Reagan*. Washington, D.C.: The Brookings Institution, 1985.
- Garwin, Richard. "Why China Won't Build U.S. Warheads." *Arms Control Association*. April 1, 1999. http://www.armscontrol.org/act/1999_04-05/rgam99 (accessed May 30, 2015).
- George, Alexander, and Andrew Bennett. *Case Studies and Theory Development in the Social Sciences*. Cambridge: MIT Press, 2005.
- George, Alexander, and Richard Smoke. *Deterrence in American Foreign Policy: Theory and Practice*. New York: Columbia University Press, 1974.
- Ghosen, Faten, and Scott Bennett. "Codebook for the Dyadic Militarized Interstate Incident Data, Version 3.10." *Correlates of War*. 2003. <http://www.correlatesofwar.org/data-sets/MIDs> (accessed June 17, 2015).
- Gibler, Douglas, Toby Rider, and Marc Hutchison. "Taking Arms Against a Sea of Troubles: Conventional Arms Races During Periods of Rivalry." *Journal of Peace Research* 42, no. 2 (2005): 131-147.
- Giles, Keir, and Andrew Monaghan. *European Missile Defense and Russia*. U.S. Army War College Strategic Studies Institute, Carlisle Barracks, PA: U.S. Army War College Press, 2014.
- Giles, Keir, and Andrew Monaghan. *European Missile Defense and Russia*. Carlisle Barracks: U.S. Army War College Press, 2014.
- Gill, Bates, James Mulvenon, and Mark Stokes. "The Chinese Second Artillery Corps: Transition to Credible Deterrence." In *The People's Liberation Army as Organization*, edited by James Mulvenon and Andrew Yang, 510-586. Santa Monica: RAND Corporation, 2002.
- Glaser, Charles. "The Causes and Consequences of Arms Races." *Annual Review of Political Science* 3 (2000): 251-276.

- Glaser, Charles. "When are Arms Races Dangerous?" *International Security* 28, no. 4 (2004): 44-84.
- "Global Nuclear Weapons Stockpiles, 1945-2002." *Natural Resources Defense Council*. 2002. <http://www.nrdc.org/Nuclear/nudb/datab19.asp> (accessed February 21, 2015).
- Glosny, Michael, and Christopher Twomey. *U.S.-China Strategic Dialogue, Phase V*. Monterey: U.S. Navy Postgraduate School, 2010.
- Glosny, Michael, Christopher Twomey, and Ryan Jacobs. *U.S.-China Strategic Dialogue: Phase VII Report*. Monterey: U.S. Naval Postgraduate School, 2013.
- Glosny, Michael, Christopher Twomey, and Ryan Jacobs. *U.S.-China Strategic Dialogue: Phase VIII Report*. Monterey: U.S. Naval Postgraduate School, 2014.
- Gochman, Charles, and Zeev Maoz. "Militarized Interstate Disputes, 1816-1976: Patterns, Procedures, and Insights." *The Journal of Conflict Resolution* 28, no. 4 (1984): 585-616.
- Goertz, Gary, and Paul Diehl. "Enduring Rivalries: Theoretical Constraints and Empirical Patterns." *International Studies Quarterly*, 1993: 147-171.
- Goldblat, Jozef. *Arms Control: The New Guide to Negotiations and Agreements*. London: Sage Publications, 2002.
- Goldgeier, James. "NATO Expansion: The Anatomy of a Decision." *The Washington Quarterly* 21, no. 1 (1998): 85-102.
- Goldstein, Joshua. "Reciprocity in Superpower Relations: An Empirical Analysis." *International Studies Quarterly* 35, no. 2 (1991): 195-209.
- Goldstein, Lyle. "When China was a 'Rogue State': The Impact of China's Nuclear Weapons Program on U.S.-China Relations During the 1960s." *Journal of Contemporary China* 12, no. 37 (2003): 739-764.
- Gompert, David, Kenneth Watman, and Dean Wilkening. *U.S. Nuclear Declaratory Policy*. Santa Monica: RAND, 1995.
- Gordon, Michael. "Maneuvers Show Russian Reliance on Nuclear Arms." *New York Times*, July 10, 1999.
- Gormley, Dennis. "Securing Nuclear Obsolescence." *Survival* 48, no. 3 (2006): 127-148.
- Gray, Colin. *House of Cards: Why Arms Control Must Fail*. Ithaca: Cornell University Press, 1992.
- Gray, Colin. "The Arms Race Phenomenon." *World Politics* 24, no. 1 (1971): 39-79.
- Griffiths, David. *U.S. China Confidence Building: Paradigms, Precedents, and Prospects*. Newport: U.S. Naval War College, 2010.

- Guthe, Kurt. *The Nuclear Posture Review: How Is the "New Triad" New?* Washington, D.C.: Center for Strategic and Budgetary Assessments, 2002.
- Hecker, Siegfried. "Adventures in Scientific Nuclear Diplomacy." *Physics Today*, July 2011: 31-37.
- Herken, Gregg. *Counsels of War*. New York: Oxford University Press, 1987.
- Herszenhorn, David. "Russia Won't Renew Pact on Weapons with the U.S." *The New York Times*, October 12, 2012: A10.
- Herszenhorn, David. "Russia Elevates Warning About U.S. Missile Defense Plan in Europe." *The New York Times*, November 23, 2011: A20.
- Hines, John, Ellis Mishulovich, and John Shull. *Soviet Intentions 1965-1985, Volume I: An Analytical Comparison of U.S.-Soviet Assessments During the Cold War*. McLean: BDM Federal, Inc, 1995.
- Hoffman, David. *The Dead Hand: The Untold Story of the Cold War Arms Race and its Deadly Legacy*. New York: Doubleday, 2009.
- Hollist, W. Ladd. "Alternative Explanations of Competitive Arms Processes: Tests on Four Pairs of Nations." *American Journal of Political Science* 21, no. 2 (1977): 313-340.
- Burr, William, ed. "How Many and Where Were the Nukes?" *The National Security Archive*. August 18, 2006. <http://www2.gwu.edu/~nsarchiv/NSAEBB/NSAEBB197/index.htm> (accessed February 18, 2015).
- Hsu, Wen. "The Impact of Government Restructuring on Chinese Nuclear Arms Control and Nonproliferation Policymaking." *The Nonproliferation Review*, no. Fall (1999): 152-167.
- Huth, Paul. "Deterrence and International Conflict: Empirical Findings and Theoretical Debates." *Annual Review of Political Science* 2 (1999): 25-48.
- Huth, Paul. "Extended Deterrence and the Outbreak of War." *American Political Science Review* 82, no. 2 (1988): 423-443.
- Huth, Paul, and Bruce Russett. "Deterrence Failure and Crisis Escalation." *International Studies Quarterly* 32 (1988): 29-45.
- Huth, Paul, and Bruce Russett. "General Deterrence between Enduring Rivals: Testing Three Competing Models." *American Political Science Review* 87, no. 1 (1993): 61-73.
- Huth, Paul, and Bruce Russett. "What Makes Deterrence Work? Cases from 1900-1980." *World Politics* 36, no. 4 (1984): 496-526.
- Hymans, Jacques. *The Psychology of Nuclear Proliferation: Identity, Emotions, and Foreign Policy*. Cambridge: Cambridge University Press, 2006.

- "India-Pakistan Relations: Recent Developments." *India Ministry of External Affairs*. 2012. <http://mea.gov.in/Portal/ForeignRelation/pakistan-august-2012.pdf> (accessed June 24, 2015).
- "India's Draft Nuclear Doctrine." *Arms Control Association*. July 1, 1999. http://www.armscontrol.org/act/1999_07-08/ffja99 (accessed February 15, 2015).
- Information Office of the State Council of the People's Republic of China. "China's National Defense in 2006." *Information Office of the State Council of the People's Republic of China*. 2006. <http://www.china.org.cn/english/features/book/194421.htm> (accessed February 22, 2015).
- Intriligator, Michael. "Strategic Considerations in the Richardson Model of Arms Races." *Journal of Political Economy* 83, no. 2 (1975): 339-354.
- Intriligator, Michael, and Dagobert Brito. "Can Arms Races Lead to the Outbreak of War?" *Journal of Conflict Resolution* 28, no. 1 (1984): 63-84.
- Ivanov, Igor. "The Missile Defense Mistake: Undermining Strategic Stability and the ABM Treaty." *Foreign Affairs* 79, no. 5 (2000): 15-20.
- Iyengar, PK. "Nuclear Nuances: Credible Deterrent through Testing." *Times of India*, August 22, 2000.
- Jaspal, Zafar. "The Introduction of Ballistic Missile Defense in South Asia." In *Nuclear Learning: The Next Decade in South Asia*, 120-130. Monterey: U.S. Naval Postgraduate School, 2014.
- Jensen, Lloyd. "Negotiating Strategic Arms Control, 1969-1979." *Journal of Conflict Resolution* 28, no. 3 (1984): 535-559.
- Jervis, Robert. "Deterrence Theory Revisited." *World Politics* 31, no. 2 (1979): 289-324.
- . *Perception and Misperception in International Politics*. Princeton: Princeton University Press, 1976.
- Jervis, Robert. "The Causes and Consequences of Arms Races." *Annual Review of Political Science* 3 (2000): 251-276.
- . *The Illogic of American Nuclear Strategy*. Ithaca: Cornell University Press, 1984.
- Jing-Dong, Yuan, Phillip Saunders, and Stephanie Liegge. "Recent Developments in China's Export Controls: New Regulations and Challenges." *The Nonproliferation Review*, 2002: 153-167.
- Jo, Dong-Joon, and Erik Gartzke. "Determinants of Nuclear Weapons Proliferation: A Quantitative Model." *Journal of Conflict Resolution* 51, no. 1 (2007): 167-194.

- Johnston, Alistair. "China's New 'Old Thinking': The Concept of Limited Deterrence." *International Security* 20, no. 3 (1995-1996): 5-42.
- Johnston, Alistair. "Learning Versus Adaptation: Explaining Changes in Chinese Arms Control Policy in the 1980s and 1990s." *The China Journal* 35 (1996): 27-61.
- Johnston, Alistair, W.K.H. Panofsky, Marco Di Capua, and Lewis Franklin. *The Cox Committee Report: An Assessment*. Stanford University, 1999.
- Joshi, Shashank. "The Mythology of Cold Start." *The New York Times*, November 4, 2014.
- Kahn, Herman. *On Thermonuclear War*. New York: Free Press, 1960.
- Kan, Shirley. *China: Suspected Acquisition of U.S. Nuclear Weapon Secrets*. Congressional Research Service, 2006.
- Kan, Shirley et al. *China-U.S. Aircraft Collision Incident of April 2001: Assessments and Policy Implications*. Washington: Congressional Research Service, 2001.
- Kapur, S, and Sumit Ganguly. "The Jihad Paradox: Pakistan and Islamist Militancy in South Asia." *International Security* 37, no. 1 (2012): 111-141.
- Kaufmann, William. *The Requirements of Deterrence*. Princeton: Princeton University Center of International Studies, 1954.
- Kaye, Dalia. *Talking to the Enemy: Track Two Diplomacy in the Middle East and South Asia*. Santa Monica: RAND, 2007.
- Keck, Margaret, and Kathryn Sikkink. *Activists beyond Borders: Advocacy Networks in International Politics*. Ithaca: Cornell University Press, 1998.
- Kerr, Paul. *U.S. Nuclear Cooperation with India: Issues for Congress*. Washington: Congressional Research Service, 2012.
- Khan, Feroz. *Eating Grass: The Making of the Pakistani Bomb*. Stanford: Stanford University Press, 2012.
- Kifner, John. "Nuclear Anxiety: In Pakistan; Complex Pressures, Dominated by Islam, Led to Testing." *The New York Times*, June 1, 1998.
- . "Nuclear Anxiety: The Overview; Pakistan Sets off Atom Test, but Again Urges 'Peace'." *The New York Times*, May 31, 1998.
- Kimball, Daryl, and Tom Collina. "The Presidential Nuclear Initiatives (PNIs) on Tactical Nuclear Weapons at a Glance." *Arms Control Association*. August 2012. <https://www.armscontrol.org/factsheets/pniglance> (accessed January 24, 2015).
- Kinzer, Stephen. "Nuclear Anxiety: In Pakistan; No Decision on Testing, U.S. is Told." *The New York Times*, May 16, 1998.

- Kipp, Jacob. "Russia's Nonstrategic Nuclear Weapons." *Military Review*, no. May-June (2001): 27-37.
- Kissinger, Henry. *Nuclear Weapons and Foreign Policy*. New York: Doubleday Anchor Books, 1957.
- Knopf, Jeffrey. "The Fourth Wave in Deterrence Research." *Contemporary Security Policy* 1 (2010): 1-33.
- Koch, Susan. *The Presidential Nuclear Initiatives of 1991-1992*. Washington, D.C.: National Defense University Press, 2012.
- Koubi, Vally. "International Tensions and Arms Control Agreements." *American Journal of Political Science* 37, no. 1 (1993): 158-164.
- Koubi, Vally. "Military Buildups and Arms Control Agreements." *International Studies Quarterly* 38, no. 4 (1994): 605-620.
- Kramer, Andrew. "2 Leaders Rebuff Russia's Nuclear Threats." *New York Times*, February 21, 2007: A6.
- Kramer, Andrew, and Thom Shanker. "Russia Steps Back from Key Arms Treaty." *New York Times*, July 14, 2007.
- Kramer, Mark. "The Myth of a No-NATO-Enlargement Pledge to Russia." *The Washington Quarterly* 32, no. 2 (2009): 39-61.
- Krepon, Michael. "Pakistan's Nuclear Strategy and Deterrence Stability." In *Deterrence Stability and Escalation Control in South Asia*, edited by Michael Krepon and Julia Thompson, 41-64. Washington, D.C.: Stimson Center, 2013.
- Krepon, Michael. "The Stability-Instability Paradox, Misperception, and Escalation Control in South Asia." In *The Stability-Instability Paradox: Nuclear Weapons And Brinkmanship In South Asia*, edited by Michael Krepon and Chris Gagne, 1-24. Washington: Stimson Center, 2001.
- Krepon, Michael, and Julia Thompson, . *Deterrence Stability and Escalation Control in South Asia*. Washington, D.C.: Stimson Center, 2013.
- Kristensen, Hans. "Declining Deterrent Patrols Indicate Too Many SSBNs." *Federation of American Scientists*. April 30, 2013. <http://fas.org/blogs/security/2013/04/ssbnpatrols/>.
- . "How Presidents Arm and Disarm." *Federation of American Scientists*. October 15, 2014. <http://fas.org/blogs/security/2014/10/stockpilereductions/> (accessed January 31, 2015).
- . "Russian SSBN Fleet: Modernizing But Not Sailing Much." *Federation of American Scientists*. May 3, 2013. <http://fas.org/blogs/security/2013/05/russianssbns/>.

- Kristensen, Hans, and Robert Norris. "Chinese Nuclear Forces, 2013." *Bulletin of the Atomic Scientists*, 2013: 79-85.
- . "Global Nuclear Weapons Inventories, 1945-2013." *Bulletin of the Atomic Scientists*, 2013.
- . "Indian Nuclear Forces, 2012." *Bulletin of the Atomic Scientists*, 2012.
- . "Pakistan's Nuclear Forces, 2011." *Bulletin of the Atomic Scientists*, 2011.
- Kristensen, Hans, and Robert Norris. "Global Nuclear Weapons Inventories, 1945-2013." *Bulletin of the Atomic Scientists* 69, no. 5 (2013): 75-81.
- Kroenig, Matthew. *Exporting the Bomb: Technology Transfer and the Spread of Nuclear Weapons*. Ithaca: Cornell University Press, 2009.
- Kuisong, Yang. "The Sino-Soviet Border Clash of 1969: From Zhenbao Island to Sino-American Rapprochement." *Cold War History* 1, no. 1 (2000): 21-52.
- Kulacki, Gregory. "Chickens Talking with Ducks: The U.S.-Chinese Nuclear Dialogue." *Arms Control Today*. September 30, 2011.
https://www.armscontrol.org/act/2011_10/U.S._Chinese_Nuclear_Dialogue (accessed June 1, 2015).
- Kydd, Andrew. "Arms Races and Arms Control: Modeling the Hawk Perspective." *American Journal of Political Science* 44, no. 2 (2000): 228-244.
- Ladwig, Walter. "A Cold Start for Hot Wars? The Indian Army's New Limited War Doctrine." *International Security*, 2007/2008: 158-190.
- Larsen, Jeffrey. *Arms Control: Cooperative Security in a Changing Environment*. Boulder: Lynne Rienner Inc, 2002.
- Burr, William, ed. "Launch on Warning: The Development of U.S. Capabilities, 1959-1979." *The National Security Archive*. April 2001.
<http://www2.gwu.edu/~nsarchiv/NSAEBB/NSAEBB43/> (accessed January 28, 2015).
- Lebovic, James. *Flawed Logics: Strategic Nuclear Arms Control from Truman to Obama*. Baltimore: Brookings Institution Press, 2013.
- Lepingwell, John. "START II and the Politics of Arms Control in Russia." *International Security* 20, no. 2 (1995): 63-91.
- Lewis, Jeffrey. "Great, Now China's Got Multiple Nuclear Warhead Missiles?" *Foreign Policy*. May 26, 2015. <http://foreignpolicy.com/2015/05/26/china-new-multiple-nuclear-warhead-missiles-arms-race-deterrence/> (accessed June 25, 2015).
- . *Paper Tigers: China's Nuclear Posture*. Oxon: Routledge, 2014.

- . *The Minimum Means of Reprisal: China's Search for Security in the Nuclear Age*. Cambridge: The MIT Press, 2007.
- Lewis, John, and Hua Di. "China's Ballistic Missile Programs." *International Security* 17, no. 2 (1992): 5-40.
- Lewis, John, and Xue Litai. *China Builds the Bomb*. Stanford: Stanford University Press, 1988.
- . *China's Strategic Seapower: The Politics of Force Modernization in the Nuclear Age*. Stanford: Stanford University Press, 1994.
- . *Imagined Enemies: China Prepares for Uncertain War*. Stanford: Stanford University Press, 2006.
- Lewis, John, and Xue Litai. "Making China's Nuclear War Plan." *Bulletin of the Atomic Scientists* 68, no. 5 (2012): 45-65.
- Lieber, Keir, and Daryl Press. "The End of MAD? The Nuclear Dimensions of U.S. Primacy." *International Security* 30, no. 4 (2006): 7-44.
- Lindsey, Eben, Michael Glosney, and Christopher Twomey. *US-China Strategic Dialogue, Phase VI*. Monterey: U.S. Navy Postgraduate School, 2011.
- Lockwood, Dunbar. "Russia Revises Nuclear Policy, Ends Soviet 'No-First-Use' Pledge." *Arms Control Today*, no. December (1993): 19.
- Lupovich, Amir. "The Emerging Fourth Wave of Deterrence Theory -- Toward a New Research Agenda." *International Studies Quarterly* 54 (2010): 705-732.
- MacMillan, Margaret. *Nixon and Mao: The Week that Changed the World*. New York: Random House, 2008.
- Mann, James. *About Face: A History of America's Curious Relationship with China, from Nixon to Clinton*. New York: Vintage Books, 2000.
- Maoz, Zeev, and Ben Mor. "Enduring Rivalries: The Early Years." *International Political Science Review* 17, no. 2 (1996): 141-160.
- Mearsheimer, John. "Nuclear Weapons and Deterrence in Europe." *International Security* 9, no. 3 (1984/85): 19-46.
- Medeiros, Evan. "'Minding the Gap': Assessing the Trajectory of the PLA's Second Artillery." In *Right Sizing the People's Liberation Army: Exploring the Contours of China's Military*, edited by Roy Kamphausen and Andrew Scobell, 143-189. Carlisle: Strategic Studies Institute of the U.S. Army War College, 2007.
- Medeiros, Evan. *Reluctant Restraint: The Evolution of China's Nonproliferation Policies and Practices, 1980-2004*. Stanford: Stanford University Press, 2007.

- . "Rebuilding Bilateral Consensus: Assessing U.S.-China Arms Control and Nonproliferation." *The Nonproliferation Review*, 2001: 131-140.
- Menon, Raja. *A Nuclear Strategy for India*. New Delhi: Sage Publications, 2000.
- Miasnikov, Eugene. "Counterforce Capabilities of Conventional Strategic Arms, Presentation at ISODARCO XXVI Winter Course "New Military Technologies: Implications for Strategy and Arms Control"." *Center for Arms Control, Energy and Environmental Studies*. January 2013. <http://www.armscontrol.ru/pubs/en/Miasnikov-PGM-130110.pdf> (accessed January 31, 2015).
- Miasnikov, Eugene. "Problems of START-2 Ratification in Russia: Is START-3 Possible?" *INESAP Information Bulletin*, no. 10 (1996): 15-17.
- Mistry, Dinshaw. "Missile Proliferation and Deterrence Stability in South Asia." In *Deterrence Stability and Escalation Control in South Asia*, edited by Michael Krepon and Julia Thompson, 123-134. Washington, D.C.: Stimson, 2013.
- Montgomery, Alexander, and Scott Sagan. "The Perils of Predicting Proliferation." *Journal of Conflict Resolution* 53, no. 2 (2009): 302-328.
- Montgomery, Evan. "Breaking Out of the Security Dilemma: Realism, Reassurance, and the Problem of Uncertainty." *International Security* 31, no. 2 (2006): 151-185.
- Moore, Molly, and Kamran Khan. "Pakistani A-Tests Seen As 'Triumph for Islam'." *Washington Post*, June 15, 1998: A19.
- Morgan, Patrick. "Taking the Long View of Deterrence." *Journal of Strategic Studies* 28, no. 5 (2006): 751-763.
- Morgenthau, Hans. *Politics Among Nations: The Struggle for Power and Peace*. New York: McGraw-Hill, 1985.
- Myers, Stephen. "Putin Says New Missile Systems Will Give Russia a Nuclear Edge." *New York Times*, November 18, 2004: A3.
- Myers, Steven. "Chinese Embassy Bombing: A Wide Net of Blame." *The New York Times*, April 17, 2000.
- Narang, Vipin. "Five Myths about India's Nuclear Posture." *The Washington Quarterly* 36, no. 3 (2013): 143-157.
- . *Nuclear Strategy in the Modern Era: Regional Powers and International Conflict*. Princeton: Princeton University Press, 2014.
- "National Security Concept of the Russia Federation." *Federation of American Scientists*. 2000. <http://www.fas.org/nuke/guide/russia/doctrine/gazeta012400.htm> (accessed January 28, 2015).

- "National Strategy to Combat Weapons of Mass Destruction." The White House. December 2002. <http://www.state.gov/documents/organization/16092.pdf> (accessed January 31, 2015).
- Nayak, Polly, and Michael Krepon. *The Unfinished Crisis: US Crisis Management after the 2008 Mumbai Attacks*. Washington: The Henry L. Stimson Center, 2012.
- Negin, Evgeny, and Yuri Smirnov. "Did the USSR Share Atomic Secrets with China?" *Parallel History Project on Cooperative Security*. 2002. http://php.isn.ethz.ch/collections/coll_china_wapa/negin_smirnov_engl.cfm (accessed February 19, 2015).
- Neilan, Terence. "Bush Pulls Out of ABM Treaty; Putin Calls Move a Mistake." *New York Times*, December 13, 2001.
- Newhouse, John. "The Missile Defense Debate." *Foreign Affairs* 80, no. 4 (2001): 97-109.
- Nikitin, Mary, and Amy Woolf. *The Evolution of Cooperative Threat Reduction: Issues for Congress*. Washington: Congressional Research Service, 2014.
- Nolan, Janne. *An Elusive Consensus: Nuclear Weapons and American Security after the Cold War*. Washington, D.C.: Brookings Institution Press, 1999.
- Norris, Robert, and Thomas Cochran. *Nuclear Weapons Databook: US-USSR/Russian Strategic Offensive Forces 1945-1996*. Washington, DC: Natural Resources Defense Council, 1997.
- Norris, Robert, William Arkin, and William Burr. "Where They Were." *Bulletin of the Atomic Scientists* 55, no. 6 (2012): 26-35.
- "Nuclear Anxiety; Pakistani's Words: 'To Restore the Strategic Balance'." *The New York Times*. May 29, 1998.
- Nuclear Notebook*. 2015. <http://bos.sagepub.com/cgi/collection/nuclearnotebook> (accessed June 17, 2015).
- "Nuclear Posture Review Report." U.S. Department of Defense, 2010.
- "Nuclear Posture Review Report." U.S. Department of Defense. 2002. <http://www.defense.gov/news/jan2002/d20020109npr.pdf> (accessed January 29, 2015).
- "Nuclear Posture Review Slides." U.S. Department of Defense. September 22, 1994. <http://www.nukestrat.com/us/reviews/npr1994.htm> (accessed January 28, 2015).
- Nye, Joseph. "Nuclear Learning and U.S.-Soviet Security Regimes." *International Organization* 41, no. 3 (1987): 371-402.
- Osgood, Robert. *Limited War: The Challenge to American Strategy*. Chicago: University of Chicago Press, 1957.

- Ottaway, David, and Steve Coll. "Trying to Unplug the War Machine." *Washington Post*, April 12, 1995: A01.
- "Pakistan Successfully Test-fires Nuclear Capable Hatf-9." *The Express Tribune*. April 20, 2011. <http://tribune.com.pk/story/152425/pakistan-test-fires-nuclear-capable-missile/> (accessed February 16, 2015).
- Palmer, Glenn, Vito D'Orazio, Michael Kenwick, and Matthew Lane. "The MID4 Data Set: Procedures, Coding Rules, and Description." *Conflict Management and Peace Science*, 2015: Forthcoming.
- Pandit, Rajat. "Agni-V, India's First ICBM Tested Successfully." *The Times of India*, April 19, 2012.
- Pant, Harsh. "India's Nuclear Doctrine and Command Structure: Implications for India and the World." *Comparative Strategy* 24 (2006): 277-293.
- Parashar, Sachin. "Pokhran II not fully successful: Scientist." *The Times of India*. August 27, 2009. <http://timesofindia.indiatimes.com/india/Pokhran-II-not-fully-successful-Scientist/articleshow/4938610.cms?> (accessed February 12, 2015).
- Perkovich, George. *India's Nuclear Bomb: The Impact on Global Proliferation*. Berkeley: University of California Press, 1999.
- Perry, Todd. "Securing Russian Nuclear Materials: The Need for an Expanded US Response." *The Nonproliferation Review*, no. Winter (1999): 84-97.
- Perry, William. "U.S. Strategy: Engage China, Not Contain It. Remarks delivered to the Washington State China Relations Council, Seattle Washington." October 30, 1995. <http://www.defense.gov/Speeches/Speech.aspx?SpeechID=1023> (accessed May 27, 2015).
- Pierson, Paul. *Politics in Time*. Princeton: Princeton University Press, 2004.
- Pifer, Steven. *The INF Treaty, Russian Compliance and the U.S. Policy Response*. July 17, 2014. <http://www.brookings.edu/research/testimony/2014/07/17-inf-treaty-russia-compliance-us-policy-response-pifer> (accessed June 24, 2015).
- Pikayev, Alexander. "Post-Soviet Russia and Ukraine: Who Can Push the Button?" *The Nonproliferation Review*, no. Spring-Summer (1994): 31-46.
- Pincus, Walter. "Russian Tactical Weapons Still an Issue after Start Treaty Ratification." *Washington Post*, December 27, 2010.
- Podvig, Pavel. "Russia and the Prompt Global Strike Plan." *PONARS Eurasia*. December 2006. <http://www.ponarseurasia.org/memo/russia-and-prompt-global-strike-plan> (accessed January 31, 2015).
- . *Russian Strategic Nuclear Forces*. Cambridge: MIT Press, 2004.

- Pollack, Jonathan. "Chinese Attitudes towards Nuclear Weapons, 1964-9." *The China Quarterly* 50, no. June-April (1972): 244-271.
- Pollpeter, Kevin. *U.S.-China Security Management: Assessing the Military-to-Military Relationship*. Santa Monica: RAND, 2004.
- Posen, Barry. *The Sources of Military Doctrine*. Ithaca: Cornell University Press, 1984.
- Powell, Robert. "Crisis Bargaining, Escalation, and MAD." *American Political Science Review* 81, no. 3 (1987): 717-736.
- Pregenzer, Arian. *Technical Cooperation on Nuclear Security between the United States and China: Review of the Past and Opportunities for the Future*. Albuquerque: Sandia National Laboratories, 2011.
- "President Bush's Speech on Nuclear Strategy." *Arms Control Today*. June 1, 2001. <http://www.armscontrol.org/print/857> (accessed January 29, 2015).
- "Press Conference with Secretary of Defense William J. Perry, General Shalikashvili, Chairman, JCS, Deputy Secretary of Defense John Deutch, Mr. Kenneth H. Bacon, ATSD-PA." U.S. Department of Defense. September 22, 1994. <http://www.nukestrat.com/us/reviews/dodpc092294.pdf> (accessed January 28, 2015).
- Priest, Dana. "Russia Flight Shocks West." *The Washington Post*, July 1, 1999: A1.
- Prindle, Nancy. "The U.S.-China Lab-to-Lab Technical Exchange Program." *The Nonproliferation Review*, no. Spring/Summer (1998): 111-118.
- "Proposed International Legally-Binding Negative Security Assurances (NSAs)." *Nuclear Threat Initiative*. 2015. <http://www.nti.org/treaties-and-regimes/proposed-internationally-legally-binding-negative-security-assurances/> (accessed January 28, 2015).
- Ragin, Charles. *Redesigning Social Inquiry: Fuzzy Sets and Beyond*. Chicago: University of Chicago Press, 2008.
- . *The Comparative Method: Moving Beyond Qualitative and Quantitative Strategies*. Berkeley: University of California Press, 1987.
- Ram, N. "What Wrong did this Man Do?" *Frontline*, 1999.
- Ramana, M.V., and Z. Mian. "The Nuclear Confrontation in South Asia." In *SIPRI Yearbook 2003: Armaments, Disarmament and International Security*, 195-212. Oxford: Oxford University Press, 2003.
- Rasler, Karen, William Thompson, and Sumit Ganguly. *How Rivalries End*. Philadelphia: University of Pennsylvania Press, 2013.
- Reed, Thomas, and Danny Stillman. *The Nuclear Express: A Political History of the Bomb and its Proliferation*. Minneapolis: Zenith Press, 2009.

- Report of the Select Committee on U.S. National Security and Military/Commercial Concerns with the People's Republic of China.* U.S. House of Representatives, 1999.
- Richardson, Lewis Fry. *Arms and Insecurity.* Chicago: Boxwood/Quadrangle, 1960.
- Rider, Toby. "Understand Arms Race Onset: Rivalry, Threat, and Territorial Competition." *The Journal of Politics* 71, no. 2 (2009): 693-703.
- Riedel, Bruce. *American Diplomacy and the 1999 Kargil Summit at Blair House.* Philadelphia: Center for The Advanced Study of India, 2002.
- Riedel, Bruce. "Pakistan and Terror: The Eye of the Storm." *The Annals of the American Academy of Political Science*, no. 618 (2008): 31-45.
- Riqiang, Wu. "Certainty of Uncertainty: Nuclear Strategy with Chinese Characteristics." *The Journal of Strategic Studies* 36, no. 4 (2013): 579-614.
- Ross, Andrew. "The Origins of Limited Nuclear War Theory." In *On Limited Nuclear War in the 21st Century*, edited by Jeffrey Larsen and Kerry Kartchner, 21-48. Stanford: Stanford University Press, 2014.
- Ross, Robert. "The 1995-96 Taiwan Strait Confrontation: Coercion, Credibility, and the Use of Force." *International Security* 25, no. 2 (2000): 87-123.
- Roth, Andrew. "Deployment of Missiles is Confirmed by Russia." *The New York Times*, December 16, 2013: A10.
- "Russian National Security Blueprint." *Federation of American Scientists*. December 26, 1997. <http://www.fas.org/nuke/guide/russia/doctrine/blueprint.html> (accessed January 28, 2015).
- "Russia's Military Doctrine." *Arms Control Today*. May 1, 2000. https://www.armscontrol.org/act/2000_05/dc3ma00 (accessed January 28, 2015).
- Rutherford, Ken. "The Evolving Arms Control Agenda: Implications of the Role of NGOs in Banning Antipersonnel Landmines." *World Politics* 53, no. 1 (2000): 74-114.
- Sagan, Scott. *Moving Targets: Nuclear Strategy and National Security.* Princeton: Princeton University Press, 1989.
- Sagan, Scott. "The Evolution of Pakistani and Indian Nuclear Doctrine." In *Inside Nuclear South Asia*, edited by Scott Sagan, 219-264. Stanford: Stanford University Press, 2009.
- Sagan, Scott. "Why Do States Build Nuclear Weapons? Three Models in Search of a Bomb." *International Security* 21, no. 3 (1996/97): 54-86.
- Sagan, Scott, and Kenneth Waltz. *The Spread of Nuclear Weapons: A Debate Renewed.* New York: W.W. Norton & Company, 2002.

- Sajad, Padder. *The Composite Dialogue Between India and Pakistan: Structure, Process, and Agency*. Heidelberg: South Asia Institute, Heidelberg University, 2012.
- Salik, Naeem. "The Evolution of Pakistan's Nuclear Doctrine." In *Nuclear Learning in South Asia: The Next Decade*, edited by Faroz Khan, 71-84. Monterey: Center on Contemporary Conflict, U.S. Naval Postgraduate School, 2014.
- Salik, Naem. "Arms Control, Confidence Building, and Nuclear Risk Reduction - A Pakistani Perspective." In *The India-Pakistan Military Standoff: Crisis and Escalation in South Asia*, edited by Zach Davis, 215-227. New York: Palgrave Macmillan, 2011.
- Sample, Susan. "Arms Races and Dispute Escalation: Resolving the Debate." *Journal of Peace Research* 34, no. 1 (1997): 7-22.
- Sanger, David. "Before and After Bush and Putin's Banter, No Agreement on Missile Defense." *New York Times*, November 16, 2001: A12.
- Sanger, David, and Thom Shanker. "U.S. Faces Choices on New Weapons from Fast Strikes." *New York Times*, April 22, 2010: A1.
- Saradzhyan, Simon. *Russia's Non-Strategic Nuclear Weapons in their Current Configuration and Posture: A Strategic Asset or Liability?* Cambridge: Belfer Center for Science and International Affairs, 2010.
- Savel'yev, Alexandr', and Nikolay Detinov. *The Big Five: Arms Control Decision-Making in the Soviet Union*. Westport: Praeger, 1995.
- Schafer, Susanne. "Aspin: New Review of Nuclear Arsenal Needed." *Associated Press*, October 29, 1993.
- Schelling, Thomas. *Arms and Influence*. New Haven: Yale University Press, 1966.
- . *The Strategy of Conflict*. Cambridge: Harvard University Press, 1960.
- Schelling, Thomas, and Morton Halperin. *Strategy and Arms Control*. New York: The Twentieth Century Fund, 1961.
- Schlosser, Eric. *Command and Control: Nuclear Weapons, the Damascus Accident, and the Illusion of Nuclear Safety*. New York: The Penguin Press, 2013.
- Schneider, Carsten, and Claudius Wagemann. *Set-Theoretic Methods for the Social Sciences: A Guide to Qualitative Comparative Analysis*. Cambridge: Cambridge University Press, 2012.
- Schneider, Carsten, and Ingo Rohlfing. "Combining QCA and Process Tracing in Set-Theoretic Multi-Method Research." *Sociological Methods and Research* 42, no. 4 (2003): 559-597.
- Schneidmiller, Chris. "Russia Might Still Use Sea-Fired Nuclear Cruise Missiles." *Global Security Newswire*, January 14, 2013.

- Schofield, Victoria. *Kashmir in Conflict: India, Pakistan and the Unending War*. London: I.B. Tauris, 2000.
- Schulte, Paul. "Tactical Nuclear Weapons in NATO and Beyond: A Historical and Thematic Examination." In *Tactical Nuclear Weapons and NATO*, edited by Tom Nichols, Douglas Stuart and Jeffrey McCausland, 75-106. Carlisle: U.S. Army War College Strategic Studies Institute, 2012.
- Schwartz, Stephen. *Atomic Audit: The Costs and Consequences of U.S. Nuclear Weapons Since 1940*. Washington, D.C.: Brookings Institution Press, 1998.
- Scobell, Andrew. *Show of Force: The PLA and the 1995-1996 Taiwan Strait Crisis*. Stanford: Stanford University, 1999.
- Seaborg, Glenn. *Kennedy, Khrushchev, and the Test Ban*. Berkeley: University of California Press, 1981.
- Sethi, Manpreet. *INS Arihant and Credible Nuclear Deterrence*. New Delhi: Centre for Air Power Studies, 2009.
- Shambaugh, David. "China's Military Views the World: Ambivalent Security." *International Security* 24, no. 3 (1999/2000): 52-79.
- Sherr, Alan. *The Other Side of Arms Control: Soviet Objectives in the Gorbachev Era*. Boston: Unwin Hyman, 1988.
- Shoumikhin, Andrei. "Nuclear Weapons in Russian Strategy and Doctrine." In *Russian Nuclear Weapons: Past, Present, and Future*, edited by Stephen Blank, 99-160. U.S. Army War College Strategic Studies Institute, 2011.
- Sims, Jennifer. *Icarus Restrainted: An Intellectual History of Nuclear Arms Control, 1945-1960*. Boulder: Westview Press, 1990.
- Singer, David, Stuart Bremer, and John Stuckey. "Capability Distribution, Uncertainty, and Major Power War, 1820-1965." In *Peace, War, and Numbers*, edited by Bruce Russett, 19-48. Beverly Hills: Sage, 1972.
- Singh, Sonali, and Christopher Way. "The Correlates of Nuclear Proliferation: A Quantitative Test." *Journal of Conflict Resolution* 53, no. 2 (2009): 302-328.
- Smith, David. "The US Experience with Tactical Nuclear Weapons: Lessons for South Asia." In *Deterrence Stability and Escalation Control in South Asia*, edited by Michael Krepon and Julia Thompson, 65-92. Washington, D.C.: Stimson, 2013.
- Smoke, Richard. *National Security and the Nuclear Dilemma: An Introduction to the American Experience in the Cold War*. New York: McGraw Hill Inc, 1993.
- Snyder, Glenn. "Deterrence and Power." *The Journal of Conflict Resolution* 4, no. 2 (1960): 163-178.

- Snyder, Glenn. "'Prisoner's Dilemma' and 'Chicken' Models in International Politics." *International Studies Quarterly*, 1971: 66-103.
- Sokov, Nikolai. "Why Russia Calls a Limited Nuclear Strike 'De-escalation'." *Bulletin of the Atomic Scientists*, March 13, 2014.
- . "Medvedev's Statement on Missile Defense Might Mean Russia Postpones Further Dialogue Until 2013." *James Martin Center for Nonproliferation Studies*. December 2, 2011. http://cns.miis.edu/stories/111202_medvedev_statement.htm#fn1 (accessed June 23, 2015).
- Sokov, Nikolai. "Nuclear Weapons in Russian National Security Strategy." In *Russian Nuclear Weapons: Past, Present, and Future*, edited by Stephen Blank, 187-260. Carlisle: U.S. Army War College Strategic Studies Institute, 2011.
- . *Russia's New Security Concept: The Nuclear Angle*. July 1, 2004. <http://www.nti.org/analysis/articles/russias-new-national-security-concept/> (accessed January 28, 2015).
- Sokov, Nikolai. "Why Do States Rely on Nuclear Weapons? The Case of Russia and Beyond." *The Nonproliferation Review*, no. Summer (2002): 101-111.
- Solingen, Etel. *Nuclear Logics: Contrasting Paths in East Asia and the Middle East*. Princeton: Princeton University Press, 2007.
- "South Asia Nuclear Crisis: India and Pakistan Statements to the United Nations General Assembly, September 1998." *Acronym Institute for Disarmament Diplomacy*. 1998. <http://www.acronym.org.uk/textonly/sasia/spsep98.htm> (accessed February 12, 2015).
- Spratt, John. "Keep the Facts of the Cox Report in Perspective." *Arms Control Association*. June 1, 1999. https://www.armscontrol.org/act/1999_04-05/jsam99 (accessed May 30, 2015).
- "Statement by Peking on Nuclear Test." *The New York Times*. October 17, 1964. 10.
- "Statement by President." *The New York Times*. October 17, 1964. 10.
- Steiner, Barry. "To Arms Control or Not: Lessons of Focused Case Comparisons." *Contemporary Security Policy* 31, no. 3 (2010): 379-405.
- Stent, Angela. "U.S.-Russia Relations in the Second Obama Administration." *Survival* 54, no. 6 (2012/2013): 123-138.
- "Strategic Offensive Reductions Treaty (SORT)." *Arms Control Association*. May 24, 2002. <https://www.armscontrol.org/documents/sort> (accessed January 31, 2015).
- Subrahmanyam, K. "The Myth of Deterrence." In *Nuclear Myths and Realities: India's Dilemma*, edited by K Subrahmanyam, 52-70. New Delhi: ABC Publishing House, 1985.

- Sutyagin, Igor. *Atomic Accounting: A New Estimate of Russia's Non-Strategic Nuclear Forces*. London: Royal United Services Institute, 2012.
- "Table of Chinese Nuclear Forces, 2002." *Natural Resources Defense Council*. 2002. <http://www.nrdc.org/Nuclear/nudb/datab17.asp> (accessed February 21, 2015).
- "Taiwan Relations Act, United States Code Title 22 Chapter 48 Sections 3301 - 3316." U.S. House of Representatives, 1979.
- Talbott, Strobe. *Engaging India: Diplomacy, Democracy, and the Bomb*. Washington, D.C.: Brookings Institution Press, 2004.
- Tannenwald, Nina. "Stigmatizing the Bomb: The Origins of the Nuclear Taboo." *International Security*, 2005: 5-49.
- Tellis, Ashley, C. Christine Fair, and Jamison Medby. *Conflicts Under the Nuclear Umbrella: Indian and Pakistani Lessons from the Kargil Crisis*. Santa Monica: RAND, 2001.
- Jones, Nate, ed. "The 1983 War Scare: "The Last Paroxysm" of the Cold War Part I." *The National Security Archive*. May 16, 2013. <http://www2.gwu.edu/~nsarchiv/NSAEBB/NSAEBB426/> (accessed January 31, 2015).
- The 1994 Nuclear Posture Review*. July 8, 2005. <http://www.nukestrat.com/us/reviews/npr1994.htm> (accessed January 28, 2015).
- "The Basic Provisions of the Military Doctrine of the Russian Federation." *Federation of American Scientists*. 1993. <http://www.fas.org/nuke/guide/russia/doctrine/russia-mil-doc.html> (accessed January 28, 2015).
- Burr, William, ed. "The Creation of SIOP-62: More Evidence on the Origins of Overkill." *The National Security Archive*. July 13, 2004. <http://www2.gwu.edu/~nsarchiv/NSAEBB/NSAEBB130/index.htm> (accessed January 31, 2015).
- "The Military Doctrine of the Russian Federation." *Carnegie Endowment for International Peace*. 2014. http://carnegieendowment.org/files/2010russia_military_doctrine.pdf (accessed June 25, 2015).
- "The National Security Strategy of the United States of America." The White House. 2002. <http://www.state.gov/documents/organization/63562.pdf> (accessed January 31, 2015).
- "The START Ratification Debate Guide." *Project on Nuclear Issues, Center for Strategic and International Studies*. n.d. <http://csis.org/program/start-ratification-debate> (accessed June 23, 2015).
- "Treaty Between the United States of American and the Union of Soviet Socialist Republics on Further Limitation and Reduction of Strategic Offensive Arms (START I)." *Federation of American Scientists*. 1991. <http://www.nti.org/treaties-and-regimes/treaties-between->

united-states-america-and-union-soviet-socialist-republics-strategic-offensive-reductions-start-i-start-ii/ (accessed January 31, 2015).

- Tyler, Patrick. "As China Threatens Taiwan, It Makes Sure U.S. Listens." *The New York Times*, January 24, 1996.
- U.S. Conventional Prompt Global Strike: Issues for 2008 and Beyond*. Washington: The National Academies Press, 2008.
- van der Vink, Gregory, Jeffrey Park, Richard Allen, Terry Wallace, and Christel Hennes. "False Accusations, Undetected Tests and Implications for the CTB Treaty." *Arms Control Today*. May 1, 1998. http://www.armscontrol.org/act/1998_05/vimy98.
- Wallace, Michael. "Armaments and Escalation: Two Competing Hypotheses." *International Studies Quarterly* 26, no. 1 (1982): 37-56.
- Wallace, Michael. "Arms Races and Escalation: New Evidence." *The Journal of Conflict Resolution* 23, no. 1 (1979): 3-16.
- Wallace, Terry. "The May 1998 India and Pakistan Nuclear Tests." *Seismological Research Letters*, 1998: 386-393.
- Waltz, Kenneth. "Nuclear Myths and Political Realities." *American Political Science Review* 84, no. 3 (1990): 731-745.
- Weber, Stephen. *Cooperation and Discord in U.S.-Soviet Arms Control*. Princeton: Princeton University Press, 1991.
- Weber, Steve. "Realism, Detente, and Nuclear Weapons." *International Organization* 44, no. 1 (1990): 55-82.
- Weiner, Tim. "Nuclear Anxiety: The Blunders; U.S. Blundered on Intelligence, Officials Admit." *The New York Times*, May 13, 1998.
- Weitz, Richard. "Illusive Visions and Practical Realities: Russia, NATO, and Missile Defense." *Survival* 52, no. 4 (2010): 99-120.
- Wendt, Alexander. "Anarchy is what States Make of It: The Social Construction of Power Politics." *International Organization* 46, no. 2 (1992): 391-426.
- Wheeler, Michael. *Track 1.5/2 Security Dialogues with China: Nuclear Lessons Learned*. Alexandria: Institute for Defense Analyses, 2014.
- Whiting, Allen. "China's Use of Force, 1950-96, and Taiwan." *International Security* 26, no. 2 (2001): 103-131.
- Whohlforth, William. "Realism and the End of the Cold War." *International Security*, 1994/95: 91-129.

- Williams, Michael. "Rethinking the 'Logic' of Deterrence." *Alternatives* 17, no. 1 (1992): 67-93.
- Wohlstetter, Albert. "The Delicate Balance of Terror." *Foreign Affairs* 37, no. 2 (1959): 211-234.
- Wolfers, Arnold. "The Atomic Bomb and Soviet-American Relations." In *The Absolute Weapon: Atomic Power and World Order*, 90-123. New Haven: Yale Institute of International Studies, 1946.
- Woolf, Amy. *Russian Compliance with the Intermediate Range Nuclear Forces (INF) Treaty: Background and Issues for Congress*. Washington: Congressional Research Service, 2015.
- Wortzel, Larry. *China's Nuclear Forces: Operations, Training, Command, Control, and Campaign Planning*. Carlisle: Strategic Studies Institute of the U.S. Army War College, 2007.
- Zagare, Frank, and D Kilgour. *Perfect Deterrence*. Cambridge: Cambridge University Press, 2000.
- Zedong, Mao. "Address by Mao Zedong to the Enlarged Meeting of the Central Military Commission (excerpt)." *Wilson Center Digital Archive*. June 21, 1958. <http://digitalarchive.wilsoncenter.org/document/114345> (accessed February 20, 2015).
- Zhang, Baohui. *China's Assertive Nuclear Posture: State Security in an Anarchic World Order*. New York: Routledge, 2015.
- Zuberi, N. "Nuclear Safeguards: The Servitudes of Civilian Nuclear Technology." In *Nuclear Myths and Realities: India's Dilemma*, edited by K Subrahmanyam, 1-20. New Delhi: ABC Publishing House, 1982.
- Zubok, Vladislav. *A Failed Empire: The Soviet Union in the Cold War from Stalin to Gorbachev*. Chapel Hill: University of North Carolina Press, 2007.