Designing Effective Social Control for Nuclear Safeguards: Matching Strategies to Context or "One Size Does Not Fit All"

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INTRODUCTION

Almost every scholarly book or journal article on nonproliferation written since 1989 begins by declaring that the end of the Cold War requires that we adopt new strategies for managing nuclear proliferation in the decades ahead /19, 31/. As the US Secretary of Defense recently noted, "the simple threat of retaliation that worked during the Cold War may not be enough to deter terrorists or aggressive regimes. . . . This new danger requires some new thinking and new leadership on how to prevent, deter and, if necessary, respond to this threat" /46/. Essentially, the argument rests on the assumption that new proliferation threats require new nonproliferation strategies. And, indeed, the end of the Cold War has seen deployment of new nonproliferation tools, most notably in the use of positive inducements for the Ukraine, Belarus, and Kazakhstan to return Soviet nuclear weapons to Russia and for North Korea to forgo development of an indigenous nuclear weapons capability.

Thus, recent theory and practice both suggest that effective international proliferation policy requires a matching of specific strategies to specific threats. As Richard Betts has noted, "no solutions at all . . . are applicable across the board" /9/. Reviewing the scholarly literature on nonproliferation policy reveals, however, a lack of a dominant theoretical model or even a field of contending theoretical models for matching strategies to threats. The categorizations of both threats and strategies appear ad hoc, theoretically unnuanced, and fundamentally unsatisfying. For example, one recent book concludes by dividing nonproliferation strategies into incentives and disincentives even while recognizing that this simple dichotomy fails to capture adequately the variance in available policy instruments /50/, while another divides nonproliferation strategies along

the rather unsophisticated lines of diplomatic and military instruments /11/.

In this paper, I take Betts' declaration seriously: one size of policy cannot fit all threats. Yet, I seek to go beyond such a generic claim to develop a theoretically informed model for matching nonproliferation strategies to proliferation threats. Of course, policy makers appear to have done quite well without such theoretical guidance at devising and deploying differentiated policies, either implicitly or explicitly, shaped to best respond to the character of the specific threat. However, I believe that an improved model of the threat-strategy nexus would nonetheless improve our understanding of why a given strategy sometimes succeed and sometimes fails and thereby improve our ability to devise and apply strategies that fail less often. I develop the model in three steps: developing a taxonomy of proliferation threats, a taxonomy of nonproliferation strategies, and a process for using the traits of the former to choose a strategy or strategies from the "menu" created by the latter.

A TAXONOMY OF THREATS

In addressing any given proliferation threat, a policy maker will want to know two things: whether to respond to the threat and how to respond to it. Providing that information requires categorizing threats according to two salient features: their urgency and their character. A short-term, static perspective leads us to dichotomize states into "threats" and "non-threats" based on their current intention and capability to acquire nuclear weapons /46/. A longer-term, dynamic perspective leads us to recognize that a state's nuclear intentions and capabilities position it along a threat spectrum between urgent current threats and unlikely future threats, with that threat position changing as intentions and capabilities

change. Especially if we seek to devise a proactive nonproliferation regime for the next several decades, we must establish a comprehensive mix of strategies that addresses immediate "extant" threats as well as the more medium and long term "latent" threats posed by those who may develop the capacity and/or the intention to "go nuclear" in the future.

Most analysts identify the crucial determinants of a state's decision to go nuclear as depending on its motivations and capabilities. The former have been referred to as the political determinants of nuclear intentions, ambitions, inclinations, preferences, or incentives, and the latter have been referred to as the technical determinants of nuclear capability, capacity, and potential /4, 9, 20/.

Motivations

States appear to seek nuclear weapons for two primary reasons: "defensive security, and assertive prestige and power" /9, 38, 52/. That is, states go nuclear for either security or status reasons. Israel, Pakistan, and North Korea appear to be "pure security-seekers" who face regional security environments involving immediate and severe security threats. Brazil and Argentina appear to more closely approximate "status-seekers" who faced less credible immediate threats of attack from neighbors and whose motivations were "strongly dominated by an ambition for status and regional power but without any genuine aggressive or expansionist designs" /43/. India and South Africa (at least through the 1980s) would appear to sit somewhere in between, having clear -- although less pressing -- security concerns but clearly also desiring nuclear weapons "as instruments of power and influence in world politics" that would improve their prestige and standing in the international community of states /14, 27, 43/. Other states such as Australia, Canada, and New Zealand seem to have clear anti-proliferation motivations arising from domestic political factors and chosen roles in the international system.

Because national security is a core goal of states, security-seekers tend to have both stronger and less unseatable nuclear ambitions than status-seekers. Israel, Pakistan, and North Korea have understandable reasons for believing that attacks by regional adversaries are both likely and potentially devastating /25/.

A state's nuclear motivations may be lessened by the alternatives the state has available for responding to the security environment they face. As the above dichotomy between security-seekers and status-seekers implies, nuclear weapons are not necessarily an end in themselves. If we accept a rational actor model of state behavior, we should expect that states will strive to acquire nuclear weaponry only if doing so proves to be the best available alternative for achieving security or status goals. In a given security environment, the choice to pursue nuclear weaponry will depend upon both the availability and the relative attractiveness of such options as conventional weaponry and external balancing through alliance formation.

In assessing just how threatening a particular state's proliferation threat is, the intention to acquire nuclear weapons has a logical primacy over the capability to acquire nuclear weapons. Nuclear intentions inherently entrain efforts to develop nuclear capabilities. In contrast, the capability to produce or procure nuclear weapons does not appear to entrain efforts to develop nuclear intentions. As Betts notes, "there is still no known case of a country that stumbled into interest in getting nuclear weapons because technology acquired to produce energy for civilian consumption made the weapons option more easily available" /9/. The "technological determinist" argument "that countries will acquire nuclear weapons if they are capable of doing so suffers from obvious empirical limitations" in the face of over 40 countries that have been unambiguously capable of developing nuclear weapons for years who have equally unambiguously refrained from doing so /23, 38/.

Capabilities

Like intentions, we can identify two major factors that determine the capability to acquire nuclear weapons: technological resources and financial resources. This categorization simply captures the fact that states can either buy nuclear weapons from foreign sources or develop them using indigenous technical expertise. Besides being security-seekers or status-seekers, states also can be "buyers" or "makers." States like Germany and Japan that are technologically sophisticated are likely to be makers, whereas states that are resource-rich but technologically less sophisticated (e.g., OPEC members) could be expected to be buyers. Of course, these are not completely substitutable factors: even a country that bought a completely assembled nuclear weapon (a more credible concern since the demise of the Soviet Union) would need considerable technical expertise to make use of that procurement, and, similarly, a country must spend considerable financial resources to develop nuclear weapons even if it has indigenous technical expertise.

These different determinants of a state's capability to acquire nuclear weapons have important implications for designing appropriate nonproliferation policies because they vary in both their implications for the speed of nuclear acquisition and the degree to which they are manipulable by other states. The ability of a state to transform technological expertise and resources into nuclear weapons is less susceptible to the influence of foreign governments than the ability of a state to transform financial resources into nuclear weapons.

Threat Urgency and Threat Character

Taken together, intentions and capability determine a threat's urgency or magnitude, and the factors that drive intentions and capability determine a threat's character or type. Conceptually, we can identify the nuclear intentions and capacity of a given state and place them on the illustrative "map" of threat urgency depicted in Figure 1. States in the northeast corner of this map have strong nuclear ambitions and strong indigenous technological capabilities and pose the most urgent threats. States in the southwest corner of the map have neither the intention nor the capabilities to acquire nuclear weapons and pose the least urgent threat. States in the northwest corner have the capability but lack incentives to acquire nuclear weapons and, for the reasons just noted, do not pose a significant current threat. States in the southeast corner have strong nuclear ambitions but lack the capability to acquire them and pose a near to medium term concern, if not threat.

Empirically, concern about proliferation threats appears to be driven primarily by intention and only secondarily by capacity. That is, threats seem to be ranked as follows: intention and capacity, intention but no capacity, capacity but no intention, neither capacity nor intention. To give but one example, nuclear-capable states that lack nuclear weapons ambitions are not mentioned in the most recent Defense Department assessment of proliferation /46/. "Threat lists" generally consist of the subset of "nuclear-ambitious" states that are "nuclear-capable" rather than the subset of "nuclear-capable" states that are "nuclear-ambitious." Thus, a line attempting to divide "threats" from "non-threats" would run more vertically than diagonally through this conceptual map.

This logical map of threat urgency may prove most useful in conceptualizing dynamic changes in threats. Consider the reduction in the proliferation threat posed by Brazil and Argentina during the late 1980s. Both states technological capacity to develop nuclear weapons remained unchanged as successful efforts at rapprochement reduced their motivation to use that capacity. In contrast, the greatest proliferation concerns involve movement of states from the southeast corner to the northeast corner or the problem of "opaque proliferation" where a state is actually closer to the northeast corner than commonly known /28/. As already noted, the strong motivation of states in the southeast corner lead us to expect them to be striving to move towards the northeast, consistently seeking to improve their technological capabilities for developing nuclear weapons indigenously or seeking ways to transform financial resources into purchased nuclear components. In contrast, there is usually less concern that states in the northwest corner will move towards the northeast. However,

the map itself highlights the potential future threat posed by states such as Germany, Japan, Sweden, Taiwan, or the tens of other technologically and financially nuclear- capable states in the world that may develop nuclear intentions in the future either because of changes in their security environment or in their domestic political environment /53/. "All advanced industrial countries with sophisticated nuclear power industries might be considered 'latent' nuclear weapons states: any one of these countries could, in theory, acquire a nuclear weapon within six to twelve months" /22/.

Although threat severity is represented in terms of the proximity of a state's position to the northeast corner of the map, threat character or threat type is captured by considering which of the two scales for each axis places the state in that position. In particular, the relative dominance of security vs. status as the basis of a state's nuclear motivations and of technological vs. financial resources as the basis of a state's nuclear capabilities influence the appropriateness and effectiveness of any given nonproliferation policy. States already sufficiently close to the northeast corner of this conceptual map or who seem likely to move in that direction pose four different types of threat: security-seeking makers, security-seeking buyers, status-seeking makers, or status-seeking buyers.

Predictions and expectations about the factors that lead, or will lead, a state to become a proliferation threat, i.e., that place it in or moving towards the northeast corner, as well as assessments about how close the state already is to the northeast corner provide the criteria necessary for identifying the most appropriate strategies to either retard or reverse proliferation efforts. Identifying the most appropriate and effective strategies depends on identifying both the threat urgency and threat character.

A TAXONOMY OF STRATEGIES

The nonproliferation policy literature presents a plethora of policy options for forestalling proliferation. Recent work ranges from remarkably long menus of carefully differentiated policies to limited lists of four or five broad policy options with little theoretical bite to broad and oversimplified dichotomizations of policies as diplomatic or military, or incentives and disincentives /9, 13, 20/. This section develops a taxonomy of nonproliferation strategies which seeks to classify the policy options that have been used or are available into a theoretical structure that provides a foundation for identifying whether, when, and how a given policy will succeed at reducing the proliferation threat posed by a given state.

In the most general terms, the nonproliferation regime seeks to either maintain or shift the

behavior of potential proliferators along a spectrum toward "desirable" behaviors in which proliferation programs and aspirations are explicitly, permanently, and sincerely renounced from "undesirable" behaviors in which nuclear weapons development and deployment are actively and aggressively pursued. I use the terms "desirable" and "undesirable" behavior change to capture the notion that the NPT and the associated nonproliferation regime have norms of behavior, however vague, that regime members, even if reluctantly, acknowledge as operative. I use "effective" to refer to the ability of a strategy to induce behavior which moves toward, even if falling short of, regime goals. I distinguish regime "members," i.e., the governments as well as nongovernmental actors involved in establishing and implementing a regime's strategy, from regime "targets," i.e., those actors whose behavior the regime seeks to alter, including member governments, nonmember governments, corporations, nongovernmental actors, and private individuals.

The first pair of strategies, punitive and remunerative strategies -- sticks and carrots -- manipulate the consequences a target faces to make desirable behavior more attractive or undesirable behavior less attractive. The second pair of preclusive and generative strategies alter a target's opportunities, reducing opportunities for undesirable behavior or creating opportunities for desirable behavior. The final pair of cognitive and normative strategies alter the target's perception of a given reality, either by altering the information targets have or the value that targets attach to certain behaviors and consequences. This taxonomy seeks to differentiate policies based on the mechanisms by which they influence the proliferation decision and behavior. I recognize that, at any given time, those seeking to forestall proliferation not only will, but should, promulgate sets of policies that combine features of the different ideal-types delineated here. The taxonomy is intended not to serve to classify complete policies or policy sets as to clarify the different mechanisms and pathways by which they influence proliferation behavior so that we can develop a better understanding of what policies work to slow proliferation and why they work.

Punitive

Punitive strategies, a particularly common and intuitive model for altering behavior, rely on sanctions, threats, coercion, or other efforts to discourage undesirable behavior by increasing its costs or reducing its benefits /24, 34, 49/. Calls for "treaties with teeth" and for better monitoring, verification, and enforcement highlight the appeal of deterrent strategies and the common view that most regimes would be more effective if only states properly implemented them. Downs, Rocke, and Barsoom /21/ recently have argued that deterrent

strategies including credible commitments to sanction noncompliance are the only strategies that can ensure high levels of compliance. The success of this punitive or deterrent strategy depends on convincing the potential proliferator that any effort to develop or procure nuclear weapons will a) be highly likely to be detected, b) be highly likely to be punished, and c) the punishment either will destroy the nuclear weapons acquisition efforts or will impose sufficiently costly other sanctions as to outweigh any benefits the proliferator expected to achieve by acquiring nuclear weapons. In standard deterrence language, detection and sanctioning must both be "credible," and the sanctions imposed must be "potent."

The multilateral safeguards system under the International Atomic Energy Agency (IAEA) and the unilateral proliferation detection efforts of many states constitute the first element of such a strategy. Recognizing that most states will resist the intrusion of any type of foreign surveillance, these policies provide access to peaceful nuclear technologies in exchange for rights to inspect nuclear facilities to ensure that nuclear equipment and material are not being diverted to military programs. If we distinguish policies of nuclear export control from policies of nuclear export denial, the former involve punitive/deterrent strategies that rely on receiving assurances that the importer will not use the technology transferred for military purposes, transferring the technology, using national systems of accounting and inspections to detect any diversions for military purposes, and threatening some form of punishment if such diversions are detected /44/.

Nonproliferation regime members have expended considerable effort to develop a safeguards system capable of detecting diversion of any significant quantity of nuclear material in a timely fashion /44/. To the extent this threat of detection is sufficiently credible, it is often implicitly assumed that this will alert other states in time for them to respond in ways that remove any potential benefits of diversion /44/. Most notably, such responses would involve military programs, alliances, and security guarantees intended to offset the hoped-for military advantage that motivated the nuclear weapons program /9, 45/. Essentially, this part of such strategies involves reducing the benefits the potential proliferant can expect to derive from going nuclear. Significant component of US nonproliferation strategy involves attempting to alter the calculus of potential proliferators to convince them that acquiring nuclear weapons will not achieve their objective of threatening the US. "One of the core objectives in [American] proliferation protection policy is to convince potential and actual proliferants that . . . [the US will] deny or limit the political and military utility of [nuclear] weapons" /46/.

As many analysts have noted, safeguards and inspections alone "may not suffice to deter violations. NPT parties must be aware that detected violations will be met with resolute responses. Verification would lose its raison d'être if violators could get away with impunity" /32/. A response must follow after safeguard activities identify proliferation attempts and the response must "outweigh any potential benefits" /18, 46, 47/. Potential punitive responses cover a wide range. At the milder end of the spectrum, IAEA, EURATOM, and the NPT can suspend current and planned technology transfers, recall prior transfers, suspend other membership privileges /32, 44/. Because such threats appear insufficiently potent as a deterrent to a state that has decided to acquire nuclear weapons, many analysts have recommended far harsher responses. "Offensive military options," "forcible disarmament," or "imposed arms control" involve explicit threats to use military means to destroy a state's nuclear capabilities before they can be used /20, 55/. Such threats have been urged and contemplated on both multilateral and unilateral bases /13, 37, 50/.

When carried out, as in Israel's 1981 bombing of Iraq's Osirak reactor, Iraq's 1980s bombings of Iran's Bushehr reactor, and the American bombing of Iraq's Al Tuwaitha facility during the Persian Gulf War, they have "demonstrated that proliferation by a 'crazy state' bore serious risk and would not be tolerated" /43/. Such imposition of sanctions serves to increase the credibility that a potential proliferator accords a declared policy of such sanctions and demonstrate the potency of those sanctions. These examples "strengthen deterrence of other would-be nuclear proliferators, and there is tentative evidence that the Gulf War may have already had this effect" /55/.

Punitive strategies face problems in terms of detection credibility, sanction credibility, and sanction potency. Two factors make detection difficult and limit the credibility of such a strategy. States have strong incentives (and capabilities) to keep military programs, especially nuclear ones, secret since doing so enhances national security by increasing the adversary's uncertainty and hence caution. The nature of a punitive strategy also inherently exacerbates these incentives because success at avoiding detection promises success at avoiding being sanctioned. Punitive strategies encourage governments and corporations "to keep secret the very types of information that can be significant" to preventing proliferation /10/. These dynamics create requirements for extensive and expensive monitoring programs that lead some to wonder whether "the intelligence community can keep pace with the threat?" /51/.

. The threat that sanctions will be imposed may also lack credibility. The more drastic the threatened sanction, the greater the required "exertion of political and military power," and states may simply lack the political will to impose

the threatened sanctions /13, 55/. The costs of imposing economic or military sanctions are difficult enough to overcome unilaterally, and are further exacerbated by collective action problems when multilateral sanctions are attempted /2, 33/. Experience with India, Israel, Pakistan, and even Iraq demonstrates that states committed to preventing proliferation find it politically difficult to respond to detected proliferation with sanctions adequate to alter a target state's behavior.

Sanctions may fail to appear potent. Harsh threats of attack may fail to deter a state from embarking on a nuclear weapons program, and, indeed, may reinforce the state's commitment to such a program by confirming that they face a hostile security environment /45, 50/. Milder threats, such as those the UN or IAEA might impose, may simply have little impact on things the target state values. The sanction of domestic or international opprobrium will likely prove insufficient to maintain nuclear abstinence if security challenges are significant /33/. Especially when faced with a very threatening security environment, the incentives to proliferate will usually dwarf any countervailing sanctions other states can be expected to impose.

Remunerative

Remunerative strategies reduce the costs or increase the benefits of desirable behavior to make it more attractive. Rewards are assumed to influence targets who lack any commitment to regime norms, have the capacity to fulfill those norms, but would otherwise not do so. Rewards effect behavioral changes either when targets view compliance as desirable but costly, or when they do not value compliance but do value the reward. Two different remunerative strategies adopted to alter the consequences of abjuring nuclear weapons involve either direct financial transfers, as evident in financial transfers for North Korean and Ukrainian nuclear restraint, or contingently enhancing a state's strategic environment, providing security guarantees or reducing security threats, in exchange for proliferation restraint.

Remunerative strategies address the fundamental point that, "to demand that a government forgo nuclear weapons is to demand that it compromise its own sovereignty. To expect it to do so without any compensating quid pro quo would not only be condescending but naive" /9/. The offers of both direct rewards in the form of new nuclear power facilities and improvements to the security environment in the form of removal of tactical nuclear weapons from the region provided the foundation for the current agreement by North Korea to forego its nuclear weapons program /43/. The Ukraine similarly received direct financial "compensation for the fissile material contained in the warheads and satisfactory assurances of security" in exchange for acceding to the NPT and returning Soviet nuclear weapons left on Ukrainian

soil to Russia /43/. In many cases during the Cold War, "an alliance with one of the nuclear superpowers meant that that superpower was willing to use its nuclear forces on behalf of the minor coalition partner. This willingness on the part of a superpower obviated the minor partner's need to develop independent nuclear forces" /29/.

Just as veiled and ambiguous threats may nonetheless deter, so vague and ambiguous rewards may lead certain states to forego their nuclear goals if doing so seems to promise sufficient rewards. Many states "explicitly or implicitly accept nonproliferation as a condition of joining the Western community of states" and enjoying the economic and political benefits of integrating into "the Western core community" /13/. Most recently, China appears to have signed the NPT at least in part "because it desires the benefits of trade and economic assistance from the West" /13/.

Remunerative strategies also face implementation difficulties. Just as the costs of punitive strategies make states reluctant to impose sanctions and thereby undercut their credibility, the costs of remunerative strategies make states reluctant to offer rewards to potential proliferators. When multilateral rewards are involved, collective action problems, not surprisingly, appear. For example, the US has funded both the Ukraine and North Korean programs while other nonproliferation supporters have proved more than happy not to contribute. Regime supporters also resist rewarding states that break the international norm against proliferation both because it seems distasteful and politically unpopular to reward undesirable behavior and because it creates incentives for extortion and blackmail attempts. These factors make states reluctant to provide large scale rewards to proliferators, even if doing so would effectively alter their behavior.

Lastly, the fact that a target accepts either financial transfers or security guarantees does not preclude them from continuing to pursue proliferation. As the extensive monitoring components of both the Ukrainian and North Korean deals make clear, neither financial or military assistance nor security guarantees "erase the attractiveness of nuclear weapons as an autonomous deterrent" /9/. The acceptance of an offered reward need not imply that the recipient has renounced nuclear weapons. Whether with respect to financial transfers or security guarantees, the target state may well accept the rewards while continuing in a more clandestine way, their nuclear program. "Structural constraints, especially the condition of anarchy, encourage self-regarding behavior that undermines confidence in international guarantees, even ostensibly firm military alliances, as a means for ensuring security. For practical strategic and normative political reasons, states prefer autonomy to dependence and, therefore, search for ways to provide for their own security" /33/.

Preclusive

If punitive and remunerative strategies increase the costs of going nuclear or increase the benefits of staying nonnuclear, preclusive and generative strategies decrease the opportunities for going nuclear and increase the opportunities for staying nonnuclear. Strategic trade embargoes and technology denial attempt to prevent (rather than deter) "have-nots" from acquiring certain technologies. Such strategies rely on a process of prohibiting precursor behaviors that regime members can more readily control and that, if prevented, also prevent the ultimately important undesirable behavior, namely nonproliferation itself /49/. Preclusive strategies tend to clearly proscribe precursor acts that themselves are not directly undesirable and use "premonitory surveillance" to detect acts before, rather than after, they occur /46, 49/. Preclusive strategies can reduce monitoring costs relative to a punitive or deterrent strategy by proscribing those behaviors most inherently transparent and most costly to conceal. Thus, efforts at technology denial are motivated in part by the difficulties of detecting nuclear weapons development and deployment.

Preclusive strategies have been a major element in the nonproliferation regime's effort to forestall nonproliferation by nuclear aspirants since its inception /53/. Unlike the punitive strategy underlying efforts to regulate and safeguard exports of nuclear technology under the NPT and the Nuclear Exporters Committee or "Zangger Committee," the Committee for Multilateral Export Controls (CoCom), the London Suppliers Group, and individual national regulations have sought the rather different goal of establishing "an embargo as concerns the most sensitive parts of the fuel cycle" /44/. The EURATOM agreement requires prior notice of expected shipments of nuclear material as a means to prevent, rather than punish diversion /44/. Such technology denial seeks to control "militarily critical technology, such as uranium enrichment, as a means to control the spread of nuclear weapons" /53/. Such denial consists of either complete bans on exports of certain nuclear technologies, or bans on exports to any country that has not accepted full-scope IAEA inspections /8, 40/. Preclusive strategies were urged as early as the mid-1970s in cases in which punitive strategies involving "end-use deterrents" seem likely to fail "to prevent the diversion of strategic technologies" /40/. For example, in response to the Soviet invasion of Afghanistan in 1979, the US forbid exports to the Soviet Union of any items on the CoCom list because of "the emerging consensus among U.S. officials that Soviet end-use assurances could not be trusted to protect against the diversion of U.S. exports to military use" /40/.

A particular advantage of preclusive strategies is that they do not "require understanding the motivations of the states that seek nuclear

weapons" /38/. Indeed, technology denial strategies are not susceptible to the risk that export control strategies face in which the intentions of the recipient state either change or are misinterpreted. The success of preclusive strategies, not surprisingly, depends on the indigenous capabilities of the target state and the strength of that state's motivation. Export controls appear to have significantly delayed, if not completely halted, "the diffusion of military or dual-use technologies" /17/. CoCom's strategic embargo of the Soviet Union allowed the West to maintain or widen military technology gaps, especially "in areas subject to tighter controls" and despite the embargo being far from complete /40/. Although much of nuclear weapons technology has become commonly available, critical parts remain difficult if not impossible for most states to produce indigenously /32/. Thus, even states with strong nuclear ambitions will be "significantly dependent on technological infusions from abroad" /12, 43/. The London Suppliers Group made it "extraordinarily difficult for Pakistan and Iraq to get their weapons programs in full swing, and certainly delayed them. That said, such restraints did not prevent Pakistan from eventually achieving the objective, and would not have prevented Iraq if the 1991 war had not intervened" /9/. "Technology denial has not reversed the nuclear weapons programs in states that strongly perceive their security as requiring nuclear weapons, although it has slowed progress in programs forced to rely on indigenous capabilities and covert activities" /53/. The weapons programs of states with strong nuclear ambitions driven by threatening security environments are unlikely to be stopped by a technology denial strategy /29, 53/.

Implementation difficulties of preclusive strategies revolve around the need for the regime to establish a set of "metasanctions" to induce governments to enforce export bans against their own corporate actors /1/. Indeed, much concern over sanctions in nuclear nonproliferation has been at this metalevel, i.e., seeking to induce countries like China to adopt and implement export control and related nonproliferation policies /36/. Preclusive strategies also founder when regime supporters lack the capacity or commitment to identify and prevent targets from engaging in the precursor activities or the undesirable behavior itself. Preclusive strategies are impotent against targets that have autonomous control over the targeted behavior and its precursor activities, a particular problem in dealing with states that have or can develop indigenous capabilities to design and build nuclear weapons. Thus, wealthier and more powerful states will be less susceptible to such strategies than developing states. Finally, preclusive strategies must rely on reinforcing strategies to address cases in which prevention fails. As the Toshiba sale of submarine propeller milling machines in violation of CoCom rules

clarified, any preclusive effort to prohibit certain exports must be "back-stopped" by a punitive policy that seeks to ensure that those technology transfers which are not prevented are at least identified after the fact /10/.

Generative
Generative strategies complement preclusive ones, creating rather than removing opportunities from targets' choice sets. Such strategies address undesirable behaviors that result from target incapacity; cases in which threats, rewards, or prevention will be unlikely to alter behavior. Generative strategies attempt to create new, more attractive opportunities which the target will choose on their own over the undesirable behavior. The American Cooperative Threat Reduction (CTR) program has sought to provide former Soviet states with otherwise-unavailable services, tools, and technology to facilitate the elimination of nuclear weapons and installation of safeguards against proliferation /46/. Without such resources, these states would be unlikely to be able to remove and dismantle these nuclear weapons as safely /46/. In an even more novel generative strategy, the US has funded "defense conversion industrial partnerships" and "international science and technology centers" in Moscow and Kiev to provide over 5,000 "job alternatives for weapons scientists who might otherwise be tempted to sell their nuclear expertise abroad" /42, 46, 56/. Of course, at the margin, generative strategies merge into remunerative strategies, but the former alter behavior by creating new alternatives rather than changing the consequences of existing alternatives. Generative strategies differ from remunerative ones in targeting capacity deficits, focusing on targets who can't, rather than won't, alter their behavior. Generative strategies assume targets want to but cannot fulfill regime commitments. The new alternatives tend to be made in a noncontingent fashion, with the assumption being that the targets will choose the new alternatively voluntarily.

In nonproliferation, during the 1950s, the United States successfully undermined the momentum of the Swedish nuclear weapons program by making weapons-incompatible civilian light water reactor technology and fuel available to the Swedes, thereby undercutting its weapons-compatible civilian heavy water reactor program. By providing Sweden with the new, and otherwise unavailable, alternative of light water reactor technology, the US policy delinked the civilian and military nuclear programs, thereby increasing the costs and undercutting the relative attractiveness of the latter program which the Swedes soon abandoned /39/. Sales of high technology conventional weaponry that would not otherwise be available to a state can help potential proliferants achieve their security goals without resort to nuclear weapons development. As with forward deployments of forces made on a noncontingent

basis (as opposed to the contingent security guarantees discussed as remunerative strategies), such strategies provide otherwise-unavailable improvements to a country's defense capabilities, creating strong incentives to refrain from developing nuclear weapons /46/. One analyst has urged that, India be offered "permanent membership in the UN Security Council in return for signing the NPT" to provide India with an alternative to nuclear weapons development as a means of achieving desired international prestige /14/.

Generative strategies face similar implementation problems to remunerative strategies. Because they involve the provision of resources to make the new opportunities available, wealthier regime members will simultaneously be required and reluctant to fund these opportunities. As evident in the programs to provide new job opportunities for ex-Soviet nuclear personnel, most programs have not been funded through multilateral collaborative efforts but rather by unilateral efforts. As with remunerative strategies, creating new opportunities for socially desirable behavior may not reduce socially undesirable behavior if the two are not mutually exclusive. For example, generative programs "intended to make [nuclear power plants] slightly safer for a short period of operation until Eastern [European] states can implement plans for shutdown has the unintended effect of prolonging the operations of the more dangerous" nuclear power plants /16/. Equally important, the success of generative strategies depends crucially on accurately predicting what choices the targeted actors will make if free to choose between existing options and the new options made available.

Cognitive
Regimes incorporating cognitive strategies provide targets with new, more complete, and more accurate information "in order to facilitate intelligent choices" that favor socially desirable behaviors /2/. The information can relate to the alternatives available, the causal relationship between behaviors and consequences, the costs and benefits of different behaviors, the current state or likelihood of various important decision parameters in the world, or the likely behavior of other actors. Diplomats and government officials may, to a limited extent, be able to provide new information as well as manipulate "means-ends" belief systems. "These strategies can rely on regime members to generate and disseminate the information themselves, to encourage others to generate and disseminate the information, or to mandate that others provide information in the course of private transactions. In the nonproliferation arena, at least part of the diplomacy has involved the perhaps heroic and often implicit effort to provide nonnuclear states with information to convince them that adding

nuclear weapons to their arsenal will not actually increase their security, and that they can increase their security more through other means /52/.

Cognitive strategies assume targets support regime norms and can fulfill regime requirements. The model assumes that targets engage in socially undesirable behavior because they mistakenly believe it to be privately desirable or beneficial, and that new information will induce targets to renounce undesirable behavior. Monitoring target behavior becomes unnecessary since actors serve as "their own ubiquitous inspectors, tailor their own standards to particular risks, and invoke their own sanctions" /3/. Implementation costs decline since altering information about consequences or opportunities usually costs far less than altering those consequences themselves.

Rather than attempting to manipulate costs and benefits through punitive or remunerative strategies, diplomatic efforts often attempt to reassure states that their security needs can be met through means other than nuclear proliferation and stress the political, economic, and military risks of nuclear weapons development, production and deployment /38, 46/. No-first-use pledges, for example, increase the "awareness of the limits of nuclear weaponry" /20/. Cognitive strategies also involve provision of specific, accurate intelligence regarding the status of regional proliferation so that states do not develop nuclear weapons because of unwarranted fears that their neighbors are proliferating /46/. Indeed, such strategies reduce the chances for "missile gap" type arms races driven by inaccurate information. Such strategies convince states not to undertake nuclear development programs that would otherwise appear desirable. Such cognitive strategies may also be useful in the post- proliferation stage as well to ensure that countries have the necessary knowledge to make intelligent choices regarding nuclear weapons control and safety /41, 45/.

Whether states perceive acquiring nuclear weapons facilitating their goals depends, of course, on actions as well as words. However, diplomats have some leeway in influencing how events are interpreted. Both the failure of India and Pakistan to gain international stature with their nuclear programs and Germany and Japan's ability to gain international without such programs (indeed, perhaps because they have not expended resources on such programs) can be highlighted to increase the perception that nuclear weapons are unnecessary and may be counterproductive to achieving international status. Such perceptions may be reinforced by the fact that developing nuclear weapons no longer carries the scientific and technical prestige it once did /50/. The recent completion of a comprehensive nuclear test ban treaty and corresponding rhetoric help strengthen the argument that nuclear weapons are less necessary to national security than previously contended. On the other hand, the effort and

rhetoric expended by nuclear weapons states in support of maintaining and relying on large nuclear arsenals tends to undercut efforts to convince nuclear-ambitious states that pursuing nuclear weapons is against their interests.

Cognitive strategies tend to fail when regime members institute them as cheap and nonintrusive ways to "do something," rather than because inadequate information is truly the source of undesirable behavior. Information-based strategies can induce a wide range and more dynamic set of positive behaviors if governmental, corporate, and private actors receive better information that allows them to more accurately assess the extent to which their individual interests coincide with regime norms. However, improving the accuracy of the information a state has about the nuclear aspirations and capabilities of its neighbors, about the costs and risks of nuclear weapons development, and about nuclear strategies and experiences of the nuclear weapons states will not prove adequate to alter their decision to "go nuclear." In many cases, states will rationally assess that their nuclear restraint may be in the interests of other states but not in their own national interest. Cognitive strategies will be impotent to alter behavioral choices unless those choices have been driven by inadequate or inaccurate information.

Normative

Normative strategies change behavior by altering targets' deep-seated values rather than the instrumental incentives that more proximately determine their decisions and actions. Regimes can establish strategies that induce targets to "change their practices because they have come to understand the world in a way that promotes certain actions over others" /54/. Normative strategies involve either collective or hierarchical efforts at consciousness-raising. During regime negotiations and recurring meetings, "leader" states may try to convince "laggards" to accept their norms of behavior, or regime members may work together to focus attention on a problem, create new collective norms, and increase member commitment to existing norms. Essentially, normative strategies involve rhetorical attempts to persuade targets not merely to adopt different means to their pre-existing goals, as in a cognitive strategy, but to adopt new goals. If the preceding five strategies are built on a "logic of consequences," a normative strategy is built on a "logic of appropriateness" /26/. By encouraging a "transformation of interests" so that states "rank adherence to global norms against possessing nuclear weapons above preserving national autonomy," such a strategy could "decisively weaken the incentives to deploy nuclear weapons" /33/.

Normative strategies do not alter the opportunities or consequences that targets face, but instead establish ongoing dialogues among regime members and between regime members and targets to promote regime norms. Normative strategies assume that targets' values are inconsistent with regime norms but are susceptible to policy manipulation, that targets have the capacity to adopt desirable behaviors, and that they will do so once their lack of an exogenous commitment to regime norms can be remedied through normative dialogue and education. Normative strategies, if successful, have the advantage that they "can begin to influence an actor as soon as an act is contemplated and before it is committed, whereas social disapproval and formal punishment can only be mobilized after the event and only in circumstances where others acquire evidence of who committed the act" /34/.

The debates in the NPT review conferences have sought, at least in part, to create a "nuclear taboo" that would convince nuclear "have-nots" that nuclear weapons development would be morally wrong /45, 48/. "International norms and standards make an important contribution to proliferation prevention [by] creating an atmosphere of restraint" /46/. Simply increasing the diplomatic and public relations priority given to nonproliferation issues "may dampen nuclear ambitions" /50/. Many analysts have argued that the negotiation of a comprehensive test ban should strengthen the norm against nuclear weapons by demonstrating both closer superpower conformance with the anti-nuclear weapons norm and final compliance with Article 6 of the NPT /37, 45, 46/. Of course, the unwillingness of nuclear "haves" to dismantle their nuclear arsenals tends to undercut such arguments /14/. The nuclear free zone treaties, building on the lack of strong immediate incentives to develop nuclear weapons in certain regions, appear to have been somewhat more successful in convincing states to forego nuclear development. These normative strategies can occur at lower, interpersonal levels as well. "Military-to-military cooperation and contacts . . . reinforce basic tenets such as civilian control of the military and the honoring of international norms of behavior" /36, 46/. At a more subtle, and more conjectural, level, efforts to increase the priority given to economic and environmental issues while reducing that given to security issues (e.g., in the European Union) appear to involve normative strategies that target the relative priority given to different goals that target states pursue.

Normative strategies are, by their nature, blunt, soft, and long-term instruments of policy. Unlike the other strategies described above, no single state can establish new norms for the international community at large. More than with other strategies, the success of a normative strategy depends on a majority of states working

consistently and cooperatively through both word and deed to promote and strengthen such norms. Norms, until they are well- established, are likely to be vulnerable to even few and small instances of nonconformant behaviors. Normative strategies face inherent difficulties of attempting to alter deeply held beliefs, resistance to "imperialist" efforts at normative education, and the time needed to induce normative change and any corresponding behavioral change. Since states will not alter their commitment to the norm of self-defense and survival, it requires developing and strengthening a norm about what constitutes "appropriate" means of achieving those goals in the international community of states. As with most norms, some states would be likely to violate even the most robust and long-standing anti-nuclear weapons norm, were it established: This does not imply, however, that a strong norm will not lead certain states that would otherwise choose to proliferate to refrain from doing so.

MATCHING STRATEGIES TO THREATS

How can we make use of the preceding taxonomies of threats and strategies to develop an appropriate set of effective proliferation responses? This section makes an initial attempt to use the insights from these taxonomies to identify strategies that will reduce the likelihood that specific potential proliferants will "go nuclear." As Richard Betts has noted, no strategy "is universally applicable -- each is undermined by costs and qualifications when applied to concrete cases. A realistic policy will have to combine ad hoc variations of several of the options in regard to different candidates" /9/. The following discussion seeks to go beyond such a general statement to suggest that policy responses may be ad hoc in the sense of being unique to the country at hand, but need not be ad hoc in the sense of theoretically uninformed. I begin by examining the most pressing and urgent threats but then look at how an integrated set of strategies can help keep long-term latent threats from becoming more urgent.

States that have both strong motivations and capabilities to acquire nuclear weapons obviously pose the most urgent threats. Having said that, however, not all these threats are alike. They differ in character based on whether their motivation derives from security or status concerns and whether their capability rests upon financial or technical resources. The effectiveness of a given strategy will depend on the strategy's ability to satisfy the concerns that motivate the state and on to take advantage of the states capability deficits, if any.

Security-seekers pose the greatest proliferation challenge. Such states are "very difficult to deal with, because their basic belief is that without nuclear weapons or at least a nuclear weapon

option national survival may be put into question. For this reason, leadership by example through a process of disarmament . . . has little effect as they do not directly impact upon regional security constellations" /43/. To think about how to address these states concerns depends on further distinguishing between defensive (or status-quo) security-seekers and offensive (or aggressive) security-seekers. In both cases, security-seekers "perceive their security situation to be so dire" that a remunerative strategy of contingent security guarantees will not persuade them to forego nuclear development or relinquish existing nuclear arsenals /29/. Indeed, for offensive but technically-unsophisticated security-seekers, such as Iraq, arms sales might well enhance rather than impede the country's technical progress.

Defensive security-seekers would seem most likely to respond to a combination of strategies that simultaneously reduce the perceived security threat and strengthen the normative pressure against responding to that threat by acquiring nuclear weapons. Reducing the perceived threat could be accomplished by combining cognitive with generative strategies. A cognitive strategy of providing better information regarding the actual threat the country faces would counter tendencies to plan policy on worst-case scenarios, thereby reducing the perceived threat. The US undertook something along these lines during the Gulf War by providing Israel with timely and detailed information on Iraqi military positions, capabilities, and activities to encourage it not to respond to Iraqi attacks. A generative strategy of actually reducing the threat environment could create the conditions that would further reduce the motivations for the state to pursue the nuclear option. The power of reductions in a state's threat environment to reduce nuclear ambitions is evident most clearly in the reduction in the US arsenal in the wake of the demise of the Soviet Union. These strategies to reduce the motivations to go nuclear could be reinforced by more proactive efforts to strengthen normative pressures on the state to provide for security through nonnuclear means. Although such pressures are unlikely to work quickly, a strengthened norm against nuclear ownership would establish a "logic of appropriateness" that would over the long term, lead fewer states to pursue and retain nuclear weapons.

Cognitive and generative strategies aimed at reducing the perceived threat environment will not reduce the nuclear ambitions of an offensive security seeker, however, such as Iraq. With such states, punitive strategies of "forcible disarmament" like that implemented during the Gulf War may actually prove effective at reducing overall likelihoods of nuclear proliferators by both setting back the nuclear ambitions of the targeted state and increasing the credibility of the punitive deterrent to other states.

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Status-seekers face less severe security environments and a looser linkage exists between nuclear-capability and their goal of international status. Punitive strategies involving "forcible disarmament" would be particularly counterproductive with these states because it would increase the perceived threat environment, thereby transforming the state from a status-seeker into security-seeker. Cognitive and normative strategies may prove useful in establishing the longer-term conditions to persuade such states that nuclear weapons either will not enhance their status as they desire or are not an appropriate means for doing so. Remunerative strategies that offer financial rewards for foregoing a nuclear program will be likely to succeed if the status goals are not particularly strong, whereas generative strategies that provide the state with alternative means of increasing their international status may prove more effective. Generative strategies would seem likely to prove particularly effective with status-seekers because, unlike security- seekers, such states have strong disincentives to pursue nuclear weapons once they have achieved greater recognition by other means.

Obviously, countries will not fit neatly and completely into these security-seeker or status-seeker categories. As Chubin notes, "the most difficult proliferator is Iran, in part because its incentives to acquire nuclear weapons are so diffuse, being animated by global ambitions as much as by regional threats. They are sought as much for an expression of the Revolution's vitality and for a defiant assertion of equality as for any specific purpose" /15/. Such cases require efforts to evaluate how these the security threats such states face can, if possible, be reduced while facilitating their achievement of non-security objectives through means other than the acquisition of nuclear weapons.

The character of the potential proliferant's capabilities provide further guidance as to appropriate policies. "Makers," i.e., states such as Israel and India with indigenous nuclear technological capabilities present those seeking to prevent proliferation with fewer points for intervention and behavioral control. Preclusive strategies, such as technology denial, will prove largely irrelevant in such cases because indigenous technological capabilities remove the need for such states' programs to buy nuclear technology. Punitive strategies, even including attempts at "forcible disarmament," are also likely to prove either ineffective or counterproductive because they will induce a reactive resistance that only increases the sense of threat and enhances the motivation to acquire nuclear weaponry while failing to damage the basic source of their nuclear weapons program, namely, their technological sophistication.

By contrast, for "buyers," i.e., states such as Iraq or Pakistan that depend in the short to medium term on procuring rather than developing

crucial nuclear components, the initial line of defense must be a preclusive strategy of technology denial. For these states, a strategy can hope to slow nuclear progress even if the state's strong motivations preclude the strategy from halting it altogether. For these states, "barring transfer of enrichment or reprocessing plants would be the most decisive way to hold back proliferation in the short run" /9/. "Argentina and Brazil are obvious cases in which technology denial may have slowed technical advancement until domestic political changes resulted in a reversal of their nuclear programs" /53/. If preclusive strategies fail, which they eventually will, punitive strategies that attack nuclear development facilities and programs may have the double virtues of directly slowing nuclear progress while also enhancing the credibility of threats to punish such progress and reinforcing norms against such progress. These benefits must be weighed against the impetus they give to the state's nuclear ambitions by increasing the perceived threat environment.

A longer-term vision of nonproliferation management requires that we look beyond this categorization of urgent threats to more remote threats. It requires establishing strategies that address currently remote threats before they become urgent threats. Such threats include those posed by states such as Libya and Syria that are nuclear-ambitious but technologically relatively unsophisticated, states like Germany and Japan that are technologically- capable but currently unmotivated to acquire nuclear weapons, and the myriad states who currently lack both the motivation and capability to acquire nuclear weapons.

All three types of remote threats seem to be reduced by far-sighted efforts to strengthen the norm against nuclear weapons acquisition. Negotiation of the CTBT, extension of the NPT, ongoing reductions in superpower nuclear arsenals, and continued conformance with the norm against nuclear use can all help legitimize and reinforce this norm. Likewise, generative strategies aimed at improving both the global and specific regional security environments by finding nonmilitary solutions to conflicts and by providing security guarantees designed to reassure rather than antagonize adversaries will help reduce the factors that transform states into nuclear-ambitious security- seekers. Cognitive strategies that improve communications between adversaries also help reduce the misperceptions and worst-case military planning that can trigger arms spirals which increase militarization but fail to increase either side's security.

The technical threats posed by states already facing severe security environments but currently far from being nuclear-capable can best be met by continued efforts to preclude them purchasing any technologies or personnel that would further their nuclear capabilities. Preclusive policies of

technology denial should be maintained so long as these states continue to show nuclear ambitions. Generative, cognitive, and normative attempts should be made to provide alternative means of achieving existing goals, and to engage these states in diplomatic dialogue to reexamine whether acquiring nuclear weapons provides the cognitively most effective and normatively most appropriate means of doing so.

The political threats posed by states that are nuclear-capable but not currently nuclear-ambitious are frequently ignored. However, the nuclear abstinence of states like Germany and Japan "will endure only until serious threats to vital interests are perceived" /33/. That is, unless policies are put in place now to discourage the acquisition of nuclear weapons as the means to respond to such threats. Evidence from Japan, South Korea, and Taiwan suggests that specifically identifying ways to enhance the security environment faced by such states, including through superpower security guarantees, can help stop nuclear programs before they get well underway /29/. These proliferation threats can also be kept latent by facilitating as much direct involvement of these states as possible in contributing to the formation of strong norms against nuclear proliferation. Keeping these states (including both their governmental representatives and their publics) engaged in the process of norm formation will increase their commitment to those norms even as pressures to violate those norms develop.

The most remote threats posed by states currently lacking in both nuclear ambition and nuclear capabilities, the difficult choice is faced between technology engagement and denial. A policy of technology engagement based on the existing safeguards regime that encourages nuclear trade while seeking to prevent diversion for military purposes seems a prudent strategy but one that has both benefits and risks. Safeguard policies will never be perfect and so run some risks of providing a false sense of security that the transfer of militarily-valuable technology is being precluded. On the other hand, "nuclear exports, even to countries that had not signed the NPT, could in the long run advance nonproliferation goals more than shortsighted technology denials because export contracts and nuclear cooperation between supplier and customer countries helped to integrate the recipients of nuclear technology into the existing international safeguards system to control the spread of nuclear weapons" /35/. The appropriateness of a policy of technology denial or technology engagement requires an ongoing attempt to assess the strength of the recipients motivations for proliferation: as security or status motivations flow, policy should shift towards technology denial and as these motivations ebb, policy should return towards a greater degree of safeguarded technology engagement.

CONCLUSION

This paper has identified the types of proliferation threats we will face in the decades ahead, identified the available range of strategies by which we can respond to those threats, and made a very preliminary attempt to combine these two taxonomies to identify appropriate policies for particular threats. Throughout I have taken the perspective of a policy maker concerned foremost with halting proliferation. This has meant ignoring the important real-world tradeoffs between this security objective and the economic objective of fostering the development of the international trade in peaceful nuclear technology which sits at the core of the international nuclear technology trade.

Efforts to prevent proliferation provide a wealth of experience for evaluating the conditions under which particular policies facilitated or frustrated nonproliferation goals. Indeed, the nonproliferation regime has faced a variety of threats and has brought to bear a variety of strategies to address them. To date, the nonproliferation regime has done remarkably well at containing proliferation, with the actual number of nuclear weapons states being far below the numbers predicted two or three decades ago. As has been frequently noted, the end of the Cold War provides a historical moment for identifying the nature of the threats the nonproliferation regime is likely to face in the decades ahead and for attempting to assess how best to deal with them. Without a theoretically-informed means of evaluating why certain nonproliferation strategies succeed at preventing proliferation in one case and fail in another, we are unlikely to achieve the important dual goals of discouraging nonnuclear weapon states from acquiring nuclear weapons and encouraging existing nuclear weapon states to dismantle theirs.

BIBLIOGRAPHY

/1/ Axelrod, Robert. 1984. The Evolution of Cooperation. New York: Basic Books.

/2/ Axelrod, Robert, and Robert O. Keohane. 1986. "Achieving Cooperation Under Anarchy: Strategies and Institutions." In Cooperation Under Anarchy, ed. Kenneth Oye. Princeton, NJ: Princeton University Press.

/3/ Bardach, Eugene and Robert Kagan. 1982. Going By the Book. Philadelphia: Temple University Press.

/4/ Bernauer, Thomas, and Dieter Ruloff. 1997. "Analytical Framework." In Soliciting Cooperation from Critical States: The Politics of Positive Incentives in Arms Control. Unpublished Manuscript, Version No. 7., ed. Thomas Bernauer, Jozef Goldblat, and Dieter Ruloff. 5-44. Zürich: Center for International Studies. ETH-Zentrum.

/5/ Bernauer, Thomas, Jozef Goldblat, and Dieter Ruloff. eds. 1997. Soliciting Cooperation from Critical States: The Politics of Positive Incentives in Arms Control. Unpublished Manuscript, Version No. 7. Zürich: Center for International Studies, ETH-Zentrum.

/6/ Bernauer, Thomas, Jozef Goldblat, and Dieter Ruloff. 1997. "Introduction." In Soliciting Cooperation from Critical States: The Politics of Positive Incentives in Arms Control. Unpublished Manuscript, Version No. 7., ed. Thomas Bernauer, Jozef Goldblat, and Dieter Ruloff, 1-4. Zürich: Center for International Studies, ETH-Zentrum.

/7/ Bertsch, Gary K., Richard T. Cupitt, and Steven Elliott-Gower. 1994. International Cooperation on Nonproliferation Export Controls: Prospects for the 1990s and Beyond. Ann Arbor: The University of Michigan Press.

/8/ Bertsch, Gary K., Richard T. Cupitt, and Steven Elliott-Gower. 1994. "Multilateral Export Control Organizations." In International Cooperation on Nonproliferation Export Controls: Prospects for the 1990s and Beyond, ed. Gary K. Bertsch, Richard T. Cupitt, and Steven Elliott-Gower, 33-59. Ann Arbor: The University of Michigan Press.

/9/ Betts, Richard K. 1993. "Paranoids, Pygmies, Pariahs and Nonproliferation Revisited." In The Proliferation Puzzle: Why Nuclear Weapons Spread and What Results, ed. Zachary S. Davis and Benjamin Frankel, 100-24. London: Frank Cass and Co.

/10/ Bialos, Jeffrey P. 1989. "The Detectionand Disclosure of Violations of U.S Export Controls: Management Choices and Their National Security Implications." Virginia Journal of International Law 29 (56-620).

/11/ Blackwill, Robert D., and Albert Carnesale. 1993. "Conclusions and Recommendations." In New Nuclear Nations: Consequences for U.S. Policy, ed. Robert D. Blackwill and Albert Carnesale, 20-50. New York: Council on Foreign Relations.

/12/ Bueno de Mesquita, Bruce, James D. Morrow, and Samuel S. G. Wu. 1993. "Forecasting the Risks of Nuclear Proliferation: Taiwan as an Illustration of the Method." In The Proliferation Puzzle: Why Nuclear Weapons Spread and What Results, ed. Zachary S. Davis and Benjamin Frankel, 311-31. London: Frank Cass and Co.

/13/ Chafetz, Glenn. 1993. "The End of the Cold War and the Future of Nuclear Proliferation: An Alternative to the Neorealist Perspective." In The Proliferation Puzzle: Why Nuclear Weapons Spread and What Results, ed. Zachary S. Davis and Benjamin Frankel, 127-58. London: Frank Cass and Co.

/14/ Chellaney, Brahma. 1994. "India." In Nuclear Proliferation After the Cold War, ed. Mitchell Reiss and Robert S. Litwak, 165-90. Washington, D.C.: The Woodrow Wilson Center Press.

/15/ Chubin, Shahram. 1994. "The Middle East." In Nuclear Proliferation After the Cold War, ed. Mitchell Reiss and Robert S. Litwak, 33-66. Washington, D.C.: The Woodrow Wilson Center Press.

/16/ Connolly, Barbara, and Martin List. 1996. "Nuclear Safety in Eastern Europe and the Former Soviet Union." In Institutions for Environmental Aid: Pitfalls and Promise, ed. Robert O. Keohane and Marc A. Levy. Cambridge, MA: MIT Press.

/17/ Cupitt, Richard T., Gary K. Bertsch, and Steven Elliott-Gower. 1994. "Introduction." In International Cooperation on Nonproliferation Export Controls: Prospects for the 1990s and Beyond, ed. Gary K. Bertsch, Richard T. Cupitt, and Steven Elliott-Gower, 3-32. Ann Arbor: The University of Michigan Press.

/18/ Davis, Zachary S. 1993. "The Realist Nuclear Regime." In The Proliferation Puzzle: Why Nuclear Weapons Spread and What Results, ed. Zachary S. Davis and Benjamin Frankel, 79-99. London: Frank Cass and Co.

/19/ Davis, Zachary S., and Benjamin Frankel, eds. 1993. The Proliferation Puzzle: Why Nuclear Weapons Spread and What Results. London: Frank Cass and Co.

/20/ Doty, Paul, and Steven Flank. 1993. "Arms Control for New Nuclear Nations." In New Nuclear Nations: Consequences for U.S. Policy, ed. Robert D. Blackwill and Albert Carnesale, 53-76. New York: Council on Foreign Relations.

/21/ Downs, George, David Rocke, and Peter Barsoom. 1996. "Is the Good News About Compliance Good News About Cooperation?" International Organization 50:3 (Summer): 379-406.

/22/ Dunn, Lewis A. 1993. "New Nuclear Threats to U.S. Security." In New Nuclear Nations: Consequences for U.S. Policy, ed. Robert D. Blackwill and Albert Carnesale, 20-50. New York: Council on Foreign Relations.

/23/ Elbaradei, Mohamed. 1996. "On Compliance with Nuclear Non-proliferation Obligations." Security Dialogue 27(1):17-26.

/24/ Etzioni, Amitai. 1961. A Comparative Analysis of Complex Organizations: On Power, Involvement, and Their Correlates. New York: The Free Press of Glencoe, Inc.

/25/ Feldman, Shai. 1994. "Israel." In Nuclear Proliferation After the Cold War, ed. Mitchell Reiss and Robert S. Litwak, 67-88. Washington, D.C.: The Woodrow Wilson Center Press.

/26/ Finnemore, Martha. 1996. National Interests in International Society. Ithaca: Cornell University Press.

/27/ Fischer, David. 1994. "South Africa." In Nuclear Proliferation After the Cold War, ed. Mitchell Reiss and Robert S. Litwak, 207-30. Washington, D.C.: The Woodrow Wilson Center Press.

/28/ Frankel, Benjamin, ed. 1990. Journal of

Strategic Studies 13 (September). Opaque Nuclear Proliferation: Methodological and Policy Implications. Special Issue of.

/29/ Frankel, Benjamin. 1993. "The Brooding Shadow: Systemic Incentives and Nuclear Weapons Proliferation." In The Proliferation Puzzle: Why Nuclear Weapons Spread and What Results, ed. Zachary S. Davis and Benjamin Frankel, 37-78. London: Frank Cass and Co.

/30/ Fujita, Edmundo. 1989. The Prevention of Geographical Proliferation of Nuclear Weapons: Nuclear-weapon-free Zones and Zones of Peace in the Southern Hemisphere. UNIDIR Research Paper No. 4. New York: United Nations.

/31/ Gill, Bates, Kensuke Enbata, and Matthew Stephenson. 1996. "Japan's Export Control Initiatives: Meeting New Proliferation Challenges." The Nonproliferation Review 4 (Fall):30-42.

/32/ Goldblat, Jozef. 1992. The Non-proliferation Treaty: How to Remove the Residual Threats. UNIDIR Research Paper No. 13. New York: United Nations.

/33/ Goldstein, Avery. 1993. "Understanding Nuclear Proliferation: Theoretical Explanation and China's National Experience." In The Proliferation Puzzle: Why Nuclear Weapons Spread and What Results, ed. Zachary S. Davis and Benjamin Frankel, 213-55. London: Frank Cass and Co.

/34/ Hawkins, Keith. 1984. Environment and Enforcement: Regulation and the Social Definition of Pollution. Oxford socio-legal studies. Oxford, England: Clarendon Press.

/35/ Hofhansel, Claus. 1994. "German Perspectives on Export Control Policy." In International Cooperation on Nonproliferation Export Controls: Prospects for the 1990s and Beyond, ed. Gary K. Bertsch, Richard T. Cupitt, and Steven Elliott-Gower. 179-200. Ann Arbor: The University of Michigan Press.

/36/ Kan, Shirley, and Zachary Davis. 1994. "China." In Nuclear Proliferation After the Cold War, ed. Mitchell Reiss and Robert S. Litwak, 129-64. Washington, D.C.: The Woodrow Wilson Center Press.

/37/ Kay, David. 1994. "The IAEA: How Can It Be Strengthened?" In Nuclear Proliferation After the Cold War, ed. Mitchell Reiss and Robert S. Litwak, 309-33. Washington, D.C.: The Woodrow Wilson Center Press.

/38/ Lavoy, Peter R. 1993. "Nuclear Myths and the Causes of Nuclear Proliferation." In The Proliferation Puzzle: Why Nuclear Weapons Spread and What Results, ed. Zachary S. Davis and Benjamin Frankel, 192-212. Portland, OR: Frank Cass.

/39/ Long, William J. 1996. "Trade and Technology Incentives and Bilateral Cooperation." International Studies Quarterly 40 (March):77-106.

/40/ Mastanduno, Michael. 1992. Economic Containment: CoCom and the Politics of East-West Trade. Ithaca: Cornell University Press.

/41/ Mearsheimer, John. 1990. "Back to the Future: Instability in Europe After the Cold War" International Security 15:1 (Summer):1-40.

/42/ Miller, Steven E. 1994. "The Former Soviet Union." In Nuclear Proliferation After the Cold War, ed. Mitchell Reiss and Robert S. Litwak, 89-128. Washington, D.C.: The Woodrow Wilson Center Press.

/43/ Müller, Harald, David Fischer, and Wolfgang Kötter. 1994. Nuclear Non-proliferation and Global Order. Oxford: Oxford University Press.

/44/ Nuclear Energy Agency. 1988. The Regulation of Nuclear Trade: Non-proliferation, Supply, Safety. Volume 1 international aspects. Paris: OECD.

/45/ Nye, Joseph S., Jr. 1993. "Diplomatic Measures." In New Nuclear Nations: Consequences for U.S. Policy, ed. Robert D. Blackwill and Albert Carnesale, 78-96. New York: Council on Foreign Relations.

/46/ Office of the Secretary of Defense. 1996. Proliferation: Threat and Response. Washington, D.C.: US GPO.

/47/ Pilat, Joseph F. 1994. "Responding to Proliferation: A Role for Nonlethal Defense." In Nuclear Proliferation After the Cold War, ed. Mitchell Reiss and Robert S. Litwak, 275-89. Washington, D.C.: The Woodrow Wilson Center Press.

/48/ Price, Richard. 1995. "The Genealogy of the Chemical Weapons Taboo." International Organization 49 (Winter).

/49/ Reiss, Albert J., Jr. 1984. "Selecting Strategies of Social Control Over Organizational Life." In Enforcing Regulation, ed. Keith Hawkins and John M. Thomas, 23-35. Boston: Kluwer-Nijhoff.

/50/ Reiss, Mitchell. 1994. "Conclusion: Nuclear Proliferation After the Cold War." In Nuclear Proliferation After the Cold War, ed. Mitchell Reiss and Robert S. Litwak, 335-50. Washington, D.C.: The Woodrow Wilson Center Press.

/51/ Richelson, Jeffrey T. 1994. "Can the Intelligence Community Keep Pace with the Threat?" In Nuclear Proliferation After the Cold War, ed. Mitchell Reiss and Robert S. Litwak, 291-08. Washington, D.C.: The Woodrow Wilson Center Press.

/52/ Samore, Gary. 1994. "Iraq." In Nuclear Proliferation After the Cold War, ed. Mitchell Reiss and Robert S. Litwak, 15-31. Washington, D.C.: The Woodrow Wilson Center Press.

/53/ Sands, Amy. 1994. "The Impact of New Technologies on Nuclear Weapons Proliferation." In Nuclear Proliferation After the Cold War, ed. Mitchell Reiss and Robert S. Litwak, 259-74. Washington, D.C.: The Woodrow Wilson Center Press.

/54/ Wapner, Paul. 1995. "Environmental Activism and World Civic Politics." World Politics

47 (April):311-40.

/55/ Zelikow, Philip. 1993. "Offensive Military Options." In New Nuclear Nations: Consequences for U.S. Policy, ed. Robert D. Blackwill and Albert Carnesale, 162-95. New York: Council on Foreign Relations.

/56/ Zinberg, Dorothy S. 1995. The Missing Link? Nuclear Proliferation and the International Mobility of Russian Nuclear Experts. UNIDIR Research Paper No. 35. New York: United Nations.

A Map of Threat Urgency

Nuclear-capable
• Technolgical Resources
• Financial Resources

Less Urgent

Most Urgent

Latent Political Threats

Urgent Threats

Remote Threats

Latent Technical Threats

Least Urgent

More Urgent

Nuclear-ambitious
• Security Seeking
• Status Seeking