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For deterrence, now, first seek arms control.

The old relationship linking deterrence, defense, and arms control served U.S. policy makers for decades during the Cold War.[1] It was manifest through the Spirit of Geneva (1955) and the Reykjavik Summit (1986). Much later, during the rise of cross-domain coercion and following Russia's annexation of Crimea, the same idea reemerged in NATO's Warsaw Communique (2016).[2]

In each case, strategic deterrence came first, ahead of credible conventional defense, and neither deterrence nor defense were to be in doubt before entering into arms control. President Ronald Reagan captured the core principle during ultimately successful Intermediate Range Nuclear Forces (INF) Treaty ratification debates, toward the end of the superpower rivalry, when the ambition of arms control proposals was climbing: "trust but verify." Verification would work, back then, and arms control would endure, if the United States were negotiating from strength.

By the time of Russia's hybrid war in Ukraine and other events compromising American interests in Europe, the South China Sea, and the Middle East, the old principle was fraying, showing its insufficiency. Even before the Warsaw Communique, adversaries found ways to work around U.S. material superiority in conventional defense or strategic deterrence, using cross-domain attacks to alter positions on the geopolitical chessboard without drawing a massive U.S. response.

Unlike the situation during the Cold War, deterring aggression below the nuclear threshold in the age of cross-domain coercion will more likely be accomplished by first creating more reasons to maintain cooperation with rising regional powers, reasons including technological benefits and strategic stability attainable through 21st century arms control.

Inability during the 20th century to close the case that deterrence and defense were assured handicapped the original bid for a grand bargain, the Baruch Plan for international control of nuclear arms after World War II. More recently, and less understandably, it undercut hopes that arms control in the form of cooperation on regional missile defense aimed at rogue actors could cement a new U.S.-Russian strategic partnership after 9/11.[3]

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[2] Goodby (2006); Mandelbaum and Talbot (1986/87); NATO, "Warsaw Communique" (August 3, 2016). As a sample of the large literature on deterrence, defense, and arms control, see Snyder (1961); Schelling and Halperin (1961); Carnesale and Haass (1987); Smoke (1993); Cimbala (2001); Morgan (2003); Shultz, Drell, and Goodby (2011); Steff (2016); and Kroenig (2018).

[3] The text of NSC 68, "Report to the National Security Council," April 12, 1950 has been uploaded by the Truman Presidential Library (https://www.trumanlibrary.org/whistlestop/study_collections/coldwar/documents/pdf/10-1.pdf); see the section on "International Control of Atomic Energy," pp. 40-43. Goodby and Morel (1993); Stent (2015). Censoring assumptions were applied to analysis of nuclear policy during the Cold War in Pelopidas (2016). Jennet Conant (2017) recounted how such premises, what would become standard postulates of

This latter invocation of an iron law requiring more deterrence before arms control proved particularly frustrating. So many of the world's contemporary security challenges—expansion of Chinese economic and military influence in the South China Sea; terrorist threats emanating from the Middle East; demand for reciprocal restraint in the face of climate change; increasing competition in space; and rising likelihood of states like North Korea and Iran trafficking in nuclear weapons—are amenable to U.S.-Russia cooperation. Yet, any attempt at resetting the relationship between the two largest nuclear powers is held hostage by a new breed of extended crises featuring cross-domain coercion. NATO remains anxious about local strength of its conventional defenses and the reliability of American extended deterrence when violence and ceasefire violations occur in Ukraine.[4] Russia feels insecure as NATO holds its door open for future accession by Georgia and Ukraine, as the United States and Russia both intervene in Syria, and as the United States spends billions on new interceptors for European missile defense and ground-based national defense.[5]

According to the Cold War principle, arms control always came last: no progress was possible without adequate preconditions for deterrence and defense. This axiom became a motor for dynamic tension and relaxation, crisis and détente. Today, in the age of hybrid war, without the immediacy of a nuclear showdown, common understanding of the proper relation between deterrence and arms control is obsolete; it mires protagonists in unproductive, ultimately dangerous, paralysis. Today, instrumental arms control, the kind that promotes coordination of defense postures toward strategic stability, rather ought to come first because it can set the stage for successful deterrence.

STRENGTHENING DETERRENCE NOW

To appreciate why the shift has occurred, including an abrupt change in the U.S. problem set from escalation management to frozen conflict between nuclear powers, it is helpful to turn attention toward the censoring assumptions underlying deterrence policy. Notably, the scientific-analytical definition of deterrence is not identical to the operational one used in defense policy *guidance* such as NATO's Strategic Concept, the U.S. National Security Strategy, or U.S. Air Force doctrine.[6] In *all* these instances, the doctrine is to win, to dominate, to control the adversary when necessary. Reflecting this optimistic policy guidance, operational deterrence is thought to have succeeded in the Cold War by threat of counteraction, preventing the Soviet Union from crossing the inner-Berlin border or exploiting the Fulda Gap in West Germany.[7] In this most crucial case, deterrence worked because the adversary was persuaded that costs of action would outweigh benefits.[8]

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deterrence, stifled the Baruch Plan in *Man of the Hour: James B. Conant, Warrior Scientist*, pp. 368-372.

[4] Adamsky (2018, pp. 164-168).

[5] NATO's Warsaw Communique trumpeted progress on deploying American-organized missile defense sites in Europe (paragraph 57).

[6] NATO, *Strategic Concept: Active Engagement, Modern Defense*, November 19, 2010, available at http://www.nato.int/cps/en/natohq/topics_82705.htm; White House, *National Security Strategy of the United States of America*, December 2017, available at https://www.whitehouse.gov/wp-content/uploads/2017/12/NSS-Final-12-18-2017-0905-2.pdf; United States Air Force, *Volume III: Command*, Annex 3-72 Nuclear Operations, available at https://www.doctrine.af.mil/dnv1vol3.htm.

[7] Mearsheimer (1983).

[8] This same maxim underpins a vast literature on 21st century deterrence, e.g., deterrence after the Cold War and deterrence after 9-11. Gray (2000); Payne (2001); Freedman (2004); Long (2008); Paul, Morgan, and

Given this positive framing, it is not surprising that deterrence as policy receives favorable mention in the U.S. National Security Strategy. Enormous military budgets are justified, though few forces are engaged, because an extensive posture is necessary to deter calamities across a variety of conflict domains at points around the globe. The military stands prepared to prevent attacks on the homeland, on allies in Europe or Asia, against soft targets in Iraq and Syria, on the seas, in space, or across cyber. When deterrence fails, the appropriate mix of nuclear, conventional, and special operations forces, in coordination with tools from the whole of government and coalition governments, must *defeat* whichever aggressors in aforesaid domains. Defense capability under deterrence as panacea is always badly needed. More is better since more forces buttress the deterrent: its capability, its communication to adversaries, and, most controversially, its credibility.[9]

Credibility is in the crosshairs, again today, because it is the one requirement that can soak up much of the presumed benefit of deterrence policy as an alternative to fighting. Deterrence, after all, should spare lives and treasure. It protects national interests by keeping opponents at bay without having to strike a mortal blow or slog through a wasting war of attrition. This was the hopeful premise underlying President Eisenhower's New Look: modest investment in nuclear weapons, for brandishing not launch, could contain Soviet aggression after costly conventional stalemates in Korea and Berlin, without having to match every Red Army division left in Europe or Communist-inspired insurgency in the developing world.

For such a threat to give adversaries pause, however, they had to believe that the United States would carry out the punishment once red lines were violated. While few may have doubted Eisenhower's resolve when the United States enjoyed superiority in nuclear capable bombers, by the end of his administration defense policy advisers were urging the President to expand defense spending in order to prevent the Soviets from acquiring overwhelming superiority in the balance of strategic forces.[10] While the actual budget increase would have to abide a new administration and a change of party in the White House, the core issue was clear enough to friend and foe: faced with naked Soviet aggression in Europe, Asia, or the Middle East, would an American president sacrifice New York to save Paris or any other allied city? Once both Cold War superpowers possessed hundreds, eventually thousands, of nuclear weapons, deterrence became a mutual affair. The United States could not launch a "disarming strike" without running the grave risk that the Soviets would survive long enough to launch a devastating salvo of their own.[11]

During contemporary crises that cut across multiple domains of conflict, it appears that the United States and rising regional powers are still mutually deterred from engaging their most terrible weapons. Old school deterrence continues to function at the major conventional and nuclear levels, and yet, 21st century hybrid wars and cross-domain

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Wirtz (2009); Delpech (2012); Lowther (2012). It also matches USAF Annex 3-72.

[9] Payne (2016). Neither does more capability necessarily provoke a destabilizing reaction from the other side. Cunningham and Fravel (2015). In tension with this argument, though, see Haynes (2016).

[10] Goodby (2006, Ch. 2); Bowie and Immerman (1998). Recent research shows that Eisenhower's advisers may have been prescient. "[S]tates that enjoy nuclear superiority over their opponents are more likely to win" (Kroenig 2013, 141).

[11] Lieber and Press (2006) shocked the community by suggesting deviation from Cold War restraint: an attempt by the United States to break out from mutual deterrence and achieve nuclear primacy that could be used for coercion or "compellence."

gambits are multiplying not receding. Successful deterrence in the age of cross-domain coercion must demand a logic of state behavior that is missing from classic Cold War theories.[12]

TWO TRADITIONS OF NUCLEAR DETERRENCE

American economist Thomas Schelling articulated the dilemma best in his seminal *Arms and Influence* (1966). Published when the nuclear arms race was well underway, Schelling's book aspired to reach a broad audience, pointing out how straightforward logic underlying complex national security decisions of maximum gravity followed the rules of familiar games accessible to any educated citizen. Part of the greatness of *Arms & Influence*—Schelling shared the 2005 Nobel Prize for his career contributions—was in how it democratized deterrence and defense. It supplied a *lingua franca* for policy makers to explain growing defense requests and alarming foreign policy crises to the American people, which in turn allowed presidents to lay planks of public support for Cold War policy, and to be held accountable when strategy failed to perform.[13]

As it turned out, policy did not follow Schelling's model or recommendations entirely. In his most resonant scenarios, Schelling emphasized risk and ambiguity over obvious brawn. When two contenders were playing chicken, approaching the precipice, tied at the waist, it did not matter after a certain point whether one was bigger or physically stronger. When either jumped into the abyss, the other must follow. Schelling likened increasing risk of nuclear war to loose gravel at the edge of oblivion.[14] At the final stages of the deterrence game, factors (loose gravel) *outside the control* of either party would determine when everyone went over the cliff—unless, that is, one side conceded first and dropped out of the game.

Winning the game, as long as things did not spin out of control, depended upon conveying resolve, a willingness to stay in and keep inching closer to the edge. Later, when resolve was quantified for formal models, it had to be incorporated into expressions of "expected utility" that could guide players' calculations of whether to escalate or capitulate. The infinite cost of general nuclear war, oblivion in Schelling's metaphor, could not be included as a factor for the finite value of game outcomes. Once the cost of nuclear war was countable and made suitable for the war ledger, this opened the door for deterrence strategies quite divergent from the New Look and from what Schelling explained in *Arms & Influence.*

During the years of rapid expansion for both U.S. and Soviet nuclear arsenals, Secretary of Defense Robert McNamara was famously asked to quantify assured destruction required for successful deterrence at the strategic level. What percentage of industrial capacity and what percentage of the population would have to be placed at risk in order to dissuade the Kremlin from crossing American red lines

[12] An alternate "domain" of low intensity conflict did challenge U.S. interests during the Cold War. The recent expansion of cross-domain options makes using nuclear weapons in response for coercive diplomacy much harder than it was against Soviet-backed insurgencies. Geopolitical stakes are sliced even thinner under cross-domain coercion, and challengers today conceive activities below a conventional redline that generally lies well below the nuclear threshold: like the Islamic State (ISIS) in Iraq and Syria, if they fail to stay below the radar, challengers are likely to cede ground once U.S.-level conventional units are engaged. For complications in leveraging nuclear weapons, even during the Cold War, see Sechser and Fuhrmann (2017).

[13] Dodge (2012).

[14] Schelling (2008 c1966, 99).

and attacking U.S. vital interests?[15] Regardless of McNamara's answer, did there not have to be conditions under which the Soviets would accept very high risk of such well-described, circumscribed destruction? Indeed, this was the basis of strategic stability: the Soviet Union *would* drive a crisis over the cliff in order to hold onto its satellite states in Eastern Europe. For both sides, some geopolitical defeats had to be worse than absorbing a nuclear assault.

Rather than relying on ambiguity, wondering whether the dark shadow cast by thousands of ballistic missiles would deter political aggression, Americans and their European allies debated a purported second school of deterrence, touting the merits of flexible response and escalation dominance.[16] Would it not be safer, more logical, if anticipated Soviet thrusts below the nuclear threshold could be met in somewhat proportional, symmetric fashion? Reducing rather than generating ambiguity was the key to communication. The adversary would know that any step toward the precipice would bring a strong counter-reaction, and any subsequent move to raise the stakes would be similarly cut off. The old deterrence posture in *Arms and Influence* invited players to enter a contest, to achieve geopolitical gains by accepting increasing risk of mutual disaster. By contrast, the new and improved flexible deterrent would make it clear that nothing could be gained *before* the first step was taken toward a "competition in risk taking." [17]

Flexible response or escalation control did provide a certain catharsis for American policy makers, supplying the rationale for burgeoning defense budgets in the 1960s and during the late-Carter and Reagan presidencies. Robust spending—call it deterrence capitalization—translated into a wide array of options that allowed national security officials to feel as if they gained a measure of control; they could now (without embracing Armageddon) adjust the price when the Soviets sought to draw the more powerful United States into Schelling's crude, leveling game of nuclear chicken. Yet, especially after disillusionment in Vietnam, critics of the second deterrence school did not forget how prescient Eisenhower had been in his 1961 Farewell Address when he warned against America's military-industrial complex.[18]

Expanded defense budgets undermined important justifications for flexible response, driving deficit spending, stoking inflation, and straining the relationship between the defense establishment and liberal society.[19] Withdrawal from Southeast Asia, temporary softness in the budget, and rising concern over a hollow American Army exacerbated the challenge of maintaining flexible response and encouraged countercyclical investment in nuclear variety: multiple independently targeted reentry vehicles (MIRVs) at the strategic level; forward deployed short- and intermediate-range nuclear-tipped missiles; radiation enhanced ("neutron") bombs; nuclear cruise missiles (ALCMs and GLCMs); guidance improvements for submarine launched missiles (SLBMs); and mobile land-based (MX) missiles. The scope, magnitude, and relentlessness of nuclear modernization, on both sides of the Cold War, divided national security experts.

Toward the end of the 1970s, a faction from civilian science steeped in the tradition of the Manhattan Project, which beat Germany to

[15] Robert McNamara, "Mutual Deterrence Speech," San Francisco, CA, September 18, 1967, available at http://www.atomicarchive.com/Docs/Deterrence/Deterrence.shtml <<October 20, 2016>>.

[16] Kahn (1965); Gaddis (1982); Yost (2011).
[17] Kahn (2010 c1965, 3).
[18] Baier (2017).
[19] Huntington (1982); Knopf (1998).

the first fission bomb, and the Atomic Energy Commission, which oversaw design, manufacture, and stockpiling of the nation's nuclear arsenal, teamed with arms control advocates linked to the State Department.[20] They resisted the military-industrial juggernaut as consuming inordinate resources while lowering the barrier to general nuclear exchange. The elaborate posture required by flexible deterrence could move the superpowers closer to danger, chipping away at common knowledge of a *condition* of mutual assured destruction (MAD) and nudging the parties toward serious consideration, indeed incipient enthusiasm, for nuclear utilization strategies (NUTS).[21]

Prospects for nuclear utilization under the flexible-control school of deterrence prompted a host of concerns. Within what Lawrence Freedman later termed the second wave of deterrence research, scholars of public policy and government pointed out how dangerous escalating to deescalate appeared from the case studies. The quickening pace of countermoves and rising levels of stress in a crisis raised the likelihood as well for fatal misperception.[22] As the sinews of flexible response were built, deployed, and exercised, executive bureaucracy had to keep pace. This expansion brought new difficulties for maintaining control, particularly during a crisis, raising the specters of inadvertent escalation, unauthorized use, and accidental launch.[23]

ARMS CONTROL: FROM OFFENSIVE LIMITS TO MISSILE DEFENSE AND DISARMAMENT

By the time President Reagan came to office, certainly after the first Congressional session, enthusiasm for flexible response and nuclear utilization was fading. The President did support the B-1 supersonic and B-2 stealth bomber programs, the MIRVed MX missile, and intermediate-range Pershing II deployment in Europe, and yes, politically, this appeared to be a one hundred eighty degree turn from Jimmy Carter's program cancellations toward the end of his presidency. Yet, this reinvigorated nuclear portfolio ignited bitter ideological divisions in Congress and helped generate pressure for renewed negotiations with the Soviet Union that would bring progress on arms control.[24]

Since Robert McNamara's time in the Lyndon Johnson administration, America's commitment to flexible response, its determination to deter by brandishing an array of limited attack options, ranging across the anticipated ladder of escalation with the Soviet Union, shaped its approach to arms control. The Limited Test Ban and Hotline agreements of 1963 addressed immediate dangers of deploying nuclear weapons, which would have plagued governments even if they had stuck with Eisenhower's logic and modest strategic deterrent. Almost as soon as these issues had been concluded, however, the arms race began in earnest, and American attention turned toward institutionalizing ceilings on offensive weapons, modulating Soviet aggressiveness in part by engaging

[20] As a short list of relevant organizations, consider Bulletin of Atomic Scientists; Arms Control Association; Federation of American Scientists; Union of Concerned Scientists; Belfer Center for Science and International Affairs (Harvard Kennedy School); and Stanford's Center for International Security and Arms Control (now the Center for International Security and Cooperation).

[21] Keeny and Panofsky (1981).

[22] George and Smoke (1974); Jervis (1976).

[23] Bracken (1985); Carter, Steinbruner, Zraket (1987); Sagan (1993).

[24] Lebovic (2013, esp. Ch. 4).

them as sovereign equals in strategic arms limitation (SALT) talks.

Eventual limits endorsed in SALT I and SALT II were famously nonrestrictive; they accommodated nuclear build programs already in train so that treaties codified armament rather than turning swords into plowshares. Strategic stability under this full-fledged arms control regime, which from 1968-1986 endured somewhat longer than most State or Defense Department political careers, rested on mutual vulnerability to the adversary's secure offense. Welcoming safe and secure ballistic missiles and long-range bombers, in the other side's offensive posture, implied that effective missile defenses were destabilizing. Accordingly, a crown jewel of 1970s arms control was the Anti-Ballistic Missile (ABM) Treaty, negotiated in conjunction with SALT.[25] In this case, an expensive system that actually might have been built, or experimented with, was prohibited by international legal agreement. Though the ABM Treaty as a straightforward ban read concise and elegant compared to the arcane counting rules for launchers and later warheads that bloated SALT, ABM would nevertheless lose its luster within a decade.

Money spared in missile defense during the 1970s poured into developing more secure and accurate offense. The geopolitical and ideological competition continued as well, with crises in Southeast Asia, Angola, Cuba, Nicaragua, and Afghanistan undermining détente and U.S. defense in the Cold War. By 1982, the fine architecture of flexible deterrence, escalation dominance, strategic containment, and arms control tottered on a foundation of sand. Rather than containing the Soviets until their system could collapse from its own internal contradictions, the U.S. combination of deterrence, conventional defense, and arms control seemed to provide an open invitation for Moscow to play and win at the deadliest of games. Even if the United States could occasionally, as in the 1973 Yom Kippur War, muster the resolve to maintain its position, how long before this strategic Russian roulette ended in catastrophe for both sides?[26]

It was this situation that Ronald Reagan, criticized by contemporaries as ignorant and cavalier but now acknowledged to have thought deeply on nuclear weapons, sought to change. Opponents from the left and some centrist Republicans saw Reagan's rejection of SALT, accompanied by rhetoric promising victory in the Cold War, as an abrupt, populist attack on strategic stability, all that had been painstakingly constructed since 1968. Once superpower summitry rekindled, however, and Reagan received a dynamic interlocutor in new Soviet Premier Mikhail Gorbachev, it became clear that the American President did not seek a nuclear victory as much as a different vision—renegotiated terms of coexistence with the Soviet Union that would redefine the relationships between deterrence, defense, and arms control.

At the strategic level, Reagan as early as the summer of 1982 proposed dramatic *reductions* rather than mere limitations in strategic weapons.[27] These proposals were criticized by the Soviet Union as highly asymmetric, but Strategic Arms Reduction (START) talks continued.[28] At the same time, Reagan approved the *dual-track strategy* that combined arms control negotiations with deployment of highly accurate Pershing II intermediate-range missiles in Europe. Ambassador Paul Nitze, author of NSC-68 (1950), which formally persuaded President Truman to build the "super," the hydrogen bomb, most likely had

[25] Cameron (2018).
[26] Sagan and Suri (2003).
[27] Talbott (1982).
[28] Lebovic (2013, Ch. 4).

President Reagan's true sentiments in mind when, some thirty years later, the same Nitze demonstrated American willingness to forego the Pershing II in his famous "Walk in the Woods" outside Geneva with his Soviet counterpart.[29]

A number of years and some difficult moments in U.S.-Soviet relations passed, but in Reagan's second term, with Gorbachev in charge at the Kremlin, pivotal innovations in defense and arms control gained traction. By the time Reagan and Gorbachev met at the Reykjavik Summit in October 1986, the talks included proposals to *eliminate* land-based ICBMs, and there were parallel efforts afoot to ban ground-launched ballistic and cruise missiles of so-called intermediate range (500-5500 km).[30] While the Reykjavik gambit failed, both arms control initiatives represented a watershed in deterrence. No longer were great powers in the realm of symmetric or flexible response to every variety of militarized threat. True, air-launched and submarine-based missiles remained, but elimination of strategic, ground-based weapons was proposed on the American side as a stage toward a long-term vision in which nuclear missiles (and bombers) were rendered "impotent and obsolete."[31] Moreover, defense now meant more than preparations to raise costs for the author of a conventional invasion; it also comprised mercurial interceptors of some sort to sow doubt in the attacker's mind about the efficiency of his strategic nuclear force.

Even in the most elaborate and flexible of deterrence postures from before, there was a strategic umbrella at the end of every crisis escalation. Getting rid of this top cover through arms elimination and missile defense broke faith with *both* founding schools of deterrence. If the Reagan vision unveiled to the National Security establishment after 1986 came to pass, the United States and the Soviet Union would fold their strategic umbrella and abandon the protection of deterrence as understood since Bernard Brodie's classic, *The Absolute Weapon* (1946).

THE END OF CREDIBILITY AND A NEW CRISIS MODEL FOR STATE BEHAVIOR

The Cold War ended too soon for Reagan's new direction to take effect. Had Reagan fulfilled his dream, the strategic renaissance would have been far more profound than a simple return to Eisenhower-era ambiguity and contemplation of massive retaliation. Eliminating via international arms control all the forces capable of a doomsday nuclear strike would have upended the scientific-analytical concept articulated in qualitative terms by early deterrence theorists like Brodie, Schelling, and Snyder, and subsequently quantified in formal games by Robert Powell in his *Nuclear Deterrence Theory* (1990).

Powell's scholarship, coming out as the Reagan administration and the Cold War were drawing to a close, is especially relevant, here, because its purpose was to encapsulate deterrence as an analytical concept, to find underlying unity among and reveal the calculus behind deterrence policy arguments.[32] Powell's "stage game," the decision element within a larger conflict

[29] Association for Diplomatic Studies and Training, "Paul Nitze and A Walk in the Woods – A Failed Attempt at Arms Control," ADST (c1998-2016), http://adst.org/2016/03/paul-nitze-and-a-walk-in-the-woods-a-failed-attempt-at-arms-control/ <<October 20, 2016>>.

[30] Goodby (2006, 143-147).

[31] Ronald Reagan, "President Reagan's SDI Speech," March 23, 1983, Atomicarchive.com (c1998-2015), http://www.atomicarchive.com/Docs/Missile/Starwars.shtml <<October 20, 2016>>.

[32] Powell (1990).

sequence, distilled the options facing heads of government during a nuclear crisis: a) concede the stake and drop out of the game; b) escalate to the next stage while raising the probability of all-out nuclear war; and c) launch the first attack.[33]

Powell's game looked and played much like Schelling's competition in risk taking with important exceptions. For example, in the deterrence game, even the brinkmanship version in which there was no limited attack option (just accumulation of probability toward all-out war), "the state with the greatest resolve [might] not prevail" because a "weakly committed" player still had incentive, at least early on, to act tough, to try to convince an adversary to back away from a mutually costly contest.[34]

Similarly, the limited retaliation game (an idealized scenario in which the chance of losing control was taken off the table) showed how advantages of possessing calibrated instruments to punish the adversary without total destruction were counterbalanced: the likelihood of nuclear crises declined with flexible tools at the ready, but crises that did occur ran longer and cost more.[35] Together, the brinkmanship and flexible response variants of deterrence encapsulated much of the social science underlying the American nuclear debate and the seesaw politics of how to posture strategic, tactical nuclear, and conventional arms to contain Soviet aggression.[36]

Properly understood, the Reagan revolution upset the ordered relationship among deterrence, defense, and arms control. Taking away the option of general nuclear attack and guaranteeing its elimination through missile defense would break Powell's working model. With all out "nuclear attack" off the table, crisis actors are left with two choices—and only in the limited retaliation variant since there *can be no brinkmanship* without an effective nuclear arsenal. Actors submit or continue to throw (and absorb) costly-but-limited punches. For sufficiently high stakes, that is, a high enough payoff from humiliating the other side, the contestants might slug it out for some time: in an "escalation and defense" world, there is no Armageddon, but there is also precious little deterrence or (further) demand for arms control.

When the Cold War ended, strategic nuclear weapons, and the attack option in Powell's baseline model, remained, so the United States and Russia never had the opportunity to bargain under "Star Wars," defense-dominant conditions. Brinkmanship, rather than being relegated to chilling historical memory, became a real possibility once Russia steadied itself for a return to major power competition.

As maneuvering ensued with Russia in Georgia and Ukraine; with China in the South and East China Seas; and against a potentially nuclear Iran in the Middle East, the beleaguered United States seemed at times to be caught off balance. Just as before, in crises with a less powerful foe, drawbacks of brinkmanship surged to the fore. When a rising power asserted itself in its home region, even past the point of annexing new territory, it was not credible that the United States would respond on its strategic periphery with nuclear weapons. Accordingly, a raft of new scholarship gravitated toward flexible response, now billed as tailored, complex, full

[33] Ibid., 39, 160.
[34] Ibid., 77.
[35] Ibid., 179.

[36] For a widely reviewed account of how this nuclear deterrence logic played against underlying geopolitical concerns, see Gavin (2012).

spectrum, layered, or cross-domain deterrence.[37]

In the near term, at least, all variations on the theme of limited retaliation proved difficult to effect and infeasible to resource, given Congress's sequester of funds to cut the Federal deficit. Once the sequester was lifted, maintaining all three legs of the strategic nuclear triad, upgrading tactical nuclear weapons such as B61 bombs in Europe, and improving conventional prompt global strike still imposed a demanding schedule of payments, many extra billions of dollars annually over the next thirty years.[38] This cost did not include hardening of systems for space and cyber operations or development of increasingly sophisticated offensive capabilities in these new dimensions.

Concepts such as whole of government response, cross-domain deterrence, and new generation warfare emerged after significant, frequently unanticipated setbacks against U.S. interests in the fifteen years since the Iraq War. Even if double the money were made available—one trillion dollars annually and 8% of U.S. GDP—it is unclear, indeed unlikely, that a plus-up deterrence posture could cover all necessary contingencies to achieve escalation dominance.

From the U.S. perspective, which tends to be that of defender, the difficulty in answering every call with Powell's "limited retaliation," calibrated escalation crafted to *deescalate* the crisis, boils down to two inconvenient factors. Rivals to the United States, chafing at the geopolitical status quo, when they hit resistance in one domain, deftly open a new line of action. Despite U.S. superiority on paper, in the number and quality of military systems, the overall impression is yet one of U.S. interests under assault in key power centers: Europe, the Middle East, and Asia. In a previous era, either the United States or the Soviet Union might have put a stop to this unraveling by ratcheting up the risk of nuclear war. Today, however, the second strategic development is that no party, not even the side that enjoys a preponderance of material power, can feign the desire to inaugurate a Cold War-style nuclear showdown. *Whether the putative opponent is Russia, Iran, or China, the United States has been incapable of leveraging its superior nuclear arsenal to defend against cross-domain or hybrid tactics that erode American regional influence.*

The ease of slipping unipolar defense, shifting one's offense to a new domain, and the utter lack of credibility, today, in deterring such an offense through motions that drag the world toward nuclear war herald the tardy arrival of President Reagan's revolution in deterrence, though not the way he intended. Nuclear weapons are poor instruments for deterring cross-domain coercion everywhere not because new missile defense technologies can blast them out of their suborbital trajectory but because *they cannot be invoked* to protect against today's non-nuclear offenses.

Powell's accomplishment, which captured formally the intuition behind great debates of twentieth-century deterrence, is overtaken by events. Critical options in his stage game, limited nuclear retaliation and substantially raising the risk of nuclear Armageddon, are gone or at least off the table. A touchstone

[37] Payne (2001); Lebovic (2007); Paul, Morgan, and Wirtz (2009); Harrison, Shackelford, and Jackson (2009); Lowther (2012); Wenger and Wilner (2012); Jon Lindsay and Erik Gartzke, "Cross-Domain Deterrence as a Practical Problem and a Theoretical Concept," Draft (July 2016) introduction for *Cross-Domain Deterrence: Strategy in an Era of Complexity* (forthcoming), available at http://deterrence.ucsd.edu/_files/CDD_Intro_v2.pdf <<October 20, 2016>>.

[38] Lowther and Cimbala (2016); Roberts (2016).

model restructuring deterrence, defense, and arms control after the revolution is simpler if less intuitive than the standard Cold War crisis game.

DETERRENCE NOW: A GAME OF INCHES

After encroachment of competing states in eastern Europe, Iraq and Syria, and the South China Sea—all during global economic recovery and expanding opportunities for cooperation—the United States plays a new game (described by an old model) of *low cost attrition*.[39] This game structure challenges the old censoring assumptions of deterrence for national security, and it works very differently from Powell's version. In the elegant, limiting case that most forcefully explains the present logic of competition between nuclear powers, states vie for a prize of finite value (v); for any round of the game, each state chooses whether to continue competing at cost (c) or quit the contest at zero payoff. When one state continues a contest as the other state quits, the enduring state does not pay and simply receives the prize (v). Both states play attrition under conditions of relative symmetry.

While this last presumption is false by conventional empirical standards of resource strength, when taking nuclear arsenals and contextual factors (e.g., the stopping power of water and rising regionalism) into account, mathematical simplification actually becomes more relevant as the world appears ever more multipolar and the cost of continuing multi-domain competition drops well below geopolitical prizes as stake.

Under increasing symmetry, then, both players in equilibrium quit a contest with the same low probability (p). For either player "to be indifferent between staying in for one more period and stopping now," payoffs of two viable courses of action must equate to one another: $0 = pv - (1-p)c$, where zero is the payoff from quitting and the right side expression is the expected value of fighting another round. When the cost of fighting or extending the geopolitical competition to a new domain is very low relative to international stakes, the opponent, indeed neither side, has high odds of stopping: $p/(1-p) = c/v$. Under conditions of "low c" relative to v, that is, low cost attrition, the mechanism of cross-domain coercion—in Europe, the Middle East, and Asia—is likely to swing like a frictionless pendulum: the chance (p) of any party seeing the value in stopping is held quite low.[40]

Without the options of Powell's classic deterrence model, that is, without limited nuclear strike or the willingness to pulse the risk of nuclear war, the cost of continuing cross-domain challenges, c, is held low. Ultra-low cost attrition for the United States becomes a trap, slow death by a thousand cuts; resources are not draining dramatically, but the bleeding never stops. Moreover, just because general nuclear war is not on the horizon shaping negotiations or included in our underlying model does not mean it cannot

[39] Fudenberg and Tirole (1991, 119). This was based on a model presented by J. Maynard Smith, "The Theory of Games and Evolution in Animal Conflicts," *Journal of Theoretical Biology*, Vol. 47 (1974): 209-221.

[40] The expression $p/(1-p)$ for odds in economics is often called the hazard rate (that something good will fail), and it neatly maps a rising exponential function to the probability value as p varies from 0 to 1 (Fearon 1995). In this application, we may appropriately call it a success rate because it monotonically follows the probability that players discontinue a costly contest. When c/v is low, state-actors enter a new world in which the hazard rate (in this instance the chance for success) is low. Something bad, the attrition war, will not end; it will go on unless players find a way to manipulate the key parameter, c/v.

happen. Time is not on anyone's side. Eventually, due to misperception or an irrational move (outside the attrition or escalation models), nuclear powers could abruptly return to Powell's deterrence framework and find themselves in a Cuba-style missile crisis.

If so, it will be too late, then, for them to exploit one possible route out of the low-cost attrition trap. During the *ancien regime* of nuclear deterrence, policy makers thought in sequence: deterrence, defense, and then arms control. In the new world, cross-domain attrition promises a revolution in this relationship: arms control, defense, and then deterrence. This is because annual half-trillion dollar efforts to modernize conventional defenses under the third offset or refurbish and replace the nuclear deterrent do not budge the underlying parameter, c, in the way they once did. Despite substantial commitments to force structure and nuclear posture, regional adversaries with global reach can at low cost continue to challenge the status quo by touching levers of power across domains, from North Korea nuclear testing to energy prices and climate change. The ticket to play another round of geopolitical attrition in the new global politics is unfortunately quite affordable for all sides.

Nevertheless, even with additional conventional defense and traditional deterrence sidelined for winning this type of game, the potential for innovation and progress in arms control remains. This is because arms control, particularly when it manifests as cooperative defense, does not have to disarm or reduce threat potential in order to be effective; rather it can provide a mutual stream of benefits, in technological exchange or in burdensharing against common external challenges, which accrue only when the attrition game ends.[41] The geopolitical stakes (v) of broader conflict go down if winning the original prize entails *loss* of benefits from stillborn defense cooperation. In the foundational logic of low cost attrition, as v, the value of winning a spat, declines, c/v, and therefore the probability of success (that is, stopping the wasteful contest), rises for both sides.

Cross-domain conflict in the world today presents several stubborn characteristics that visionary political scientist Samuel Huntington outlined twenty years ago in *Clash of Civilizations*.[42] Huntington's book responded to what he warned was wrongheaded, or at least incomplete, speculation about the end of ideology as the "end of history," a transcendent condition when differences among states and the distribution of nuclear capability mattered less and all parties resigned themselves to competition according to globalized rules of the game designed for promoting commerce.[43]

Huntington warned that when the clash between communism and liberalism wound down, this did not mean that American-led liberal order would run on its own momentum. Potential for resistance, even great power conflict, interrupting progress of international relations, remained strong.[44] Civilizations structured along common language, religion, and preferential commerce continued to spread from cultural hearths under globalization, reinforcing regional identities that could flood across conventional nation-state boundaries much as ideology had during the Cold War. Powerful nation-states, however, would not disappear. Regional champions, Huntington predicted, could

[41] Carter, Perry, and Steinbruner (1992). Contemporary arguments include Koblentz (2014), Steer (2017), and Rose (2018).

[42] Huntington (1998).

[43] Fukuyama (1993).

[44] Mearsheimer (2001).

polarize local identities, bend them along civilizational lines, and mobilize them for grand strategies, overcoming material deficits to challenge American hegemony.

All this coheres with contemporary security challenges against the United States at world power centers and helps explain why the United States is keen to revisit and reinforce deterrence, now. A generation ago, Huntington moderated his doom and gloom. Cataclysmic deterrence breakdown and conflict among nuclear champions, particularly in the form of an anti-Western alliance against the United States, was not a foregone conclusion. Avoiding catastrophe, though, would demand prudential decisions from the West to figure how to accommodate rising power of the Rest.[45] Huntington's ideas about emerging world disorder and prescriptions to find areas of cooperation were heavily discounted immediately after 9/11, when they seemed to conflate the U.S.-led War on Terror with a nightmarish Western Crusade against Islam. Today, we ignore at our peril the rise of regional champions, international identity politics, and the potential for a defense strategy that leads with practical accommodation.

Huntington, of course, did not foresee concurrent innovations below the grand strategic level in multi-domain operations and cross-domain coercion. These developments make multiple deterrence challenges for the United States more difficult, but they, too, may be accommodated if, beyond Powell (1990), policy makers recognize a new political economy of their situation. The United States' game-theoretic best response given its role as status quo power acknowledges a revolution in deterrence, defense, and arms control. Novel arms control, moving from emphasis on disarmament, closer toward cooperative defense that institutionalizes mutual benefits of strategic stability, may, instead of trailing, now strike a path toward strengthened deterrence and effective defense of the national interest.

[45] Zakaria (2008); Kupchan (2012); Rose (2013).

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