How Much is Enough?
Testing Theories of Nuclear Deterrence

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Most scholars of international politics believe that nuclear weapons constitute a powerful deterrent against nuclear attack. Important questions persist about the reliability of deterrence in practice – for example, about the dangers posed by organizational biases, irrational leaders, or spirals of hostility – but the core claim of nuclear deterrence theory is widely accepted: as long as countries build nuclear arsenals that are sufficiently survivable and capable of retaliation, the likelihood of intentional nuclear war between them will be very small. Unfortunately, this core claim alone provides a shaky foundation for deterrence theory.

In fact, after decades of study scholars still cannot adequately answer the most fundamental questions, such as: *How survivable* must a nuclear arsenal be to reliably deter nuclear attack? *How devastating* does the threatened retaliatory blow need to be to produce the fear that nuclear deterrence theorists expect will prevent nuclear war? Does deterrence depend on maintaining massive, redundant retaliatory forces, as the United States and Soviet Union did during the Cold War? Or would nuclear deterrence be robust even with much smaller and less capable arsenals? In other words, "how much is enough?" when it comes to nuclear deterrence?

Assessing the requirements for successful nuclear deterrence is harder than it appears. Nuclear weapons could be used to deter a wide range of actions (e.g., conventional military attacks or nuclear strikes) in a wide range of circumstances (e.g., during peacetime or war) and in conflicts over a dizzying range of possible issues (e.g., from low stakes to high). It is likely that the requirements for deterrence vary across that range. Nevertheless, one deterrent mission is more fundamental than the others: a country's nuclear arsenal must, at a minimum, deter enemies from launching nuclear strikes on its homeland, and the deterrent force must deter attacks on itself. As Thomas Schelling noted about Japan's decision to attack Pearl Harbor, "a fine deterrent can make a superb target."[1] The core question that follows is, how survivable, how deliverable, and how powerful must an arsenal be in order to cease being a "superb target" and become a "fine deterrent"?

Many books and articles were written on this topic during the Cold War. Doves claimed that even a small U.S. nuclear force would deter Soviet aggression. Hawks warned that only a massive, survivable arsenal could reliably keep aggressors at bay. But scholars were unable to adjudicate these claims for several reasons. First, without access to the most sensitive deliberations about war and peace inside the Kremlin, it was impossible to know how U.S. nuclear forces affected Soviet decisions. That critical evidence was unavailable then, and it still is today. Second, even the evidence on U.S. deliberations, military strategy, and war plans was suspect. Scholars working during the Cold War were forced to rely on highly selective access to archives, as well as unreliable first-hand accounts by former decision makers. Finally, because nuclear war never occurred, the key dependent variable behind the question of whether deterrence worked never varied. In sum, although there were many plausible claims about the sufficiency of "minimal deterrence" – or the necessity of "assured destruction" – there was no way to systematically assess these competing claims.

In this paper we take three steps to clear the intellectual roadblock. First, we reverse the research question. Instead of asking how much U.S. nuclear capability was needed to deter the

[1] [From Schelling's introduction to Roberta Wohlstetter's *Pearl Harbor: Warning and Decision*.]

Soviets, we study the effect of various levels of Soviet nuclear capability on the U.S. "strategic posture."[2] This reversal is helpful because detailed evidence about Cold War U.S. decision making – on very sensitive national security topics – is much more available and reliable than the evidence on Soviet decisions. Second, we rely heavily on the new diplomatic and military histories of the Cold War, which use the most recently declassified documents. We supplement those histories with our own research using primary sources. These newer histories and declassified documents permit us to move beyond first-hand accounts. Finally, we re-cast the dependent variable to capture crucial evidence that would be lost if one only looked at the dichotomous outcome of war or peace. We track the development of Soviet nuclear capabilities over time (our independent variable), and we look for links between those Soviet capabilities and changes in U.S. strategic posture (our dependent variable). Specifically, we ask: how large and survivable did the Soviet arsenal have to become before the United States abandoned its reliance upon nuclear weapons, and abandoned its plans for war-winning nuclear-disarming strikes on the Soviet Union? Did the mere acquisition of nuclear weapons by Moscow cause changes in U.S. strategy? Or did the Soviets require a more survivable and potent force before the United States downgraded nuclear use as a military strategy for defending Western Europe?

We find that that a small and vulnerable Soviet nuclear arsenal was not "enough" to deter the United States from initiating a massive nuclear strike on the Soviet Union -- if a conventional conflict erupted in Europe. From 1947 through the late 1950s, U.S. plans for defending Western Europe *relied upon* a massive nuclear strike by the United States on hundreds of government, military, and nuclear targets throughout the Soviet Union. Whether a war in Europe was conventional or nuclear – the U.S. response would have been the same: a massive nuclear strike to cripple the Soviet government and destroy its nuclear forces. Critically, this was not one of several alternative plans available to U.S. political leaders in this period; it was the only plan for defending Europe.

Revealingly, U.S. strategic doctrine changed as the Soviet nuclear arsenal grew larger and survivable. The United States slowly abandoned its *reliance* on massive nuclear escalation for defending Europe and, instead, sought to develop conventional military options and hoped to delay – or ideally avoid – the use of nuclear weapons in a war. Furthermore, U.S. leaders were explicit about why such changes were necessary: the previous strategy of winning World War III by launching a decisive nuclear strike on the Soviet Union no longer made sense now that the Soviets could retaliate against the United States.[3]

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[2] In this context, "U.S. strategic posture" has three components: (a) the overarching defense concept for defending Western Europe – principally, the relative roles of nuclear and conventional forces in the defense of Europe; (b) the triggers for nuclear escalation – meaning the events that would cause the United States to employ nuclear weapons; and (c) the targets that were identified for nuclear attack.

[3] To clarify, the dependent variable in this analysis is what we call "U.S. strategic posture." We track changes in this "strategic posture" by examining Washington's overall defense concept for defending Western Europe (i.e., the role of nuclear weapons in U.S. plans), the escalatory triggers which would have called for nuclear weapons, and the planned targets for nuclear strikes. Those three indicators allow us to track changes in U.S. strategic posture. Note that the question we ask here – how much is enough to make the United States abandon its reliance on nuclear weapons – is distinct from the question that is often asked about the Cold War: why did deterrence hold? Among the best arguments explaining the "long peace" of the Cold War are Trachtenberg, *A Constructed Peace: The Making of a European Settlement, 1945-1963* (Princeton, 1999); Richard Ned Lebow and Janice G. Stein, *We All Lost the Cold War* (Princeton, 1994); and Mueller, *Retreat from Doomsday: The Obsolescence of Major War* (Basic Books, 1989).

In other words, in the Cold War context, an "existential deterrent" or "minimal deterrent" was insufficient to protect the Soviets from a massive nuclear disarming strike by United States had war erupted in Europe. The U.S. did not downgrade nuclear weapons in its plans to defend Western Europe – and begin to seriously rethink the wisdom of launching strategic attacks on the Soviet homeland – until the Soviets built an "assured retaliation" force. To put it bluntly, prior to the late 1950s, the development of the Soviet nuclear arsenal mainly increased the number of "aimpoints" in their country that would have been struck by U.S. nuclear forces had World War III erupted. Only in the early 1960s did the Soviet force grow capable enough that it stopped being merely a "superb target."

Is Cold War history still relevant? An understanding of "how much is enough" for nuclear deterrence is crucial for analyzing and managing many current and future security challenges. For example, some analysts are optimistic that the United States and China can avoid conflict during China's rise because nuclear weapons will help mitigate the security dilemma. However, China's arsenal is a small "minimal deterrent" force (vis-à-vis the United States) and it may remain at that level for many years. Is this enough to constitute a "fine deterrent" or a "superb target"? If China rapidly expands its arsenal, should the U.S. interpret the change as evidence of hostility, or an understandable desire (based on history) to move beyond a vulnerable minimal deterrent arsenal? Similarly, if Iran acquires nuclear weapons, will the current Israeli arsenal – which was structured for a region in which Israel was the only nuclear-armed state – need to grow more survivable? Would a small and only moderately survivable Iranian nuclear arsenal be enough to deter Israeli attack during a war or period of high tension, or would Iran need a bigger, survivable force? Do the Indians and Pakistanis have sufficiently capable nuclear arsenals to take intentional strategic strikes off the table if those two countries find themselves in an intense conventional war? Is North Korea's small and perhaps undeliverable arsenal capable enough to dampen escalatory dynamics if there is a war on the Korean Peninsula? And how low is it safe for the United States, Britain, and France to reduce their nuclear force levels?

What can one case study (i.e., the Cold War) tell us about the general phenomenon of deterrence? In most areas of scientific inquiry, it is difficult to answer key questions about general phenomena using single case studies. One reason is that scholars generally seek to understand averages and trends – which are difficult to discern without observing a large, representative sample of the population of cases. However, in the field of nuclear deterrence, the goal is not to create an arsenal that will deter the average leader in typical circumstances – a nuclear arsenal must *reliably* deter the most aggressive leader even in trying circumstances. This study, which shows that two unexceptional, democratically elected presidential administrations were willing to rely upon nuclear-centric national security strategies until their adversary developed an assured retaliation force posture, raises serious questions about the adequacy of existential and minimal deterrence postures. If those postures could not make two sets of average leaders take "strategic nuclear attack" off the table as a war-winning strategy, they cannot be counted on to be reliable postures for deterring highly aggressive adversaries.

The remainder of this paper is divided into five main sections. In the first section we lay out four distinct schools of nuclear deterrence that have framed deterrence debates for decades,

and to this day. The second section tracks the changes in the strategic nuclear balance from 1949 to 1965. Third, we describe U.S. strategic posture during the same period, focusing on how changes in the nuclear balance affected U.S. war plans for defending Europe. In the fourth section we address counter-arguments. The last section summarizes the results of this analysis and then draws two somewhat surprising conclusions – first, that reliable deterrence is best served by an *assured destruction* nuclear posture, and that lower levels of capability create deterrence risks and that, second, even an assured destruction nuclear posture proved inadequate for all Soviet nuclear deterrence requirements. We discuss the implications for U.S. nuclear policy.

COMPETING VIEWS OF HOW MUCH IS ENOUGH

The basic logic of deterrence is simple: a state will refrain from launching an attack if the expected costs outweigh the expected benefits. The tremendous destructive power of nuclear weapons, if used in retaliation for attack, would appear to make those costs easily outweigh the benefits. But the simple elegance of nuclear deterrence is deceptive. Deterrence theory has many layers of complexity, depending on the type of attack in question (nuclear or conventional, limited or full-scale, preemptive or punitive), the target of retaliation (the attacker's population, military forces, or leadership), and whether retaliation is threatened directly against an attacker or its allies. These dimensions may pose vastly different capability and credibility requirements in any given circumstances. This complexity is reflected in the intense debates during the Cold War over the appropriate size and nature of the U.S. nuclear arsenal, the capabilities and intentions of the Soviet Union, the challenge of extending deterrence to U.S. allies, the costs and benefits of counterforce versus countervalue targeting, the status of the conventional and nuclear balance, the role of rationality and non-rationality in crisis behavior, the nature of escalation dynamics, and many other topics.

However, all dimensions of nuclear deterrence explicitly or implicitly hinge on a key assumption about the vulnerability of the retaliatory nuclear forces being used to deter. Whether a country is using the threat of nuclear punishment to prevent an attack on its homeland, or whether it is threatening to use its nuclear forces on the battlefield to defeat an attack on its allies, the deterrent impact of its threat depends on some assessment of how capable its nuclear forces are of surviving an enemy's preemptive strike.

The key question at the heart of nuclear deterrence theory, therefore, is "How survivable must a country's arsenal be to make nuclear deterrence robust?" Do countries need large arsenals of highly survivable warheads to create robust nuclear deterrence? Or will even small, vulnerable arsenals be sufficient because the mere possibility of retaliation with one or two warheads will create a paralyzing fear in the minds of adversaries? In this section of the paper we describe four schools of deterrence; each offers a competing answer to the question – how much is enough?[4]

[4] The schools of deterrence theory all claim that success or failure at deterrence will depend on the value of the same independent variables (principally, the nuclear balance of power). But they differ in their expectations about what value that independent variable must take to create robust deterrence.

Four Schools of Deterrence Theory

Four major schools of nuclear deterrence theory posit different levels of nuclear capability required for dissuading attack. Proponents of *existential deterrence* contend that states are deterred by the mere possibility of nuclear retaliation. Simply having a nuclear weapons capability forces an adversary to steer clear of any behavior that might trigger escalation because the mere possibility of nuclear war is too terrible to risk. Proponents of *minimum deterrence* believe that states must do more than merely join the nuclear club to ensure deterrence – but not much more. Deterrence will be robust when retaliation after attack is not just possible, but also plausible; in other words, an arsenal must not merely exist, it must be deliverable. A small, deliverable nuclear arsenal – even if it is small and not truly survivable – will deter attacks because the chance of retaliation will be sufficiently terrifying. The *assured retaliation* school is more pessimistic; it views deterrence as robust only when retaliation is near certain. That retaliation need not be society ending, however: the horrifying expectation of absorbing a few nuclear strikes in retaliation will give any aggressor pause. And proponents of the fourth school, *assured destruction*, contend that deterrence requires that retaliation be not only assured, but also massive.

We are not the first analysts to classify schools of deterrence theory, but existing frameworks are unsatisfactory for two reasons: First, previous classifications are not delineated in a way that allows the evaluation of important competing claims about the requirements for deterrence. Specifically, some frameworks differentiate types of deterrent postures solely on the basis of absolute force size – ignoring other key criteria like survivability and deliverability. For example, Patrick Morgan's "minimum deterrence" school captures under one tent all adherents of the view that deterrence can be obtained with only a few nuclear weapons: "Just a small nuclear arsenal [gives] a state an inherent or 'existential' deterrence credibility."[5] The problem with this categorization is that it glosses over potentially important distinctions among small nuclear forces. China, North Korea, and the United Kingdom all have small nuclear arsenals. However, China's arsenal is deliverable but not survivable (at least vis-à-vis the United States);[6] North Korea's may be survivable but not deliverable;[7] and the United Kingdom's force is both survivable and deliverable.[8] Whether or not these three small arsenals create the same deterrent

[5] Morgan, *Deterrence Now*, pp. 22-25. Morgan's other categories include the "rejection," "massive destruction," and "war-fighting" schools.

[6] China's arsenal is "deliverable" against the United States because Beijing has roughly 20 ICBMs with sufficient range to strike the U.S. homeland. These missiles, however, are not truly survivable because they are kept unfueled, unarmed, and (more fundamentally) China lacks early warning systems that would reliably detect a U.S. counterforce strike. U.S. nuclear delivery systems have become so lethal that such a counterforce strike would likely not only destroy the Chinese strategic force, but also do so with relatively few casualties. On these topics, see Lieber and Press, "The Nukes We Need: Preserving the American Deterrent," *Foreign Affairs*, Vol. 88, No. 6 (November/December 2009), pp. 39-51; as well as Lieber and Press, "Superiority Complex," *Atlantic Monthly*, pp. 86-92; and Lieber and Press, "U.S. Nuclear Primacy and the Future of the Chinese Nuclear Deterrent," *China Security*, pp. 66-89.

[7] North Korea's arsenal is said to be survivable because the United States is claimed to have had little luck locating its nuclear forces and facilities: its force is not deliverable against the United States because it has no missiles that can reach the U.S. homeland.

[8] The entire U.K. nuclear arsenal is now submarine-based; the British operate some of the quietest submarines in the world, and the Trident II missiles they carry can reach targets across the globe.

effect is an empirical question, but one that cannot be answered if all three postures are grouped under one category.

Second, most of the existing classifications of deterrence theory are a product of the late Cold War period, and thus were not crafted to permit scholars to address the key questions about nuclear relations today and in the future. For example, Charles Glaser analyzed the strengths and weaknesses of several schools of deterrence that held sway at the end of the Cold War.[9] This was reasonable because Glaser's objective was to shed light on the then-dominant debates about deterrence stability between the United States and the Soviet Union. Because the superpowers possessed huge and diversified nuclear arsenals at the time, the only relevant debates were between those who believed in the deterrent power of "assured destruction" arsenals and those who believed in the need for "war-fighting" arsenals. The possibility of achieving deterrence at force levels below an assured destruction capability was simply not as interesting for scholars focusing on the dynamics of the superpower competition at the end of the Cold War. Today, however, the most interesting dynamics of deterrence between states are those that may occur at smaller force levels or between asymmetric forces. It is now essential to understand whether deterrent forces less capable than those captured by Glaser's categories promote stalemate or invite attack.

The shortcomings of existing categories of deterrence theory are also illustrated by the difficulty of classifying the work of prominent scholars. Part of this difficulty stems from individuals staking out incompatible positions on the requirements for deterrence from one work to the next or offering incongruous theoretical arguments and policy recommendations, but the paramount problem is the fuzziness of existing schools of thought. Finally, identifying specific schools of thought with particular individuals is complicated by terminology: the labels used here – for example, "minimum deterrence" – have been used differently in the past and have meant many different things to many different analysts.

For all of these reasons, we identify below the specific arguments, logics, and relative force postures to distinguish one theory of nuclear deterrence from another. Only with clear categories can we derive testable predictions and evaluate these theories of deterrence against the empirical record. In discussing the four schools, we highlight each school's basic claims, the causal logic behind those claims, and the kind of arsenal that would correspond to each school's depiction of how much is enough.[10]

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[9] Glaser, *Analyzing Strategic Nuclear Policy* (Princeton: Princeton University Press, 1990). Glaser's categories included the "punitive retaliation," "military denial," and "damage-limitation" schools.

[10] A fifth school of deterrence -- the "war-fighting" school -- is not discussed in this paper because the time period we study here does not include the 1980s, the era in which this view emerged and to which its predictions apply, and an era not likely to be witnessed in international politics anytime soon. According to the war-fighting school, deterrence is only achieved when a potential aggressor faces a state that is prepared to fight and win at any level of military conflict, both at the conventional and nuclear levels, and ranging from limited military engagements to all-out nuclear war. A potential victim must have the capability and will to endure and inflict more punishment than the attacker, and must have a plausible theory of military victory. See Colin Gray, "War-Fighting for Deterrence," *Journal of Strategic Studies*, Vol. 7 (March 1984), pp. 5-28; and Caspar W. Weinberger, Secretary of Defense, *Annual Report to the Congress, Fiscal Year 1984* (Washington, D.C.: USGPO, February 1, 1983), p. 51.

Existential Deterrence

Basic claims. The first school of thought contends that the mere existence of nuclear weapons is enough to deter attack. "Everything about the atomic bomb," as Bernard Brodie wrote at the dawn of the nuclear age, "is overshadowed by the twin facts that it exists and its destructive power is fantastically great."[11] Matters such as the relative size or vulnerability of nuclear arsenals are irrelevant for generating deterrence; that outcome automatically follows from the mere presence of nuclear weapons – more specifically, the brooding shadow of immense destruction that any potential attacker would confront when facing a nuclear-armed adversary. As one advocate writes, nuclear weapons "have only to exist and deterrence is the law of their existence."[12] Herman Kahn derided some analysts for viewing "the deterrence of a rational enemy as almost a simple philosophical consequence of the existence of thermonuclear bombs" – yet this accurately captures the core belief of the existential deterrence school.[13]

According to this school, deterrence occurs whenever a potential attacker believes nuclear retaliation by the victim is merely *possible*. That possibility can never be completely eliminated if a potential victim possesses nuclear weapons. Put another way, all that is needed for deterrence to hold is any amount of "first-strike uncertainty" – a seed of doubt in the attacker's mind that nuclear retaliation can be avoided. "The standard of first-strike uncertainty," writes Avery Goldstein, "assumes that a potential attacker facing a nuclear-armed state will find almost any slippage from 100 percent certainty in successful preemption excruciatingly inhibiting."[14] In other words, even a very small chance of retaliation will deter, given the catastrophic consequences that retaliation would bring. In light of this low threshold, deterrence is virtually an automatic condition among nuclear powers.

McGeorge Bundy is perhaps the most famous public figure to be associated with the concept of existential deterrence, coining the term in his famous essay, "The Bishops and the Bomb." He wrote, "The terrible and unavoidable uncertainties in any recourse to nuclear war create what could be called 'existential' deterrence, where the function of the adjective is to distinguish this phenomenon from anything based on strategic theories or declared policies."[15] Elsewhere, Bundy argued that even one chance in a hundred that a country will use nuclear

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[11] Brodie, *Absolute Weapon*, p. 52. Although Brody may have provided the essential observation for the existential deterrence school, his arguments fall squarely in the assured retaliation school discussed below.

[12] Leon Wieseltier, *Nuclear War, Nuclear Peace* (New York: Holt, Rinehart & Winston, 1983), p. 38. For believers in existential deterrence, Robert Tucker writes, "deterrence is not only an inherent property of nuclear weapons, it is very nearly a self-sufficient property." Robert Tucker, "The Nuclear Debate," *Foreign Affairs*, Vol. 63 (1984-1985), pp. 1-32, at p. 3. For a critique of the existential deterrence school, see Lawrence Freedman, "I Exist; Therefore I Deter," *International Security*, Vol. 13, No. 1 (Summer 1988), pp. 177-195.

[13] Kahn is quoted in Jervis, *Meaning of the Nuclear Revolution*, p. 23 (n. 63).

[14] Avery Goldstein, *Deterrence and Security in the 21st Century: China, Britain, France, and the Enduring Legacy of the Nuclear Revolution*, (Stanford, CA: Stanford University Press, 2000), pp. 44-45. In other words, Goldstein continues, "Nuclear-armed states do not need to convince a potential aggressor that retaliation is certain, or even likely, only that it is possible and, most importantly, that neither party can safely predict what the actual response will be." *Ibid.*, p. 46. See also Devin Hagerty, *The Consequences of Nuclear Proliferation: Lessons from South Asia* (Cambridge, Mass.: MIT Press, 1998), esp. pp. 3, 26, 46-47, and 184-185.

[15] McGeorge Bundy, "Bishops and the Bomb," *New York Review of Books*, Vol. 30, No. 10 (June 16, 1983), pp. 3.

weapons to retaliate is enough to deter an aggressor.[16] Bundy noted, "We must remember that at the upper levels of force the two greatest powers have been extraordinarily cautious with each other. This is not the result of estimates of each other's first- or second-strike counter-force capability, or a consequence of the possession or absence of escalation dominance… They do not dare get close to war with each other because of their fear of what would happen if it turned nuclear, as it always might."[17]

Causal logic. The logic of the existential deterrence view rests on the potent combination of uncertainty and fear in the mind of a potential attacker when faced with the sheer destructive power of nuclear weapons.[18] On the one hand, the logic is strategic: even the miniscule possibility of nuclear retaliation after an attack is sufficient to deter a potential attacker because the expected costs of retaliation are so great that they would overwhelm any possible benefits attacking. But the real causal force behind existential deterrence is psychological, and stems from the power of uncertainty.[19] James Lebovic writes, "The existential deterrent acquires its power from the nonrational world of fear, psychological bias, and uncertainty and not from the rational world of deduction and mathematical precision."[20] According to Hedley Bull, "A potential attacker is deterred when his leaders are in a certain state of mind. Their state of mind, even when advised that the opposing retaliatory forces can be eliminated with near certainty, is still likely to include feelings of uncertainty about weapons that have not been tried in battle… The essential conditions of mutual deterrence are subjective or psychological, and these conditions may in principle be satisfied even in the absence of totally invulnerable retaliatory forces."[21]

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[16] McGeorge Bundy, "Strategic Deterrence Thirty Years Later: What Has Changed?" in *The Future of Strategic Deterrence: Part I*, Adelphi Paper No. 160 (London, UK: International Institute for Strategic Studies, Autumn 1980), pp. 5-23, at p. 11. Similarly, Richard Rovere (the journalist and *New Yorker* columnist), wrote: "If the Russians had ten thousand warheads and a missile for each, and we had ten hydrogen bombs and ten obsolete bombers… aggression would still be a folly that would appeal only to an insane adventurer." Quoted in Wohlstetter, "Delicate Balance," p. 213.

[17] Bundy, "Strategic Deterrence Thirty Years Later," p. 11. At times, however, Bundy seems to emphasize that survivable retaliatory forces – not just the mere existence of weapons – are necessary for deterrence. For example, a few years later he writes, "As long as each side has thermonuclear weapons that could be used against the opponent, *even after the strongest possible preemptive attack*, existential deterrence is strong and it rests on uncertainty about what could happen." Bundy, "Existential Deterrence and Its Consequences," in Douglas MacLean, ed., *The Security Gamble: Deterrence Dilemmas in the Nuclear Age* (Totowa, N.J.: Rowman and Allanheld, 1984), pp. 8-9. (Emphasis in original.)

[18] Goldstein, FPRI, pp. 4-5.

[19] This echoes Lynn Etheridge Davis' description of the different emphasis Americans and Europeans place on particular elements of deterrence: "Both agree that deterrence depends upon the ability to pose a credible risk that the enemy will suffer unacceptable damage… Americans, however, emphasize the need to design rational strategies for the *use* of particular weapons systems in the event that deterrence fails. They consider that deterrence is inseparable from the capability to defend… In contrast, Europeans emphasize the *uncertainty* which must exist in the mind of the enemy about how particular weapons will be used. For them, nuclear weapons contribute to deterrence primarily by their existence, and it is the risk of their use, rather than the manner of it, that promotes deterrence." Lynn Etheridge Davis, *Limited Nuclear Options: Deterrence and the New American Doctrine*, Adelphi Paper No. 121 (London, UK, International Institute for Strategic Studies, Winter 1975/76), p. 13. (Emphasis in original.)

[20] James H. Lebovic, *Deadly Dilemmas: Deterrence in U.S. Nuclear Strategy* (New York: Columbia University Press, 1990), p. 193.

[21] Hedley Bull, "Future Conditions of Strategic Deterrence," in *The Future of Strategic Deterrence: Part I*, p. 17.

Retaliatory posture. In terms of the concrete manifestation of an existential deterrence arsenal, not much is required. Even a rudimentary arsenal will dissuade a potential adversary from attacking because a country cannot sensibly contemplate a disarming attack unless it believes its strike is guaranteed to succeed. Goldstein, again, states the claim clearly: unless a "nuclear power can be disarmed with virtual 100% certainty, the onus of initiating an unpredictable, possibly disastrous chain of events that could entail absorbing a nuclear retaliatory strike, falls to the aggressor. In even the most lopsided nuclear pairs, this unavoidable worry exerts a powerfully dissuasive effect."[22] A disarming strike must be virtually assured of success before a rational leader would undertake such a momentous gamble.

Thus, relative nuclear force levels are of almost no consequence, and sophisticated retaliatory delivery systems with sufficient range, extensive defensive measures, and training for nuclear retaliatory operations are utterly irrelevant. Simply "joining the nuclear club" (as with North Korea today) would be seen as sufficient, with differing opinions of whether this entails just testing a nuclear device or actually building a few weapons. Some in the existential deterrence school go even further, arguing that states with the technological know-how to readily build nuclear weapons (such as Japan today) should be considered to possess an existential deterrent.[23]

In sum, existential deterrence advocates believe that deterrence is easy to achieve because first-strike uncertainty is inherent in any relationship among nuclear-armed states, regardless of the size and sophistication of the respective arsenals. As soon as a country develops its first nuclear weapons, other states will be very unlikely to initiate major attacks even if the new nuclear power has no clear ability to deliver its nuclear warheads. After all is said and done, some nuclear warheads might survive a preemptive strike, and they might somehow find their way back to the aggressor's cities. That gamble is too big to take for any rational actor. As Michael Howard aptly summarizes the existential deterrence view, "It is the prospect of nuclear war *as such*, not any calculation of the balance of probable losses or gains, that now deters statesmen from taking risks."[24]

Minimum Deterrence

Basic claims. A second school of thought posits that deterrence will hold when retaliation is not just possible, but *plausible*. As with the existential deterrence school, analysts of minimum deterrence (or "finite deterrence," as some have known it) reject the notion that retaliation must be assured in order to ward off attacks. Something far short of a guarantee of retaliation will do the job. But they part company with the existentialist argument that the mere possession of nuclear weapons capability is enough. Rather, a country that wishes to create robust deterrence must deploy an arsenal that makes retaliation after a preemptive strike reasonably likely.

Minimum deterrence is a prevalent view among academic and policy analysts of nuclear weapons, with Kenneth Waltz perhaps the most prominent example of the former. Although

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[22] Goldstein, FPRI, p. 5.
[23] Mazaar 1997 ("virtual arsenals"); Schell 1984/2000 ("weaponless deterrence").
[24] Howard, "Nuclear Danger and Nuclear History," p. 81.

proponents sometimes refer in their writings to situations of mutual invulnerability when describing the requirements of deterrence, it is clear from the context of their writings and from their policy recommendations that their beliefs are fundamentally different from those of advocates of assured retaliation. The key difference is that minimal deterrence proponents believe that the prospect of retaliation is very easy to generate, even with few weapons and apparently vulnerable delivery systems. As Waltz writes, "An adversary need only believe that some warheads *may* survive its attack and be visited on it. That belief is not hard to create" (emphasis added).[25] In general, proponents of this school of thought believe that nuclear second-strike forces are simple to build, cheap to maintain, easy to hide, and unaffected by other country's nuclear force levels, deployment policies, and strategies. "A little deterrence," according to Ned Lebow and Janice Stein, "goes a long way."[26] Indeed, deterrence is so easy to achieve that strategy has been rendered essentially obsolete in the nuclear age.

Causal logic. The logic of minimum deterrence, like the logic of existential deterrence, rests on the power of fear and uncertainty in the eye of the potential attacker. Waltz writes, "Contemplating war when the use of nuclear weapons is possible focuses one's attention not on the probability of victory but on the possibility of annihilation. Because catastrophic outcomes of nuclear exchanges are easy to imagine, leaders of states will shrink in horror from initiating them… Anyone – political leader or man in the street – can see that catastrophe lurks if events spiral out of control and nuclear warheads begin to fly."[27]

The prospect of nuclear retaliation is sufficient to deter any rational attacker, but minimum deterrence proponents believe that the prospect must be a realistic one, not just hypothetical. As William Kaufmann writes, "Potential as against actual capability cannot be regarded as a convincing instrument of deterrence in the present state of affairs. Nor is it enough simply to have a certain number of planes supplied with fission and fusion bombs. The enemy must be persuaded not only that the instrument exists but also that its power is operational."[28] In other words, there is an important difference between retaliation that is merely imaginable and retaliation that is plausible. Plans and operational capabilities distinguish the latter from the former.

The presence of actual capabilities for nuclear retaliation underlies the minimal deterrence view, but crucial to the causal logic is the idea that nuclear deterrence does not depend much on strategic interaction. A limited arsenal is invulnerable (or, more precisely, is seen to be invulnerable) – and thus constitutes a deterrent – without regard to the strategies or capabilities of a potential attacker. As Waltz writes, "Nuclear weapons can carry out their deterrent task no matter what other countries do."[29]

Retaliatory posture. A minimum deterrent force is more than a 'bomb-in-the-basement," but much less than a large and diversified arsenal of the kind deployed by the superpowers late in

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[25] Waltz, *The Spread of Nuclear Weapons: A Debate Revisited*, pp. 20-21.
[26] Lebow and Stein, *We All Lost the Cold War*, p. 361.
[27] Waltz, *Nuclear Myths*, p. 734.
[28] William W. Kaufmann, "The Requirements of Deterrence," in Kaufmann, ed., *Military Policy and National Security* (Princeton: Princeton University Press, 1956), p. 19.
[29] Waltz, *Nuclear Myths*, p. 732. He also writes, "The efficacy of nuclear deterrence… does not depend on anyone's accepting it." Ibid., p. 737.

the Cold War. At a minimum, such a force would include deployed nuclear delivery systems with sufficient range to reach the attacker's territory. The exact number of weapons needed for a minimum deterrence force depends on contextual factors, but regardless of those factors the number of required warheads is small. According to Waltz, "Even with numbers immensely disproportionate, a small force strongly inhibits the use of a large one."[30]

A minimum threshold force is one that would complicate any attack, even if it would likely *not* survive an enemy first strike. Minimum deterrence advocates typically suggest that an arsenal of ten to a few hundred weapons will deter any deterrable foe. Perhaps the best real-world example of a minimum deterrent arsenal would be China's nuclear force today; a U.S. preemptive strike would likely eliminate the Chinese ability to retaliate against the U.S. homeland, but U.S. leaders could not be certain of success when contemplating such an attack. For this reason, some arms control advocates have pointed to China as an admirable example of a country that has grasped the fundamental deterrent power of a minimal retaliatory arsenal – a model that newer nuclear states should adopt rather than the one provided by the superpower nuclear postures of overkill during the Cold War.[31]

Assured Retaliation

Basic claims. The assured retaliation school concludes that deterrence is robust when retaliation is *assured*, not when it is merely possible or plausible. A state that aims to deploy a robust deterrent needs a force sufficiently survivable that some portion would almost certainly retaliate after a first strike. According to this school, it is essential to convince potential adversaries that even a flawlessly-executed strike, carried out under ideal circumstances, would fail to disarm the victim – likely resulting in the destruction of one or more of the attacker's cities.

Robert Jervis is one of the most prominent scholars of the assured retaliation school.[32] Jervis and other analysts writing in the 1970s and 1980s were compelled to make the case for the sufficiency of assured retaliation because U.S. nuclear policy seemed to reflect the alternative belief that only an ever-bigger and more sophisticated arsenal could reliably deter the Soviet

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[30] Waltz, *Nuclear Myths*, p. 734. Elsewhere, he writes, "It does not take much to deter." Waltz, *The Spread of Nuclear Weapons: A Debate Revisited*, p. 142. To be fair, Waltz sometimes writes as if he belongs in the existential deterrence school, and sometimes as if he believes that an assured retaliatory force is necessary – just easy to achieve. As an example of the latter, he wrote "Numbers are not very important. To have second-strike forces, states do not need large numbers of weapons. Small numbers do quite nicely… The requirements of second-strike deterrence have been widely and wildly exaggerated." Waltz, *A Debate Renewed*, p. 143. But the core of Waltz's view is that nuclear weapons deter – not just the superpowers' arsenals, but also China's, Pakistan's and North Korea's. Had Ukraine kept its nuclear weapons, they would have deterred, and if Iran gets them, they will deter, too. What is revealing about his views is that he reaches these conclusions without conducting a force-on-force analysis for each arsenal to see whose force is in fact survivable. In fact, Waltz would reject that method because he believes that such calculations imply an unnecessarily high standard for deterrence. The reason why everyone's arsenal deters is that deterrence does not really depend on assured survivability, in Waltz's view. He therefore belongs in the minimum deterrence school.

[31] Jeffrey G. Lewis, "Minimum Deterrence," *Bulletin of Atomic Scientists*, Vol. 64, No. 3 (July/August 2008); and Jeffrey Lewis, *The Minimum Means of Reprisal: China's Search for Security in the Nuclear Age* (MIT Press, 2007).

[32] Assured retaliation was by far the most popular view among scholars in the international security community: e.g., see George Quester, Shai Feldman, Jack Snyder, Stephen Van Evera, Charles Glaser, etc. Add others.

Union. The "illogic" of the superpower arms race stemmed from a failure to grasp the essential meaning of the "nuclear revolution."[33] As Jervis writes, "The vulnerability of population centers in both the United States and the Soviet Union that comes with mutual second-strike capability has transformed strategy. Because a military advantage no longer assures a decisive victory, old ways of thinking are no longer appropriate. The healthy fear of devastation, which cannot be exorcised short of the attainment of a first-strike capability, makes deterrence relatively easy. Furthermore, because cities cannot be taken out of hostage, the perceived danger of total destruction is crucial at all points in the threat, display, or use of force."[34]

Causal logic. The logic behind the assured retaliation view is more pessimistic than that of the first two schools of deterrence. It assumes that some leaders are willing to take big risks when vital national interests (or their necks) are at stake – so the possibility of retaliation will not always deter. Furthermore, first-rate militaries work hard to identify and exploit enemy weaknesses. Advocates of assured retaliation understand that adept military organizations spend their time during peacetime devising plans to defeat their enemies' forces; spying to learn about the deployments and capabilities of enemy weapons; studying enemy command and control systems; and devising doctrine and technology to exploit the weaknesses they discover. In a crisis, a clever war plan designed to destroy the enemy's "existential" or "minimum" nuclear force may be highly attractive to decision makers. To establish robust deterrence, therefore, states must build a force that simply cannot be destroyed in any conceivable preemptive strike, regardless of the malevolence and creativity of potential enemies.

The assured retaliation school can also claim to address the problem of irrational leaders. Jervis argues that states need to "develop the forces and display the resolve that would lead even an emotional, short-sighted, and dim-witted opponent to see that to start a war would be the worst alternative."[35] Leaders are not only willing to accept significant risks in high-stakes crises, but are also sometimes stupid, ignorant, or confused. Only an assured retaliatory force can hope to clarify such minds.

Retaliatory posture. In most cases, an assured retaliation force must be fairly sophisticated and moderately large. No weapons delivery system is inherently or perfectly survivable. Even modern ballistic missile submarines are only survivable if the crews are well trained, the boats are well-maintained, the navy has created procedures to help the subs slip out of port undetected, and if the opposing navy has not made some breakthrough (e.g., intelligence on deployment areas) that allows it to find the subs. An assured retaliation arsenal enhances survivability by deploying several types of delivery systems so that even on the attacker's best day at least a small number of deliverable warheads will survive a counterforce strike.

An assured retaliatory force consists not only of diverse delivery systems with sufficient range to strike enemy targets, but also personnel trained to carry out retaliatory strikes in the event of attack. Bernard Brodie is often identified with existential deterrence (and sections of his

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[33] Jervis, *The Illogic of American Nuclear Strategy*; and Jervis, *Meaning of the Nuclear Revolution*.
[34] Jervis, "Why Nuclear Superiority Doesn't Matter," pp. 617-618. Jervis uses the term "assured destruction" to describe this school of thought, but his discussion better accords with our category of assured retaliation.
[35] Robert Jervis, "Deterrence Theory Revisited," *World Politics*, Vol. 31, No. 2 (January 1979), pp. 289-324 at p. 299.

writing articulate the existential deterrence position effectively), but he made clear his belief that deterrence rests on the concrete capability to retaliate in kind after a nuclear attack, something which could not be taken by granted simply by possessing nuclear weapons: "The preparation of such retaliation must occupy a decisive place in any over-all policy of protection against the atomic danger."[36]

Assured Destruction

Basic claim. A fourth school of deterrence holds that retaliation must be *assured and massive*. For deterrence to be truly robust, potential attackers need to face the near certainty of retaliation and the negative consequences of that retaliation must be mind-boggling. Attackers are deterred when there is no prospect of meaningfully limiting the amount of damage a victim could inflict after an attacker launches a first strike. When the potential victim possesses a very large and invulnerable retaliatory capability, a nuclear attack would be tantamount to certain national suicide – and no remotely rational leader would invite that outcome.

Causal logic. The basic logic of assured destruction is that nuclear arsenals should not be designed to deter typical leaders in normal circumstances. A robust nuclear posture should even terrify risk-acceptant leaders during high-stakes crises. Major wars, after all, are never initiated by the faint-of-heart; they only occur when leaders accept enormous risks in pursuit of their goals. Assured destruction advocates note that at the outset of World War II, several countries could have avoided war, but they chose to fight even though the costs they accepted were clearly going to be enormous. Robust deterrence in such circumstances thus requires potential victims to impress upon the most aggressive leaders that an attack will result in much worse than "merely" the loss of a few cities: only guaranteed and utter destruction of the enemy population, industry, and perhaps means for recovery, would suffice against a truly motivated foe.

Retaliatory posture. The indicators of an assured destruction arsenal are similar to those of an assured retaliation force, only with more of everything. The best example of such a force can be found in either of the superpower arsenals in the latter half of the Cold War. Consider the U.S. deterrent posture, which sought to maintain an assured destruction capability. The United States kept roughly two-thirds of its ballistic-missile submarine fleet at sea in normal, peacetime situations, as well as a quick-response nuclear bomber force ready to take off with very little warning. Launch control officers trained to fire their ICBMs on a moment's notice, quickly enough to get the missiles a safe distance from the silos after U.S. sensors detected an incoming Soviet first strike and before the arrival of the Soviet warheads. These redundant precautions were designed to ensure that even if the Soviet Union completely surprised the United States with a bolt-from-the-blue nuclear strike U.S. forces would be able to deliver vast numbers of high-yield thermonuclear weapons against the Soviet Union in retaliation.

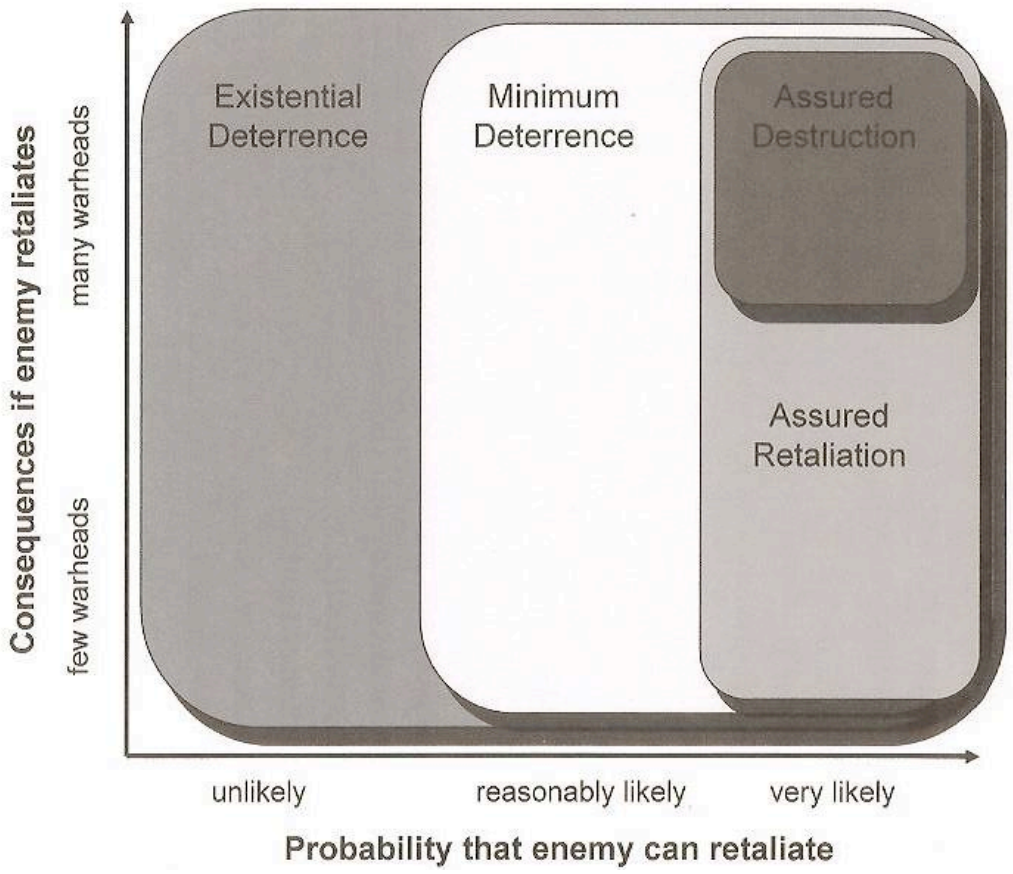
The four schools of nuclear deterrence theory are illustrated in Figure 1 below. As the figure suggests, deterrence rests upon a potential attacker's assessment of two key dimensions: the probability of retaliation and the consequences of retaliation. All schools agree on that premise, but they differ about where along these two dimensions deterrence begins to become

[36] Brodie, chapter in Brodie, ed., *Absolute Weapon*, p. 134.

reliable. According to the existential deterrence school, deterrence will be robust regardless of the vulnerability of the arsenal to a counterforce attack and even if the size of a potential retaliatory attack is quite small. Advocates of minimal deterrence are slightly less optimistic; they have faith in deterrence as long as an attack would plausibly result in a retaliatory strike. Those who believe that "assured retaliation" is necessary expect deterrence to be robust only when at least some retaliation is very likely. Finally, adherents of the massive destruction school believe that robust deterrence requires the nearly certain prospect of enormous retaliation.

Each of the four theories has plausible validity. The two most optimistic schools of deterrence rest on the common-sense observation that leaders – if they are remotely rational – should not require the absolute certainty of impending destruction to be deterred from most actions. Even a small chance of the loss of a few cities – let alone civilization-ending retaliation – should be horrifying enough to deter in virtually all circumstances. But adherents of the two more pessimistic schools counter that the optimists have ignored history and are far too confident about deterrence. The possible loss of a few cities is certainly terrible, but no more terrible than the risks that countries have accepted in the past when they have initiated major wars. In fact, both World Wars began precisely because *several* countries willingly accepted risks that were far greater than "merely" losing a handful of cities. When stakes are high, countries have run staggering risks. They may do so again, so assured retaliation or assured destruction may be needed for robust deterrence.

Figure 1: Four Schools of Nuclear Deterrence Theory



Case Selection and Selection Bias

It is unlikely that any of these schools of deterrence is always right – for at least two reasons. First, if nuclear deterrence is based on rational calculations, then the level of interests at stake in a given dispute will affect countries' willingness to run risks. In fact, to qualify as rational, leaders must be willing to run greater risks to protect things that matter greatly than things that are of less importance. Therefore drawing lessons about how deterrence *generally* works from the willingness of a single country to use nuclear weapons during a single dispute is fraught with peril. Presumably the United States and the Soviet Union were more willing to use nuclear weapons in their struggle over Europe than they were in less-consequential disputes.

There is a second methodological challenge to confront. Although we have high-quality evidence about U.S. decision making in the 1950s and 1960s, it would be odd to assume that all countries, and all potential leaders, will reason about nuclear weapons (or about anything else) the same way that the Eisenhower and Kennedy Administrations did. How can we be confident that the Eisenhower and Kennedy Administrations are a good guide to the nuclear employment policies of leaders around the world – democrats and dictators, doves and mass-murderers?

Pulling these two lines of criticism together, is there any reason to believe that our findings in these chapters are generalizable?

We offer two responses to these questions. First, it is important to remember that Cold War history is the foundation for most of what scholars and analysts think they know about nuclear deterrence. Whether or not Cold War history *should* be used as evidence of how deterrence relationships will work in the 21st century, that history *is* used over and over again. If we discover (and we do) that many of the conclusions that scholars draw from the Cold War about deterrence are wrong – e.g., we discover that robust deterrence required much higher force levels than many Cold War scholars and nuclear revisionists now claim – then simply correcting the historical record will improve our understanding of nuclear deterrence. However, our goals are much greater than that in this manuscript.

Second – and this is the most important point – although we focus our empirical work on two U.S. administrations, we *can* draw very important lessons about deterrence in general, which *should* guide our understanding of nuclear deterrence. Suppose we had attained access to reliable documentary evidence on the decision making processes of the most-aggressive and most-cold blooded governments in modern history – e.g., Hitler's, Stalin's, Mao's, Pol Pot's, Saddam's – and examined their thresholds for using nuclear weapons. Critics might claim that we biased our analysis by focusing on the most brutal leaders in history, *but the critics would be wrong*. Because the consequences of strategic nuclear war would be calamitous, a prudent deterrent policy cannot be designed to deter average adversaries; it should be structured to deter enemies who are aggressive and murderous in pursuit of their goals. Dams are designed with earthquakes in mind; nuclear postures must be designed to deter the likes of Hitler and Stalin.

To say this differently, a study of nuclear deterrence that focused on aggressive leaders would utilize a biased sample – if our goal were to characterize the reaction of the median leader to a deterrent threat. But this line of criticism misses the point: practitioners of deterrence want to powerfully constrain the worst plausible enemy – not the median leader. Nuclear deterrence must work in the outlier cases: against aggressive enemies during high-stakes conflicts.

In this study we do not examine the decisions of heinous aggressors;[37] we study two unexceptional presidential administrations in a democracy. Neither administration had revolutionary aspirations to remake the global order; neither saw mass-murder as an acceptable tool of social progress. Whatever we discover, therefore, about the level of deterrent that the Soviet Union needed to build, in order to convince Dwight Eisenhower and John Kennedy that launching strategic nuclear strikes was an imprudent strategy for waging World War III, we

[37] And we would be dubious about a study that did. Although some totalitarian states establish Weberian bureaucracies that carefully document and record government decisions (e.g., the German Democratic Republic), others do not. Furthermore, few totalitarian states allow scholars access to any of their records, let alone their most sensitive national security planning documents. Furthermore, given the potentially deadly consequences of being on the wrong side of any political debate in a society like Saddam's Iraq or Mao's China, their records are likely to be less reliable than in a democracy – demonstrating loyalty to the leaders and avoiding blame for policy failures are life-and-death imperatives. Memoirs and interviews by former authorities are notoriously unreliable – in authoritarian states and democracies – because of selective memory, motivated bias, and the understandable desire to present one's views and contributions while in government in the best possible light.

should interpret our findings as a *lower bound* for a prudent deterrent. If the goal of nuclear-weapons states is to have a robust deterrent – not just against the likes of Eisenhower and Kennedy, but against more-aggressive, more-cold blooded adversaries – then those countries will need at least the capability that caused the United States to rethink it's strategy for waging World War II, and perhaps more.

Of course, the capabilities that the Soviets required to force the United States to move away from a "nuclear-centric" strategic posture for defending Europe is probably not the level of nuclear capabilities that Moscow needed to deter the United States from using nuclear weapons in lower-stakes circumstances. Countries with small and relatively weak arsenals – such as North Korea today – seem to have substantial deterring power even over the United States, presumably because the stakes for Washington on the Korean Peninsula are much lower today than the stakes in the superpower competition for Europe during the Cold War. What we discover about the Cold War threshold for a robust nuclear deterrent, therefore, should not be applied broad brush everywhere.

However, a robust nuclear deterrent must be sufficient to deter strategic nuclear attacks on the homeland across the range of plausible circumstances -- even during high-stakes crises. Designing an arsenal with sufficient retaliatory capability to deter attacks in low- and moderate-stakes crises, but not high-stakes crises, would be a terrible mistake: given the reluctance to use nuclear weapons, that deterrent force would be capable in every circumstance except where it was needed. A prudent deterrent is one that is sufficiently powerful to deter aggressive adversaries in high-stake crises. But how much capability does that require?

THE STRATEGIC BALANCE, 1945-65

This section addresses the balance of power between the United States and the Soviet Union during the first few decades of the Cold War. We first describe the strategic context in Europe at the dawn of the Cold War and then track the development of Soviet and U.S. nuclear forces in the decades that followed. Because the purpose of this paper is to assess the deterrent effect of Soviet nuclear forces on U.S. strategic doctrine, our focus here is on the retaliatory capabilities of the Soviet arsenal and the first-strike capabilities of the U.S. force. Did the United States ever have meaningful nuclear primacy over the Soviet Union? If so, when?

The Dawn of the Cold War – The Strategic Context

The United States emerged from World War II as the world's most powerful country. In 1950, U.S. GDP accounted for roughly half of total world output.[38] The United States had the only major industrial economy that escaped the war without major damage from bombing or conquest. Even America's population got through the conflict relatively unscathed compared to the losses suffered by the major powers of Europe and Japan. Finally, the United States emerged from the war with a network of allies that spanned the globe.

[38] For a good discussion of the challenges inherent in measuring the aggregate balance of power, and data on the balance at the start of the Cold War, see William C. Wohlforth, "The Stability of a Unipolar World," *International Security* Vol. 24, No. 1 (Summer 1999), pp. 9-22.

These assessments, however, fail to capture the strategic dilemmas that the United States faced as the Cold War began. For one thing, U.S. leaders feared that economic despair would allow local communist parties to gain political power throughout Europe, resulting in a massive sphere of Soviet dominance. But the military situation was even more dire. Specifically, the imbalance in conventional military power in Europe between the United States and the Soviet Union in the late 1940s was staggering. In 1948 the U.S. Joint Chiefs of Staff (JCS) estimated the Soviet force in Europe to be 135 divisions, plus an additional 100 divisions of allied forces. The United States, in contrast, had 2 divisions in Europe and 10 others worldwide.[39] Furthermore, the two American divisions were configured and deployed for garrison duty – principally occupying West Germany – and were therefore not combat ready. These JCS estimates probably overstated the size and readiness of Soviet forces in Europe, but the imbalance of conventional military capabilities was so stark (on the order of 30:1 or more) that it hardly mattered. As we discuss later in this paper, U.S. estimates of the balance of power generated a plan to essentially concede the entire Eurasian landmass to the enemy at the outbreak of war.

Ironically, the period often characterized as a moment of U.S. global hegemony was viewed at the time by U.S. leaders as a moment of great vulnerability – and rightly so, given the conventional military balance in Europe. How did U.S. atomic (and later nuclear[40]) forces add to this equation? And how did the U.S.-Soviet balance shift as the Soviet Union developed and deployed its own nuclear arsenal?

1945-1949: The Era of U.S. Nuclear Monopoly

From August 1945 until the Soviet Union tested its first atomic bomb in August 1949, the United States had a monopoly on atomic weapons. From the standpoint of evaluating the effect of the Soviet arsenal on U.S. strategic doctrine, there was simply no Soviet atomic arsenal to deter American planners. But the period of U.S. atomic monopoly was no golden age of American superiority. In addition to the Soviet Union's daunting advantage in conventional forces in Europe, the U.S. atomic arsenal was no juggernaut. Although America's arsenal grew quickly in this period – from only 11 weapons in 1946 to 300 by 1950 – the United States had only a rudimentary capability to deliver them against targets in the Soviet Union. In 1946 the United States had only 27 B-29s which had been modified to carry atomic bombs, and had added only six more bombers by 1948. The total atomic-capable bomber fleet grew to 121 aircraft by 1949.[41]

The situation for the United States was far worse than even these numbers suggest. Bomb-laden B-29s had only a 2,000 mile combat radius, so they could not strike targets in the

[39] Britain and her dominions had twelve divisions, but they were scattered across the Empire and could not be quickly deployed to the Continent in a crisis.

[40] Fission bombs, which generate their destructive force by splitting atoms, are generally referred to as "atomic" weapons. The weapons that were dropped on Hiroshima and Nagasaki were both fission bombs. Fusion weapons – which generate much of their destructive power by fusing together atoms – are generally referred to as "nuclear" or "thermonuclear" weapons. This distinction is sometimes important because thermonuclear weapons can be designed to create vastly more destructive power than atomic bombs.

[41] Ross, *American War Plans*, p. 12-13.

Soviet Union when flying directly from the United States. Instead, B-29s would have to stage attacks through bases on the perimeter of the Soviet Union.[42] Even worse, U.S. fighter aircraft lacked the range to reach Soviet targets – even from the forward bases – so the small fleet of U.S. strategic bombers would have to fly unescorted through Soviet air defenses. Furthermore, the United States could only assemble 2 atomic bombs per day in 1948 (and 3.5 bombs per day in 1949)[43]; once assembled, the bombs had only a 48-hour shelf life before the battery died. The U.S. air force simply could not unleash a massive simultaneous raid to overwhelm Soviet air defenses; rather an atomic offensive would unfold very slowly, using a couple of bombers at a time.

Even those U.S. bombers that successfully penetrated Soviet air defenses would have difficulty destroying their targets. The training of America's strategic bomber aircrews in the late 1940s was abysmal. Although U.S. plans called for bombers to conduct strategic attacks at night (to increase survival against air defenses), bomber crews only trained in daylight. U.S. aircrews were to use onboard radar to navigate in the dark through Soviet airspace, but they had no reliable maps with geographic reference points to help them do so. In some cases, bombers were assigned to hit targets whose location was not precisely known – because U.S. planners were relying on Tsarist era maps. Even under ideal conditions, the accuracy and thus lethality of the bombing campaign would be severely limited.[44] Even though the United States had an atomic monopoly until the summer of 1949, the aggregate balance of power was anything but favorable to the United States.

1950-1955: Soviet Existential Deterrence

The Soviet Union detonated its first atomic bomb in August 1949, had 150 simple fission bombs by 1954, and tested a "true" thermonuclear device in November 1955,[45] but its nuclear posture remained one of "existential deterrence" until roughly 1956. The problem lay in the range of its nuclear delivery systems. Although the Soviet Union fielded hundreds of short-range bombers that could launch nuclear strikes against U.S. allies in Europe, it had no bombers with sufficient range to reach the United States.

In the early 1950s, the only Soviet aircraft capable of delivering atomic bombs was the Tu-4, which was essentially a copy of the U.S. B-29 bomber. But while the United States had a myriad of potential staging bases along the Soviet periphery for its nuclear forces – and planned to use bases for this purpose in the UK, Egypt, Turkey, Pakistan, Japan, and Guam, for example – the Soviet Union had no allies with bases close enough to U.S. territory for the lumbering Tu-4. The Soviets worked hard to extend the bomber's range. They experimented with midair

[42] [Cite]

[43] Assembling a single bomb took a 39-man crew two full days. The United States had only four such crews in 1948 and seven in 1949.

[44] Finally, the (approximately) 20-kiloton bombs that the United States fielded in the late 1940s had a destructive radius of approximately one mile against an "urban-industrial" target (i.e., a city). But U.S. experience using high-altitude radar-guided bombing a few years earlier in World War II suggested that only half of the bombs that American pilots released would fall within that distance. [Cite]

[45] The Soviets had 5 fission bombs by March 1950, 50 by 1952, and 150 in 1954. In August 1953 they tested a "boosted" fission weapon, but their first "true" thermonuclear test employing a two-stage fusion device did not occur until November 1955. They deployed their first fusion bomb the following year. [Cite]

refueling devices on a small number of Tu-4s, and they tried putting external fuel tanks on other Tu-4s. But these efforts failed to give the bomber sufficient range to strike targets in the United States and return to Soviet territory.[46]

The United States, in contrast, saw its offensive nuclear strike capabilities soar.[47] From 1950 to 1955, the U.S. stockpile grew five times in size to over 1,750 weapons. The lethality of the arsenal also grew exponentially. The United States carried out its first true thermonuclear test in November 1952, and the minimal required quantity of deliverable hydrogen bombs was stockpiled by early 1954. The resulting increase in destructive power was enormous: the atomic bomb dropped at Nagasaki in 1945 had an explosive yield of 22 kilotons; the Mark 17, the first hydrogen bomb that could be dropped from a plane, had a yield of 11 megatons – 500 times the explosive yield of the Nagasaki weapon.

In addition to greatly increasing the number and yield of U.S. nuclear weapons during the first half of the 1950s, the United States expanded its strategic bomber force. The force assigned to carry out nuclear strikes grew from roughly 200 bombers in 1950 to over 1,200 bombers in 1955. Only the B-36 heavy bombers had true intercontinental capability; they could fly directly from bases in the United States, hit targets in Soviet territory, and then return to base. But many medium-range aircraft were an integral part of the nuclear offensive because of access to foreign bases and aerial refueling. All told, by the mid-1950s, the Strategic Air Command could deliver over 1,500 atomic and thermonuclear weapons against a full range of military, political, and industrial targets in the Soviet Union in a matter of days.

To say that the Soviets had merely an "existential deterrent" does not mean they had no possible chance of delivering a weapon. If, during a war, any Soviet (medium-range) nuclear-capable bombers survived a U.S. nuclear attack, the Soviets could have tried to cobble together a retaliatory strike – for example, they *might* have sent any surviving nuclear-capable medium-range bombers equipped with aerial refueling systems on one-way suicide missions. However, the Soviet armed forces had no operational units trained to carry out such an attack. Soviet bomber crews neither planned, nor trained, nor established procedures for conducting intercontinental nuclear missions. Their mission in a war was to strike targets through Europe. The U.S. homeland was safe.

American leaders recognized U.S. nuclear primacy during this period. Declassified intelligence estimates from 1950 to 1955 demonstrate that U.S. planners had an accurate picture of Soviet nuclear forces.[48] They understood the range limitations of the Tu-4 and they conducted frequent aerial reconnaissance flights over the Soviet Siberian air bases which were closest to the United States (via polar routes) and would be needed for one-way atomic missions. The

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[46] 847 Tu-4s were eventually produced (the last one in 1952), but only a portion of these were the nuclear-capable Tu-4As. Moreover, only very few of the Tu-4As received any kind of range-extension improvements. See "Tu-4 (Bull)," Globalsecurity.org; and Podvig [RSNF], pp. 366-370.

[47] Data on U.S. strategic capabilities in this period are derived from a declassified U.S. air force report, Richard D. Little, *A History of the Air Force Atomic Energy Program, 1943-1953, Vol. III, Part 1, Sec. 1: Building an Atomic Air Force, 1949-1953* (U.S. Air Force Historical Division, 1959), "Chapter IV: Expansion of the Strategic Atomic Striking Force," [DNSA]; and [NRDC]

[48] NIE-3; SE-10; SE-14;NIE-64; JCS report in Rosenberg p. 23; NSC 140/1; SE-36/1; SNIE 11-2-54; NIE 11-5-54; NIE 11-3-55.

intelligence documents also reveal that U.S. estimates of the size of the Soviet medium-range bomber force were also very accurate. For example, a total of nearly 850 Tu-4s had been built when production stopped in late 1952; U.S. intelligence in that year estimated that there were 800-900 Tu-4s in the Soviet air force.

Had war erupted in the early 1950s, a U.S. nuclear counter-force strike might have failed. Some number of Soviet warheads would have likely hit European cities, and the possibility of Soviet nuclear retaliation against the United States could not be ruled out. But the Soviet deterrent fell short of even a "minimum deterrent" force; they simply did not have reliable delivery systems that could carry warheads to the American homeland.

1956-1961: Soviet Minimum Deterrent

The first Soviet intercontinental bombers began to enter service in 1956, ushering in the era of Soviet "minimum deterrence." Although the Soviet Union finally had the capability to strike the U.S. homeland, its nuclear force remained vulnerable to attack.[49]

The backbone of the Soviet strategic deterrent in the late 1950s was its bomber force. In 1956 Moscow deployed its first 20 long-range bombers, and by 1961 the number of Soviet long-range strike aircraft had climbed to 150. A force of this size could have been survivable. For example, if the Soviets had built a robust radar network around the country's periphery, they might get warning of an attack and get the bombers in the air. The Soviets could have instituted a "strip alert" system – keeping some bombers armed, fueled, and ready to fly. Finally, if the new, intercontinental Tu-95 bomber had slightly more range – that is, if they had not needed to refuel at Siberian airfields in order to return from raids against the United States – the aircraft would have been much less vulnerable.

As it turned out, the Soviet bomber force merely generated a longer list of targets for U.S. planners. U.S. war planners could not guess where the Soviet bombers would be located during a crisis, but they assumed the Soviets would disperse nuclear-armed bombers to airfields all across the country. Thus, the United States identified the 645 biggest airfields across the "Sino-Soviet bloc" and targeted them for rapid attack in case of war.

The Soviets did deploy a radar network to cue their air defense fighters and provide warning of a U.S. nuclear strike, but the United States worked hard to identify holes through which a U.S. bomber force might slip through.[50] Even if a few U.S. aircraft were picked up by radar, Soviet bombers were not prepared to react quickly; their nuclear warheads were not stored

[49] At no time during this period did the Soviets have a first strike capability against the United States. The U.S. Defense Department calculated that a Soviet disarming attack on the United States would require at least 270 ICBMs in 1960 and at least 440 missiles in 1961. The Soviets had less than 1% of the required forces in 1960, and less than 3% in 1961. In addition, in 1957 SAC established a "ground alert" and began to keep B-52s armed and ready to take off at first warning of a Soviet attack. Starting in 1960 SAC made its ground alert more stringent: "One-third of SAC achieved 15 minute ground alert status by August 1960," meaning that 150 (out of 450) nuclear-armed B-52s would be in the air before Soviet ICBMs could strike SAC airfields. See Memorandum, McGeorge Bundy to Paul Nitze, May 31, 1963 ("But Where Did the Missile Gap Go?"), p. 12 [DNSA].

[50] These were discussed in the documents generated during the 1961 Berlin Crisis, when the Kaysen group in the White House worked on U.S. nuclear counterforce plans. [Cite]

on the same airbases as the planes, and the aircraft themselves required 6-8 hours of preparation before takeoff.[51] Most importantly, the arctic airbases that the new long-range bombers would use to fly roundtrip missions to the United States were carefully monitored by U.S. reconnaissance aircraft and often inaccessible in the winter. Furthermore, the arctic bases were easy targets for an American first strike because U.S. bombers would fly right past these bases (over the pole) on their way to targets throughout the Soviet Union. Moscow's new long-range bomber fleet was a step in the right direction for the Soviets, but it was far from an invulnerable force.

In 1958-59 the new Soviet submarine fleet was also quite vulnerable. Early Soviet submarines were loud and hence relatively easy to track, their missiles had only a ninety-mile range, and they could not fire while submerged. The subs, therefore, had to approach within approximately 75 miles of the U.S. coast and surface before firing – increasing the odds of detection by U.S. antisubmarine forces. Furthermore, the Zulu and Golf subs spent most of their time in port, making them vulnerable to a U.S. first strike.[52] Finally, when the early Soviet submarines did go on patrol, they did not bring nuclear warheads with them. Nuclear warheads were kept in storage sites on land.[53]

The window for a successful U.S. first strike, however, was closing. By 1961 the Soviets began deploying large numbers of Golf-class submarines, most of which did go to sea with their nuclear warheads. In 1960 the United States had to contend with 15 Soviet submarines; a year later the force had reached 40 boats.[54] Another problem for U.S. war planners was the deployment of new Soviet ICBMs. The early versions of the first Soviet ICBM (the SS-6) were unreliable and vulnerable because they required twenty-four hours of preparation to launch. But by 1961 the Soviets were deploying newer missiles (modified SS-6s as well as SS-7s) that were more reliable and could be launched in a few hours or less.[55]

Of course, U.S. offensive capabilities were growing, too. By 1961, the United States had a full, robust triad: 500 B-52s, 5 Polaris submarines, and 50 ICBMs.[56] U.S. target intelligence was improving as well. In September 1961 the United States began to receive its first high quality spy satellite photographs of the interior of the Soviet Union. But these improvements could not prevent U.S. nuclear primacy from slipping away. The Soviet arsenal was simply becoming too large and diversified to completely disarm. An attack could no longer just strike 645 airfields – ICBM sites, sub pens, and submarines at sea would all have to be located and destroyed. And these targets would need to be hit nearly simultaneously.

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[51] Podvig, RSNF, p. 363; Trachtenberg, *History and Strategy*, pp. 29-31. The process of loading would take 6-8 hours. Moreover, there were few bases overall – some of which were undefended w/SAMs.
[52] Sagan, "SIOP-62", p. 29 and n. 23; Podvig, [RSNF], p. 237; and "629 Golf," at Globalsecurity.org.
[53] Podvig, [RSNF], p. 312.
[54] U.S. naval forces would have scoured the ocean for any Soviet submarines that survived a U.S. attack on Soviet ports, but antisubmarine warfare (ASW), especially in this period, was far from a sure thing.
[55] Podvig, [RSNF].
[56] This data on U.S. nuclear forces includes only America's long-range nuclear attack forces; the United States also had medium-range bombers and ballistic missiles stationed abroad. Had the United States decided to launch a nuclear first strike on the Soviet Union during this period, however, it is likely that the U.S. would have relied solely on the forces deployed in the United States and at sea in order to achieve a high level of surprise.

Western leaders understood that the U.S. had a meaningful nuclear advantage in the late 1950s, and that this advantage was slipping away.[57] Intelligence estimates provided U.S. leaders with a very accurate view of the Soviet strategic nuclear arsenal and the operational limitations of those forces. For example, as early as 1956, U.S. intelligence reported that Soviet Bear bombers could only strike targets in North America if they staged through arctic refueling bases.[58] Western intelligence also learned that Soviet submarines had to surface to fire their missiles, that their missiles had short range, and that the Soviet subs spent most of their time in port.[59] In short, excellent intelligence about the operational limitations of Soviet bombers, submarines, and ICBMs gave U.S. leaders an accurate picture of America's nuclear primacy, as well as a good understanding that this capability would not last.

1962-1964: Soviet Assured Retaliation

There is no precise answer to the question of when the U.S. first-strike option disappeared; that capability gradually diminished as the Soviet nuclear arsenal became larger, more sophisticated, and more diverse. In 1958 a U.S. nuclear disarming attack against the Soviet Union would likely have worked unless several things went wrong; by late 1961 it could only have worked if everything went right; and in 1962 it was nothing more than a pipe dream. In short, the balance of power shifted from a condition of Soviet minimum deterrence to one of Soviet assured retaliation.

A simple numerical comparison of U.S. and Soviet strategic nuclear forces in 1962 makes it appear that the United States still enjoyed nuclear primacy. In a surprise attack, the United States could have quickly launched between 1,000 and 2,000 nuclear warheads at the Soviet Union, with the vast majority of these warheads delivered by B-52 bombers stationed in the United States.[60] In contrast, the Soviets had only 160 bombers, 38 ICBMs, and 48 nuclear-missile armed submarines. Attacking these forces would require destroying at most 140 major Soviet airfields, plus 10-25 ICBM launch sites, and up to 30 submarine bases.[61] A U.S. first strike would have attacked other targets too – including an enormous number of additional airfields – but the critical targets numbered only about 200.

However, simply counting the number of U.S. warheads and Soviet targets does not give a realistic picture of the strategic balance. Coordinating a nuclear attack on a diversified nuclear arsenal raised tremendous complications for U.S. war-planners. One major problem was the expanded deployment of Soviet nuclear submarines. By 1962 the Soviets had 48 submarines

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[57] Much of what we know about this period -- especially 1958-61, the so-called "missile gap" period -- might lead us to believe that western leaders were in the dark about the balance of power, but this is wrong. In the late 1950s there were great fears, which we now know were baseless, about Soviet nuclear superiority, but these misperceptions were always about *trends* in the balance of power, and hence the *future* military balance. Ironically, the "missile gap" period was a time of accurate intelligence assessments of *existing* Soviet strategic nuclear forces.

[58] [NIE 11-56; SNIE 11-6-57; SNIE 11-7-58; NIE 11-8-59; NIE 11-61.]

[59] [NIE 11-8-60; 11-8-61] Regarding ICBMs, intelligence correctly inferred that early Soviet ICBMS were so big that the launch sites had to be located on railroad lines, helping them identify likely locations of Soviet launch pads even before they were confirmed by satellite photos. [NIE 11-8/1-61].

[60] For a remarkably detailed description of U.S. nuclear war planning at the time, see "Memorandum for General Maxwell Taylor," September 5, 1961, National Security Archives, Record Group 218, Records of the Joint Chiefs of Staff, especially Annex A and its Appendix.

[61] Sagan, "SIOP-62," pp. 32-33.

capable of firing nuclear-tipped missiles. Only a small fraction of Soviet subs were at sea at any given time, but with 48 submarines in the Soviet fleet, the probability that a few would survive, and fire their three nuclear warheads at American cities, grew dramatically. American anti-submarine warfare (ASW) capabilities were good, but as the United States learned during the Cuban missile crisis, the U.S. could not always track Soviet subs in the open ocean.[62]

A second problem for U.S. war planners stemmed from the deployment of Soviet ICBMs. Attacking Soviet ICBMs before they could be launched was difficult because the bombers might be detected as they approached Soviet airspace – a few hours before they reached the Soviet missile sites – possibly long enough for the missiles to be launched.[63] The U.S. could target Soviet ICBMs with American missiles (ICBMs and SLBMs), but in 1962 U.S. ballistic missiles were neither accurate nor reliable.[64] Even worse, a quick U.S. missile strike on Soviet ICBMs would leave many hours before U.S. bombers reached their targets, giving the Soviets time to get bombers in the air and subs out to sea. A third approach would launch U.S. bombers first and delay the missile attack on Soviet ICBMs until American bombers approached Soviet air defense radars. This plan, however, ran the risk that the U.S. bombers would be detected early (e.g., by spotters near American bomber bases) giving the Soviets hours to push subs out to sea and launch their ICBMs in retaliation.[65] In sum, once the Soviets built a non-trivial number of ICBMs and submarines, coordinating a nuclear strike became much more complicated.

A third problem for the United States, unrelated to the condition of Soviet nuclear forces, was weaknesses in U.S. nuclear war plans. Once the Soviet arsenal included a significant number of submarines at sea and ICBMs, a disarming attack would require great speed and surprise to hit Soviet nuclear forces before they could be launched or further dispersed. But U.S. plans in the early 1960s had not been adjusted to account for the growth of the Soviet arsenal. In previous years, the U.S. plan made sense: hitting air defense sites in Eastern Europe on the way to attacking targets further east. A deliberate attack like this made sense when the United States confronted only the Soviet bomber force, but by 1962 it would likely give the Soviets sufficient warning to disperse their nuclear forces.

By 1962, senior American decisionmakers understood that the era of U.S. nuclear primacy had disappeared. In the fall of 1961, a year before the Cuban missile crisis, President Kennedy was briefed by the Chairman of the JCS on U.S. nuclear war plans; he was told that if war came, the U.S. would "prevail" but "under any circumstances – even a preemptive attack by

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[62] An authoritative history of U.S. anti-submarine operations during the Cold War reports that the Soviets deployed five submarines "to support Soviet naval operations…in the Caribbean during the Cuban Missile crisis." Despite American ASW efforts, the subs "were not detected until they encountered American quarantine forces in the region…the sub-air barrier off Argentina that was established after the quarantine began therefore missed them." Owen Cote, *The Third Battle: Innovation in the U.S. Navy's Silent Cold War Struggle with Soviet Submarines* (Newport: Naval War College, 2003), p. 46. See also, Sagan, "SIOP-62," pp. 34-35.

[63] The Soviets ICBM force included 6 SS-6s and 32 SS-7s in 1962. The SS-6s required 24 hours to fuel and prepare to launch, making them very vulnerable to a U.S. first strike. The SS-7s, on the other hand, could be launched within a few hours. If they had been previously alerted, the SS-7s could be launched in less than an hour. See Podvig, *RSNF*, pp. 179-181, 189-190.

[64] "Memorandum for General Maxwell Taylor"; Sagan, "SIOP-62," pp. 32-35.

[65] On the possibility of spotters, see Stephen M. Meyer, "Soviet Nuclear Operations," in Ashton B. Carter, John D. Steinbruner and Charles A. Zraket, eds., *Managing Nuclear Operations* (Washington: Brookings Institution, 1987), p. 488.

the U.S. – it would be expected that some portion of the Soviet long-range nuclear force would strike the United States."[66] The details of the president's next yearly briefing on U.S. nuclear war plans (in the fall of 1962) is still classified, but in the fall of 1963 he was told that that the U.S. no longer had a reasonable chance of prevailing in a nuclear war.[67] In other words, in 1961 the president had been told he had a viable first strike option, though this still meant that some nuclear weapons would probably hit U.S. cities. In 1963 even the dubious achievement of "prevailing" with only a few lost cities was no longer attainable.

The military was not alone in their skepticism about the U.S. ability to conduct a successful nuclear disarming strike. Former Secretary of Defense Robert McNamara has repeatedly argued that the United States had no meaningful nuclear first strike capability in 1962. A few weeks after the Cuban missile crisis, McNamara wrote to Kennedy: "I am convinced that we would not be able to achieve tactical surprise, especially in the kinds of crisis circumstances in which a first-strike capability might be relevant. Thus, the Soviets would be able to launch some of their retaliatory forces before we had destroyed their bases."[68]

In sum, the odds of the United States executing a successful disarming strike against the Soviet Union had dropped substantially by 1962. There was no precise moment at which a U.S. first strike became impossible; instead it melted away gradually as the probability of success declined. Whether the actual probability of success in 1962 was 30 percent or 60 percent is both unknowable and irrelevant; the odds of success were no longer good enough to permit an attack in any but the most dire circumstances. The age of mutual assured retaliation had arrived. The age of mutual assured destruction would soon follow.

1965-1990s: Mutual Assured Destruction

Between 1964 and 1967, the Soviet ICBM force more than quadrupled, to over 800 missiles. American planners contemplating a disarming first strike in 1967 thus faced the prospect of needing to locate and destroy over 1,000 Soviet long-range nuclear delivery vehicles (including missiles, submarines, and bombers), which were equipped with over 1,500 warheads, and needed to do so quickly, nearly simultaneously, and with complete strategic surprise. Such a first strike almost certainly would have resulted in hundreds of surviving Soviet forces able to reap massive nuclear retaliation on the United States. In short, at some point in the mid-1960s, the Soviet Union acquired an assured destruction capability, thus ushering in the condition of MAD that would endure through the end of the Cold War.

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[66] Sagan, *Moving Targets*, pp. 25-26; and Sagan, "SIOP-62," p. 30. The quotations come from General Lemnitzer's briefing notes for the president.
[67] Trachtenberg, *A Constructed Peace*, pp. 182-183; and Francis J. Gavin, "Myth of Flexible Response," pp. 20-21.
[68] The memo is dated November 21, 1962. Sagan, "SIOP-62," p. 30. John Lewis Gaddis agrees with this description of McNamara's views during the crisis. Gaddis, *We Now Know*, p. 268. McGeorge Bundy, Kennedy's national security advisor, appears to have shared McNamara's views about the nuclear balance of power at the time. See Bundy, Danger and Survival, p. 448; and Comments of Colonel Lawrence J. Legere, Assistant to the President's Military Representative, cited in editorial note 127, *FRUS* vol. 8, p. 463.

U.S. STRATEGIC POSTURE, 1945-1965

To test the four schools of nuclear deterrence, we look for evidence that the growth of Soviet nuclear capabilities affected what we call "U.S. strategic doctrine" for defending Western Europe. This category is broader than war plans; it has three elements: (1) America's overall defense concept for Europe (e.g., the relative contributions of U.S. conventional and nuclear forces); (2) the conditions and timing of U.S. nuclear escalation; and (3) the targets for U.S. nuclear forces.

In other words, we look for evidence that the shifting nuclear balance induced the United States to decrease the emphasis on nuclear forces in U.S. plans for the defense of Europe; raised the threshold for U.S. nuclear escalation; and forced the U.S. to adapt its nuclear targeting to spare strategic targets (e.g., Soviet cities and the Soviet nuclear deterrent) as a means to avoid, if possible, unlimited escalation. The key questions we ask: did these changes occur when the Soviets initially acquired an "existential deterrent" force, or later? And is there evidence linking these shifts to the growing Soviet nuclear force?

The evidence shows that despite the Soviet acquisition of an "existential" and then later "minimum" deterrent force, the United States retained a nuclear-centric defense concept for Europe and planned to initiate nuclear war if the Soviets invaded Western Europe. Furthermore, the U.S. planned to commence strategic nuclear attacks at the outset of a conflict – preemptively if possible. Nor did the United States shy away from Soviet cities or their nuclear forces; in fact, those would be the main foci of the massive U.S. strike. The United States did not reduce the role of its nuclear forces in its war plans until the Soviets deployed an "assured retaliation" force.

The Era of Nuclear Monopoly

In the immediate aftermath of World War II, senior members of the U.S. government felt ambivalence about nuclear weapons. President Truman initially discouraged integrating atomic bombs into U.S. war plans, considering these weapons to be tools of slaughter rather than weapons of war.[69] The president's distaste for nuclear weapons led him to order the Pentagon to develop conventional (i.e., non-nuclear) plans for defending Europe as well as plans that incorporated atomic attacks by the United States.[70] Despite the very recent slaughter of German and Japanese civilians in the U.S. strategic bombing campaigns during World War II – or perhaps because of that recent experience – U.S. leaders were reluctant to organize the nation's defenses around the strategy of strategic nuclear terror bombing.

But despite their moral concerns, Truman and other senior U.S. leaders quickly reversed course and decided that the United States would use nuclear weapons during a major war in Europe. The Berlin crisis of 1948 was a watershed. When the crisis began, U.S. officials understood that their conventional forces in Europe were vastly outnumbered. JCS estimates

[69] Sagan, "Change and Continuity," p. 283; Rosenberg, "Reality and Responsibility: Power and Process in the Making of United States Nuclear Strategy, 1945-68," Journal of Strategic Studies, Vol. 9, No. 1 (March 1986), p. 38.
[70] Rosenberg, "Origins of Overkill," pp. 11-13; Sagan, "Change and Continuity," p. 283.

suggested that Soviet divisions in Europe outnumbered U.S. forces 135 to 2. Even if these estimates exaggerated Soviet capabilities, a conventional defense of Europe was a non-starter.

Defending West Berlin from a Soviet conventional attack was even less plausible. West Berlin was a vulnerable island in the middle of East German territory. U.S. and Allied forces, therefore, would have to fight their way up the East German autobahn to support the small U.S., French, and British garrisons in West Berlin – a military impossibility. The 1948 Berlin crisis forced U.S. political leaders to confront the possibility of a near-term war against the Soviet Union for control of Europe. The normative concerns were tossed aside, and the U.S. Secretary of Defense directed the Pentagon to cease work on conventional war plans for Europe. Subsequent plans were to make full use of U.S. atomic weapons.[71]

The war plans that emerged called for the United States to respond to a conventional Soviet attack on Western Europe with a no-holds-barred atomic offensive against Soviet cities.[72] According to the plan, which was approved by the JCS approved in December 1948, the United States would initiate atomic attacks on the Soviet Union "on a first-priority basis" when hostilities began. The plan called for 133 atomic bombs to be dropped on 70 Soviet cities.[73] What is striking about the plan, however, is that the atomic campaign would be methodical. The atomic offensive would unfold over the course of a month because the bombs themselves took two days to assemble, and could only be assembled a few per day.[74] Furthermore, because only a few B-29 bombers had been modified to carry the 10,000-lb. devices, and because the Soviets had no nuclear capabilities of their own, there was no vital need to rush the strikes.[75]

U.S. military planners did not believe that the 70-city assault would win the war or even prevent the Red Army from conquering Western Europe. First, the atomic blitz might fail. As described earlier, U.S. bomber crews had poor maps, only a rough idea of the location of several target cities, and they would have to navigate to their drop points without reliable geographic reference points in the dark. Even worse, they would have to proceed to their targets for much of their sortie without fighter escort.

The difference between the atomic attacks on Japan and the planned missions against the Soviet Union are striking. The United States practiced atomic bombing runs before conducting the actual attacks, and conducted both the practices and actual attacks in daylight against well known targets. Japanese air defenses never came up to challenge the 3-plane nuclear strike groups – in practice or during the operations.[76] By contrast, the attacks on the Soviet Union

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[71] Rosenberg, "Origins of Overkill," p. 13.

[72] Steven T. Ross, *American War Plans: 1945-1950* (London: Cass, 1996), p. 84-91; Harry R. Borowski, "A Narrow Victory: The Berlin Blockade and the American Military Response," *Air University Review*, (July-August 1981), p. 3.

[73] Kunsman and Lawson, p. 23; Sagan, "Change and Continuity," p. 283-84;

[74] Borowski, "A Narrow Victory," p. 5. He cites: Letter, General Hoyt Vandeberg to Commanding General, Hq Strategic Air Command, 13 July 1948, Air Force OPD A/AE 381 (Atomic Weapons Test), and Memorandum for General Schlattter from William E. Kennedy, Office Assistant Operations for Atomic Energy, 27 August 1948, AF OPD A/AE 381 (Harrow).

[75] Sagan, "Change and Continuity," p. 284; Rosenberg, "Origins of Overkill," pp. 14-16.

[76] The 3-plane practice bomb runs – called "pumpkin" raids because they each dropped a single bomb to simulate the a-bombs – served both to increase crew proficiency and to "condition" Japanese air defenses to believe that the 3-plane missions were not a threat (relative to the ongoing fire-bomb raids). The Japanese therefore made an

would be nighttime raids against targets the pilots had never seen, facing air defenses. In World War II and exercises, the average miss-distance for high-altitude radar-guided attacks was roughly a mile – the destructive radius of the bombs. It is quite plausible that a U.S. atomic offensive would have failed to deliver more than a fraction of the intended weapons.

But even if the atomic offensive was an operational success, the JCS expected the Soviets to fight on and quickly conquer Europe. An atomic blitz would wreck the Russian state, but U.S. analysts expected the Red Army to continue its offensive operations, stopping only when the Red Army ran out of "POL" – petroleum, oil, and lubricants.[77] U.S. plans assumed that the Soviets would reach the Pyrenees Mountains in Europe and simultaneously seize Iranian and Iraqi oil fields in the Middle East within 60 days of initiating war, and control China up to the Yellow River and South Korea within 150 days.[78]

The Effect of "Existential" and "Minimum" Deterrence

In 1949 the Soviet Union detonated its first atomic bomb. The ensuing period of existential deterrence did trigger abrupt changes in U.S. war plans – but not the changes that advocates of existential deterrence would expect. Rather than shy away from using atomic bombs against the Soviet Union, the United States responded to the Soviet test by making three significant changes to its strategic doctrine: the JCS elevated the priority of nuclear weapons in U.S. plans, placed paramount importance on immediate U.S. escalation and rapid execution of U.S. atomic operations, and explicitly assigned the highest-priority to strikes against Soviet nuclear targets.[79] Soviet cities stayed in the war plan – in fact, U.S. planners surprisingly found 104 cities of substantial enough strategic importance to justify at least one atomic weapon.[80]

By the mid-1950s, the Soviets finally deployed a "minimum deterrent" force – one that was capable of striking the U.S. homeland, but which was not particularly survivable. This force did not dissuade the United States from its nuclear-centric plans for war in Europe. In fact, as in the previous period, growing Soviet nuclear capabilities simply caused an expansion of U.S. nuclear targets with even greater emphasis on the BRAVO set.

For example, by 1955 the U.S. war plan called for prompt nuclear strikes against an enormous number of airfields across the Sino-Soviet bloc: 645 airfields including main bomber bases, training facilities, other military airfields, and a large number of civilian airports.[81] These

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explicit decision against intercepting the strange 3-plane bombing raids. Obviously the circumstances would be very different during a war between the United States and Soviet Union. For a description of the practice raids against Japan, see Reed and Stillman, *The Nuclear Express: A Political History of the Bomb and its Proliferation*.

[77] Rosenberg, "Origins of Overkill," pp. 14-16.

[78] [Ross]

[79] Rosenberg, "Reality and Responsibility," pp. 39-40; Sagan "Change and Continuity," pp. 288-89.]

[80] Rosenberg, "Origins of Overkill," p. 16.

[81] Sagan, "Change and Continuity," p. 288. Hitting 645 airfields provided very thorough coverage of actual and suspected Soviet bomber facilities, plus large numbers of supporting facilities and plausible dispersal bases. The thoroughness in U.S. targeting is indicated by a subsequent 1961 report that mentioned the approximate number of targets that would be struck in a U.S. nuclear attack that year. The 1961 report mentioned approximately 200 targets – including bomber bases and support airfields, and dispersal bases. Robert McNamara, "Appendix I to the Memorandum for the President," September 23, 1961, pp. 5-6.

were top priority targets because Soviet bombers were the only force that could be used for nuclear retaliation. The U.S., therefore, intended to destroy the Soviet strategic force on the ground by striking the bombers' main facilities and their likely dispersal bases. The plan also called for strikes on an additional 25 targets associated with Soviet nuclear energy, as well as attacks on 118 cities in the Sino-Soviet bloc.[82] Targeting these cities meant every city with a population over 25,000 people would be hit with a nuclear strike.

The sheer destructiveness of the planned U.S. nuclear offensive is mind-boggling. First, most of the 645 airfields were in or near cities, so many of the 118 cities on the target list would be hit several times – by the bombs designated for the city as well as the bombs dropped on nearby airports. Second, by 1954 U.S. bombers began to be outfitted with thermonuclear weapons – each with at least 500 times the destructive yield of the "small" bombs that wrecked Hiroshima and Nagasaki. Finally, many of the U.S. nuclear strikes on the Soviet Union would have been ground bursts – i.e., detonations at or near the surface – which would have spread plumes of radioactive fallout across Eurasia.

The vulnerable Soviet retaliatory force also reinforced the importance of immediate escalation – or, it was hoped, preemptive strike – in U.S. planning. Soviet nuclear forces would need to be hit as hard and quickly as possible. Simply put, the deployment of a Soviet minimum deterrent did not force the U.S. to adopt a conventional-war-only strategy for defending Europe; instead, it forced the United States to assign nuclear warheads to every major airfield in the Communist bloc, and to plan to launch this attack at the earliest possible sign of hostilities.

Four other points about U.S. war plans in this period are critical. First, the documents are clear that the reason that the U.S. felt it could rely on a "nuclear-first" strategy throughout the 1950s was because of U.S. nuclear primacy – meaning the U.S. ability to strike the Soviet Union without the Soviets having a good chance of retaliating against the U.S. homeland.[83] Second, U.S. war plans were repeatedly debated at the highest levels of the U.S. government throughout the decade. The debates show that the nuclear-centric plan for defending U.S. interests was not merely the work of Pentagon planners who were divorced from high-level political guidance. To the contrary, the president and his key advisors took a strong interest in U.S. war plans.

Third, the plans described above were not "just plans" – they provide accurate insight into what the United States would have done had war erupted in the 1950s. On several occasions U.S. political and military leaders suggested to the president that he might want to develop a range of plans to give him options during a crisis or a war. He repeatedly rejected those suggestions and insisted that there only be one plan: winning by "hitting the Russians as hard as we could." As Eisenhower explained in his pithy fashion during an NSC meeting, "They...will have started the war, we will finish it. That is all the policy [I have]."[84]

Finally, the debates over U.S. war plans in the mid-to-late 1950s reveal growing concern in the United States about the viability of U.S. strategy. U.S. leaders were explicit about their

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[82] Sagan, "Change and Continuity," pp. 287-88; Rosenberg, "Origins of Overkill," p. 39.
[83] "U.S. Strategic Objectives and Military Deployments in NATO, As Related to the Problem of Arms Control," WSEG Staff Study no. 83, 30 August 1961, pp. 2-3, 10. [Add cites and quotes]
[84] Cited in Peter J. Roman, *Eisenhower and the Missile Gap*, pp. 82-84

reasons for doubting the future of existing U.S. strategy: because the Soviets were developing a survivable retaliatory capability, the U.S. would soon be unable to credibly threaten a massive first strike, and would have no palatable options if war actually came. For example, in May 1958, National Security Advisor Robert Cutler began a NSC meeting by laying out the issues that were driving the ongoing review of US national security policy. Cutler said: "First. The realization that both sides are capable of delivering massive nuclear devastation (regardless of which side strikes first) increasingly deters each side from initiating, or taking actions which directly risk, general nuclear war." Cutler warned that parity would make U.S. allies doubt Washington's resolve to use nuclear weapons to defend them, and embolden the Soviets. His conclusion: "Sixth. [The US needs] A US flexible and selective capability (including nuclear) to deter or suppress limited military aggression;…"[85] U.S. Secretary of State John Foster Dulles agreed with Cutler's diagnosis of the problem, arguing in a June 18, 1958 meeting that: "Time is soon coming when our NATO allies will not be satisfied that American will surely go to general nuclear wear to defend them, if attacked, and risk American devastation; and will demand a surer strategic concept."[86]

In other words, the documentary record explicitly connects the emergence of "assured retaliation" with the realization in the United States that prompt escalation, and preemptive nuclear options, would soon cease to be a reliable bedrock for U.S. strategy to defend Europe.

The Emergence of "Assured Retaliation"

U.S. war plans began to change in the early 1960s as the Soviets finally deployed an assured retaliation force. Some aspects of U.S. planning stayed the same: for example, U.S. war plans continued to include preemptive nuclear options. Furthermore, U.S. civilian leaders – right up to the president – focused carefully on the paramount issue in the nuclear balance: whether or not the U.S. could surprise the Soviets and destroy their *long range* nuclear delivery systems in a first strike. For example, in 1961, at the height of the Berlin crisis, President Kennedy asked for an immediate briefing by the Joint Chiefs of Staff on the possibility and likely outcome of a surprise U.S. counter-force strike on Soviet nuclear forces.[87] But in other ways U.S. thinking about defending Europe changed dramatically. By 1962, as the odds of a successful U.S. preemptive strike dropped, the United States pushed for new defense concepts for NATO.

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[85] The debates during the Eisenhower Administration are summarized in Peter J. Roman, *Eisenhower and the Missile Gap*, pp. 68-74.

[86] Roman, *Eisenhower and the Missile Gap*, p. 78. Dulles understood that the U.S. strategic concept would soon be obsolete, but he did not give his full support to Cutler because he did not believe that Cutler's alternative strategic posture feasible. (ibid, p. 78). Dulles told the President in a private meeting that he believed that the current nuclear-centric strategy "is rapidly outliving its usefulness and we need to apply ourselves urgently to finding an alternative strategic concept." (Roman, p. 78) In Roman's words, "Thus, the problem of massive retaliation's lack of credibility in Europe pushed John Foster Dulles to the brink of endorsing a policy of Flexible Response, only to have him back down because of economic costs, Eisenhower's obstinance, and his own inability to present an acceptable alternative." (Roman, p. 79)

[87] Chillingly, Kennedy explicitly asked the JCS to tell him whether the U.S. could facilitate a nuclear disarming strike on the Soviets by limiting the size of the bomber attack (to increase the chance of surprise) even though doing so would force the U.S. to spare Soviet medium-range nuclear forces (i.e., those that could retaliate against America's European allies.) Cite. [And add other Kennedy-1961-preemption stuff – i.e., Kaplan, NSArchive, etc.]

First, the United States reversed a decade of thinking about the planned timing for a U.S. nuclear strike. Rather than strike preemptively, or during the first moments of major conventional war, the U.S. sought to delay nuclear escalation for as long as possible. If war erupted, the United States would initially rely on conventional forces to resist the Soviet attack for as long as possible; only when NATO's conventional defenses began to crumble would nuclear escalation be warranted. This was not merely a symbolic change; during the 1950s the formation of NATO and rearmament of West Germany, and the modest enhancement of U.S. conventional forces in Europe made the conventional military balance far more competitive than it had been a decade earlier.[88]

Second, the targets for the initial U.S. nuclear strikes changed. Rather than launch a full strike on every major Soviet city, and on their nuclear forces, the U.S. planned to begin with tactical (i.e., battlefield) attacks on Soviet conventional forces. Only if those failed to end the war would the United States consider escalating to strategic nuclear war.[89] Third, the U.S. searched (in vain) for ways to fight a strategic nuclear war without attacking each others' cities – this was impossible, U.S. leaders soon realized, because so many of the other targets in the nuclear war plan – e.g., those associated with Soviets military forces (conventional and nuclear) – were located in or near cities. Therefore, even a "no-cities" war plan would cause so much damage to cities that the targeting restraint might not even be noticed by the Soviets. Finally, the U.S. became pre-occupied with war termination, trying to figure out how to stop a nuclear war before it burned itself out.

The changes that were ushered in when the Soviets developed an assured retaliation force should not be exaggerated: nuclear weapons still played a major role in U.S. and NATO's war plans. The United States still planned to use nuclear weapons if NATO's conventional defenses were failing. And there was still a real chance that a war would escalate to a full-scale nuclear exchange, destroying both sides' cities. But in contrast to the earlier periods, the debates within the U.S. government over U.S. war plans showed that U.S. leaders were desperate to avoid this chain of events. In the 1960s they wanted conventional options – which they had eschewed throughout the 1950s; they wanted escalation firebreaks, whereas in the 1950s they simply wanted to strike the Soviet homeland as hard and as quickly as possible; and U.S. planners desperately wanted to find ways to limit escalation, whereas earlier they wanted to rapidly destroy the Soviets. The Soviet arsenal finally paid real dividends for the Soviet Union in the early 1960s; it substantially reduced the odds that the United States would launch a major nuclear strike on Soviet cities should war come, and it forced the United States into a huge strategic quandary about how to defend Western Europe when the conventional options were poor and the nuclear options were suicidal.

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[88] See the great analysis of the conventional balance in Enthoven and Smith, *How Much is Enough*?.

[89] See, Maxwell D. Taylor, "Memorandum for General Leon W. Johnson, Director Net Evaluation Subcommittee Staff," 13 June 1963, and the attached "The Management and Termination of War with the USSR," passim. For a more general discussion of NATO defense concepts circa 1961, see "U.S. Strategic Objectives and Military Deployments in NATO," pp. 4, 37, 39, 44-48. [add quotes]

Summary: U.S. Strategic Posture

Neither existential nor minimal deterrent forces were sufficient to deter the United States from defending Western Europe by initiating a full-scale strategic nuclear war. Until the Soviets deployed an assured retaliatory force, the United States planned to win World War III by attacking Soviet nuclear facilities and smashing Soviet cities with a major nuclear attack. But as soon as the Soviets had an assured retaliatory capability things changed for the United States. Suddenly the aim of war was to avoid escalation, or restrict the scope of the targets while suing for peace.

COUNTERARGUMENTS

In this section we consider two counterarguments. The first critique suggests that our use of U.S. "strategic posture" as a dependent variable is misguided. At most our study reveals how Soviet nuclear capability affected U.S. war plans, but it doesn't reveal much about *deterrence*, because "plans are just plans." Second, perhaps the changes that occurred in U.S. strategic posture happened for other reasons (not because of changes in Soviet nuclear capabilities) – perhaps because Kennedy replaced Eisenhower?

Plans are just plans

Critics may wonder whether we can draw reliable conclusions about deterrence by looking at changes in war plans. Peacetime war plans, they say, are dubious indicators of the actions a country will take during war. When war approaches, political and military leaders can often select from a range of existing war plans – or tweak the plans they have.[90] The best study we've found that compares war plans with wartime operations, by Michael C. Desch, reinforces this critique. Desch looks at the military plans that were formulated in Germany and France prior to the two World Wars and discovers that in each case the peacetime plans were substantially changed as war approached.[91] According to critics, plans are not really the first casualty of war -- they usually die before the shooting starts.

In fact, we see evidence from the Cold War that supports Desch. As the Berlin Crisis of 1961 escalated, and the possibility of major war began to seem very real, the Kennedy Administration began a Top Secret project in the White House to improve U.S. plans for waging war against the Soviet Union. The White House brought together military planners and senior civilians to improve the President's military options, and they outlined an alternative plan that would be substantially different from the existing European War Plan.

Although plans are not generally reliable indicators of what countries would do during wars, U.S. war planning in the 1950s and early 60s for the defense of Europe is an exception. First, there was considerable senior political oversight for U.S. strategic posture. In both the

[90] For example, the lead-up to Operation Desert Storm and Operation Iraqi Freedom involved considerable back-and-forth between U.S. military planners and senior political leaders in Washington. In both wars, the actual military operations were quite different from the off-the-shelf plans.
[91] Michael C. Desch, "Planning War in Peacetime," *Joint Forces Quarterly* Vol X No X (Spring 2002), pp. 94-104.

Eisenhower and Kennedy Administrations, there were repeated debates about strategies for defending Europe, and the wisdom of relying on a nuclear-centric strategy, at the highest levels of government. The National Security council directly addressed this issue on at least [number] occasions, and the debates were ultimately resolved the by senior political leaders – including the president – rather than military planners in the Pentagon.

Second, throughout the 1950s, the United States did not have a range of military options for defending Europe: U.S. leaders had one war plan.[92] The plan steadily evolved, as SAC acquired more and better nuclear delivery systems, and as the number of targets in the Soviet Union ballooned, but the President would not have had a list of military options had the Soviets crossed the Inter-German border; he had a single option.

In fact, one of the key differences between U.S. "strategic posture" in the 1950s and 1960s is that in the 50s the U.S. had only one war plan (at any given time) for fighting World War III, while the 60s saw the proliferation of options. There was only one plan in the 1950s because the senior civilian leaders knew what they would do if a new world war were thrust upon them. In contrast, starting in the 1960s, U.S. civilian leaders asked the military to produce an ever expanding set of options for waging war in Europe precisely because all the options were bad, and because U.S. leaders did not know what they would do if war erupted. With only one option, we can say with some confidence that had war erupted in 1959 the United States would have launched the massive SAC campaign against the Warsaw Pact that was outlined in U.S. war plans – and that conclusion is enough to cast great doubt on both the "existential" and "minimal" deterrent views. We cannot say what the United States would have done had war erupted in the mid-1960s or later – because U.S. leaders themselves did not know. But we attribute that change – from a period of near-certain strategic nuclear offensive to a period of options and uncertainty-- to the growth of Soviet nuclear capabilities.

Third, and most importantly, although there are many examples of political leaders modifying peacetime war plans as war approaches, it is essential to note the limits of those modifications. As Desch shows convincingly, German leaders altered the Schlieffen plan before World War I, weakening the right wing of the German attack and strengthening the left. Similarly, in the months before World War II, the German leadership relocated the main thrust of their attack on France to the Ardennes forest. While these changes had big effects on the battles that followed, they were changes to the weight and location of the ground offensives – they were *not* radical revisions of the entire concept of how Germany would fight. To say this differently, German leaders adjusted how they would invade France – they didn't abandon the ground invasion altogether for, say, a naval campaign. Alterations on the latter scale, of course, would have been infeasible.

Skeptics who think we attribute too much weight to "just plans" in the 1950s, however, are positing that, during a crisis, U.S. leaders might have fundamentally changed the U.S. military's core concepts of how they would fight the Soviet Union. The peacetime plans to begin the war with a major strategic nuclear offensive would be overturned for, say, a conventional defense with only limited nuclear operations. But it is hard to see how U.S. leaders could conjure up plans for the conventional defense of Europe during a crisis. A change of that

[92] [Cite/see Cambell Craig pp. 94, 111, and 117, esp. for Ike and single plan.]

magnitude would require entirely different concepts of operations throughout Europe. Even if the U.S. had been the only major military actor in NATO, changes of that magnitude during a crisis would have been impractical. Given that NATO's conventional power was provided by a multi-national force, such radical changes during a crisis seem far-fetched.

U.S. military planning during the 1961 Berlin Crisis illustrates this distinction. As the Kennedy Administration realized that the crisis could lead to a major war in Europe they reviewed U.S. war plans and were unsatisfied with the only option they had – a single massive nuclear strike on the entire Warsaw Pact. But the White House effort to create an alternative war plan did not come up with a radically different way of fighting the Soviets, such as a protracted conventional defense of Europe. Instead they created a *modified strategic nuclear offensive*. The major change – akin to German leaders' decision to relocate their major advance through the Ardennes – was to reduce the size of the initial U.S. nuclear strike force, so that they could slip through holes in the Soviet radar network and increase the odds of destroying all long range Soviet nuclear delivery systems on the ground.

In sum, during crises leaders can adjust plans, but they are limited by available forces, existing military doctrine, and the need to coordinate militarily and politically with their allies. Given those constraints, the United States had only one option for defending Europe in the 1950s: launching a strategic nuclear offensive against the Soviet Union. The change we observe from the 1950s to the 1960s -- the initial embrace and then subsequent abandonment of nuclear-centric plans for waging war in Europe – reveals a major shift in U.S. strategic posture, and reflects a significant reduction in U.S. willingness to launch strategic nuclear attacks on the Soviet Union.

Counterargument #2: Change in Administration

Perhaps the change in U.S. strategic posture did not occur because of the growth of Soviet nuclear capabilities, but because of the change in U.S. administration.

- Ike to Kennedy
- Republican to Democrat
- Conservative to Liberal
- Fiscal conservative to New Deal / Great Society liberals

Our answer:

- The change in U.S. posture did not happen abruptly at change of Admin
- Support for the nuke-centric approach was eroding throughout the late 1950s; Ike's senior national security advisors fell away one-by-one until by the end of the Administration, perhaps only the President among all the principal national security officials supported it.
- The reasons IKE admin officials were moving away from nuke centric plans were exactly those we posit here: the growing Soviet capability to retaliate. Docs show senior IKE officials arguing internally that the U.S. strategic posture will make no sense as soon as the Soviets are able to launch a devastating retaliatory blow.

- Similarly, JFK administration did not immediately reject strategic nuclear attack as a means of waging World War III. Furthermore, the JFK Administration's analysis of the strategic imperatives facing the United States in the early 1960s framed the issues (regarding defending NATO) the same way that the IKE administration had: for example, during the Berlin crisis of 1961, when JFK and his senior advisors talked about their military options, they focused on what would be the key issues if Soviet Capabilities were driving their assessments of their strategies: evaluating U.S. ability to destroy Soviet long-range retaliatory forces. That's what the Bundy/Kaysen group was doing in the White House during the Berlin Crisis.
- What may be true, however, is that the nuclear-centric strategy was particularly attractive to Ike because of his fiscal conservatism and his deep aversion to spending enough during peacetime to maintain large conventional forces – but the favorable nuclear balance made that relatively "low cost" strategic posture possible – until the Soviets built up.

CONCLUSION AND IMPLICATIONS

In 1949 the Soviet Union tested its first atomic bomb, but that did not protect them from nuclear attack. To the contrary, had a major war erupted in Europe anytime in the following decade, the United States planned to promptly launch an extensive nuclear-bombing campaign against targets throughout the Soviet Union, China, and Eastern Europe. The United States abandoned this nuclear-centric plan of massive strategic nuclear offensive only after the Soviets acquired an "assured retaliation" capability, not when the Soviets first joined the nuclear club or developed delivery systems capable of reaching the U.S. homeland.

These findings appear to validate the deterrence school of assured retaliation, but for several reasons the evidence may actually suggest that *assured destruction* is the more stable foundation for deterrence. First, an assured retaliatory force was necessary to deter U.S. leaders during the Cold War, but a prudent deterrent must also deter highly risk- and cost-acceptant leaders of revisionist states. Few historians would portray U.S. Presidents Dwight Eisenhower or John Kennedy as revisionist leaders who sought to overturn the global order. Thus, the level of nuclear retaliatory capability necessary to deter these kinds of leaders would seem to present a lower bound for a robust deterrent. History is replete with more aggressive, cold-blooded, and risk-tolerant leaders. If reliably deterring these leaders during high-stakes crises is the fundamental purpose of a nuclear arsenal, then building an assured destruction force may be required.

Second, an assured retaliation force may not be "assured" into perpetuity if states are engaged in a serious security competition. Many great powers in history have created first-rate militaries, which use peacetime to innovate and capitalize on new developments to maximize their fighting ability. Given the inherent unpredictability of technological change, an assured retaliation force today could become a mere minimum deterrent tomorrow. For example, in the current era, a small mobile missile force (when deployed out of garrison) is essentially survivable – but it may not be in the future if an adversary develops better intelligence,

surveillance, and reconnaissance (ISR) for tracking mobile missiles, perhaps while simultaneously deploying more effective missile defenses. During the Cold War, the Soviets might have been satisfied in the late 1960s or early 1970s with a small submarine-based force and decided to forego the major strategic buildup that followed. But given U.S. innovations in anti-submarine warfare, a Soviet "assured retaliation" force centered on a small submarine fleet and a few ICBMs could have been transformed into a "minimum deterrent" – perhaps without the Soviets ever knowing the change had taken place. The massive and diverse superpower arsenals of the late Cold War period were not realistically subject to downgrade through the efforts of one side or the other, but the smaller arsenals more prevalent in the 21st century could well be more susceptible to such vicissitudes.

Readers familiar with the force requirement debates of the late Cold War period might erroneously interpret this discussion of the potential merits of assured destruction as a brief for building and maintaining massive nuclear arsenals. That is not the case. The actual assured destruction requirements for the United States vis-à-vis any existing adversary appear modest – even compared with the current shrinking force. Today the US has roughly 1,500 deployed strategic warheads, down roughly 85 percent from the end of the Cold War. Yet, an assured destruction force can probably be maintained below even this greatly reduced force level. Assured destruction does not require huge arsenals.

Finally, it is essential to note that neither an assured retaliation capability – nor even the assured destruction" force that the Soviets started to field in the mid-1960s – were "enough" to deter NATO nuclear escalation during a major war in Europe. Right to the end of the Cold War, NATO was prepared to use nuclear weapons, if necessary, to prevent a major military defeat on the Continent. Even in the last decades of the Cold War, when NATO stood no real chance of winning a strategic nuclear exchange, the Alliance planned to escalate *coercively* to try to force the Soviets to halt the ongoing conflict. NATO's initial strikes would probably have been aimed at targets in Eastern European – far from the Soviet homeland – but the message to the Soviet leadership would have been clear: the war is spinning out of control, and it's time to stop.

What scholars and policy analysts often overlook is that the logic of coercive nuclear escalation endures today – but the tables are turned. Future U.S. adversaries may have the same incentives that NATO faced in the last decades of the Cold War: to use tactical and theater nuclear strikes to stalemate the overwhelming conventional military power of the United States. A truism among U.S. nuclear force planners today is that no rational enemy would use nuclear weapons first against the United States. That belief ignores Cold War history – and U.S. strategic posture from the recent past.

In sum, it was not until the early 1960s that the Soviet arsenal ceased to be primarily a target, and became a robust deterrent. Countries who maintain nuclear weapons presumably do so for the capabilities they provide – not for everyday peacetime relations, but for dark times. Cold War history suggests that to have a solid foundation of nuclear deterrence, which will deter in desperate times, symbolic arsenals – those without delivery systems, and those that are not truly survivable – are not sufficient. It is said that a little knowledge can be a dangerous thing; the same may be true about nuclear arsenals.