

# STRATEGIES FOR INTERNATIONAL CONTROL OF NUCLEAR PROLIFERATION

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## Abstract

States turn to international regimes as one mechanism for altering existing patterns of behavior. This paper uses experience with environmental treaty regimes to suggest that those designing regimes to limit nuclear proliferation can select from a set of six primary strategies. Traditionally, political scientists have seen regime design options as limited to variants of carrots and sticks, i.e., deterrent and remunerative strategies that attempt to alter target's behavior by altering the consequences of engaging in those behaviors. However, states may also design regimes to change behavior by altering the opportunities "targets," i.e., potential proliferators, face, or the perceptions those targets have. Specifically, targets' choice sets can be altered by generative strategies which create opportunities for desirable behavior or by preclusive strategies which foreclose opportunities for undesirable behavior. In addition, targets' perceptions can be altered by cognitive strategies which alter the information targets have about consequences, opportunities, and other actors' behavior, or by normative strategies which alter the values that targets place on certain behaviors and the consequences of those behaviors. The effectiveness of a regime at inducing positive behavioral change is a function of the type of strategy adopted, the degree of commitment that targets have to regime norms, their capacity to fulfill those norms, and the transparency of the behavior involved.

## 1. Introduction

How effective are different regulatory strategies of international regimes at altering behavior? Any particular strategy's effectiveness is likely to be influenced by three factors usually identified as influencing regime effectiveness: target commitment to regime norms, target capacity to fulfill regime rules, and regime transparency. This section provides the analytic framework for five hypotheses regarding the conditions under which a regime will be effective.

Regulatory regimes seek to shift behavior along a spectrum away from undesirable behavior and toward desirable behavior. I use the terms

"desirable" and "undesirable" behavior change to capture the notion that regulatory regimes have norms of behavior, however vague, that regime members, even if reluctantly, acknowledge as operative. These terms also avoid the limitations of the compliance-noncompliance dichotomy, allowing us to evaluate vague rules, hortatory guidelines, and aspirational goals and to capture noncompliance that is desirable, compliance that is undesirable, and overcompliance that is more socially desirable than mere compliance /1, 2, 3, 4/. In short, I use "effective" to refer to regimes that 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. I focus on treaty-based intergovernmental regimes, specifically looking at "regulatory" regimes targeting behavioral change, and on the effect they have on behavior, although they may have other effects /5, 6/. Questions of "which type of regimes succeed, and under what conditions" have recently gained both theoretical and policy relevance.

The next section delineates each of the six categories in a taxonomy of regulatory strategies. The description of each strategy is followed by delineation of basic characteristics that distinguish it from other strategies, highlights of the underlying model of behavior, and how target commitment, target capacity, regime transparency, and implementation influence regime effectiveness within that strategic context. These discussions provide the foundation for five hypotheses regarding the relationship of regulatory strategy, commitment, capacity, transparency, implementation, and regime effectiveness.

## 2. Six strategies of social control

Since no standard categories of regime type exist in the political science literature, I have drawn from both domestic sociology and public policy literature to develop a six-part taxonomy of the

regulatory strategies that members design into regimes to alter behavior. The first pair of strategies, deterrent and remunerative strategies corresponding to the typical carrot and stick approaches of manipulating incentives, alter the consequences a target faces, making a desirable behavior more attractive or an undesirable behavior less attractive. The second pair of preclusive and generative strategies alter a target's opportunities, creating opportunities for desirable behavior or reducing opportunities for undesirable behavior. The final pair of cognitive and normative strategies alter the target's perception of a given reality, either by altering the information an actor has or the value that targets attach to certain behaviors and consequences.

### **Deterrent strategies**

Deterrent strategies have been traditionally common strategies to incorporate in regulatory regimes. Deterrent strategies involve sanctions, threats, coercion, taxes, charges, and any other efforts to discourage undesirable behavior by increasing its costs /7, 8, 9, 10/. Calls for "treaties with teeth" and for better monitoring, verification, and enforcement highlight the appeal of deterrent strategies and the common view that they would work more often if only states properly implemented them. Indeed, Downs, Rocke, and Barsoom recently have argued that deterrent strategies including credible commitments to sanction noncompliance are the only strategies that can ensure high levels of compliance /11/.

Deterrent strategies usually a) clearly delineate proscribed behavior, b) establish mechanisms to identify such behavior as or after it occurs, and c) establish mechanisms to impose costs on targets so identified. Deterrent strategies may vary with respect to the types of costs imposed (e.g., military sanctions, economic boycotts, diplomatic threats, taxes), the actors imposing them (e.g., governments, publics, NGOs, media), and the strength of incentives actors have to identify and sanction proscribed behavior. Deterrent strategies assume that targets intentionally choose to engage in the undesirable behavior because they value the consequences of that behavior more than those of available alternatives and lack adequate commitment to regime norms. The model also assumes targets have adequate capacity to engage in desirable behaviors. Such strategies require transparency regarding target behavior to prompt regime members to sanction deviant actors. Notably, however, the sanction threat creates strong incentives to conceal deviant behavior, thus frustrating efforts to achieve

transparency /12/. Sanction threats also may lack credibility, potency, or both. The lack of an overarching government makes centralized enforcement impossible internationally, and the cost of sanctions to the imposer and the problems of collective action make decentralized enforcement unlikely /13, 14/. Even when sanctions are imposed, they are often too small to counter the likelihood that undesirable behavior will go undetected, especially when sanction magnitude is limited by political factors /10, 15/. Even successful deterrent strategies, because they must "specify minimum conditions of performance" and because they may create "reactive resistance," fail to induce targets to achieve "higher levels of aspiration" /16, 12/.

Nuclear proliferation cases usually fit this model's assumptions well, but experience demonstrates the ubiquity of the problems noted. Israel's bombing of the Osirak nuclear site provides one example of how a deterrent strategy might operate. States choosing to develop or procure nuclear weapons do so intentionally, and they could choose to do otherwise. However, experience demonstrates the strong incentives and success such states can have in conducting programs clandestinely, and the pressure that creates for extensive and expensive monitoring programs. Experience with India, Israel, Pakistan, and even Iraq also demonstrates that states committed to preventing proliferation find it politically difficult to respond to detected proliferation with sanctions adequate to alter a target states behavior. All deterrent strategies "close the barn door after the cow is gone," an especially troubling approach in the nuclear weapons realm. The positive incentives for proliferation usually dwarf any countervailing sanctions other states can be expected to impose. Notably, however, a second order deterrent strategy may succeed at altering the behavior of nuclear technology exporters, thereby supporting a first order preventive strategy targeted at potential proliferators.

### **Remunerative strategies**

Environmental regimes have increasingly adopted remunerative strategies to reduce the costs or increase the benefits of desirable behavior to make it more attractive. Sidepayments or rewards can influence those who could fulfill regime commitments but would otherwise not do so, as evident in North-North financial transfers for North Korean, Ukrainian, and Byelorussian nuclear restraint, or Polish, Russian, and French environmental cleanups /17, 18/.

Remunerative strategies usually create a) clear standards of desirable behavior, b) identify those

engaged in it, and c) reward them for doing so. They may vary in the type of rewards provided, the type of actors providing those rewards, and the structure of incentives those actors have to provide them. Like deterrent strategies, remunerative strategies assume targets are capable but reluctant to engage in the desirable behavior. Rewards are assumed to effect behavioral changes either when targets view compliance as desirable but costly, or when they do not value compliance but do value the sidepayments /19/. Thus, the strategy's behavioral model assumes targets lack adequate commitment to regime norms, but have the capacity to fulfill those norms. Transparency is crucial to successful remunerative strategies, since regime members must be able to distinguish who to reward. Unlike deterrent strategies, however, remuneration induces actors to volunteer, rather than hide, information. Implementation problems include the disincentives a) of collective action problems of inducing actors to provide funding, b) of regime supporters paying to reward recalcitrant actors, and c) of rewards simply being insufficient to overcome the benefits of the undesirable behavior. Remuneration fosters innovation by creating a goal toward which actors can strive /20/, and is seen as less coercive and less of an infringement on sovereignty and free will.

Recent payments to North Korea, Ukraine, and Byelorussia to forego nuclear weapons suggest that remuneration may be an important component in a comprehensive nonproliferation strategy. Such strategies face unique problems however. For example, the US has funded all three programs, and other nonproliferation supporters seem unlikely to contribute in the future. And acceptance of these rewards do not preclude the state from continuing to pursue proliferation. The strategy also has the morally distasteful feature of rewarding states that break the international norm against proliferation. This will evoke resistance among states to give a large scale reward to proliferators, even if doing so would effectively alter their behavior.

### **Preclusive strategies**

Preclusive strategies seek to eliminate defection as an option rather than making it less attractive /10/. Export control regimes regulating nuclear power and weapons, military technologies, or chlorofluorocarbon products attempt to prevent (rather than deter) "have-nots" from acquiring certain technologies /21/. Such strategies rely on a process of prohibiting precursor behaviors that regime members can more readily control and that, if prevented, also prevent the undesirable behavior itself /10/.

Preclusive strategies usually a) clearly delineate proscriptions of precursor acts that themselves are not directly undesirable, b) use "premonitory surveillance" to detect acts before, rather than after, they occur, and c) make efforts to reduce target autonomy to engage in the undesirable behavior. Preclusive strategies make similar behavioral assumptions to deterrent strategies, assuming targets lack a strong commitment to regime norms rather than the capacity or opportunities to fulfill them. However, preclusive strategies can pay less attention to transparency and monitoring programs than a deterrent approach if they proscribe behaviors most inherently transparent and most costly to conceal, as evident in regulation of trade in nuclear or missile technology because of the difficulties of detecting their development and deployment. Implementation problems arise when regime members 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 target's that have autonomous control over the targeted behavior and its precursor activities. Thus, wealthier and more powerful states will be less susceptible to such strategies than developing states. Preclusive strategies also commonly must rely on reinforcing strategies to address cases in which prevention fails.

Preclusive strategies have been the first line of defense in nonproliferation. To date, the regimes have adopted second order deterrent strategies against nuclear exporting governments and corporations as part of a first order strategy of precluding nonproliferation. Given the magnitude of concern regarding even a single new case of proliferation, a preclusive strategy has the virtue of locking the barn door before the cows escape. It founders, as expected, when nuclear technology is developed indigenously or when second order strategies against nuclear exporters fail.

### **Generative strategies**

Generative strategies complement preclusive ones, creating rather than removing opportunities from targets' choice sets. When undesirable behaviors result from target incapacity, threats, rewards, or prevention will be unlikely to alter behavior. Generative strategies can either address systemic opportunity deficits or target-specific opportunity deficits. The former "Field of Dreams" strategy assumes that "if we create the opportunity, they will use it," while the latter assumes that the opportunity exists but certain targets lack the resources to avail themselves of it. The difference is

captured in the contrast between technology development and technology transfer programs: e.g., the International Atomic Energy Agency has promoted development of safer nuclear reactors while the Montreal Protocol on stratospheric ozone depletion has financial and technology transfer mechanisms to help developing states cover the "incremental costs" of compliance. At the margin, such strategies merge into remunerative strategies, but they differ in how they alter behavior.

Generative strategies can be distinguished from remunerative ones by a) their targeting of either systemic or individual capacity deficits, b) their imposition of costs on regime supporters, not targets, and c) their focus on targets who can't, rather than won't, alter their behavior. Generative strategies assume targets want to but cannot fulfill regime commitments. Transparency serves to assure those actors providing the opportunities that targets will not appropriate the funds without fulfilling regime commitments. Generative strategies face the same implementation problems as remunerative ones of inducing wealthier regime members to fund new opportunities, as evident in the underfunding of the financial mechanisms of the Montreal Protocol and the Framework Convention on Climate Change. Creating new opportunities for socially desirable behavior also may not reduce socially undesirable behavior if the two are not mutually exclusive.

In nonproliferation, a generative strategy might provide security guarantees or nonnuclear weapons transfers to help states achieve their security goals without resort to nuclear weapons development.

### **Cognitive strategies**

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 /13/. 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. 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. Direct cognitive strategies can convince targets that they are unwitting victims of their own behavior. The Convention on Long-Range Transboundary Air Pollution's cooperative environmental monitoring demonstrated the damage from acid precipitation,

leading many European governments to reduce pollution in the absence of regulatory requirements /22/. Indirect cognitive strategies inform those influenced by a target's behavior to induce a behavioral response that will alter that target's behavior. Ecolabeling, environmental audits, and pesticide prior informed consent rules use information to alter consumer behavior which, in turn, acts to reward green companies and punish brown ones /23, 24/.

Cognitive strategies a) lack clear behavioral prescriptions or proscriptions and b) focus on creating and disseminating information. Regime members may view such strategies as more effective or simply as least common denominator strategies that evoke less opposition during regime negotiation. 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" /12/. Of course, implementation costs decline since altering information about consequences or opportunities usually costs far less than altering those consequences themselves. 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. Properly implemented, however, informational strategies can induce both a wider range and more dynamic set of positive behaviors as 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.

In nonproliferation, efforts to clarify the risks of nuclear weapons development, production and, deployment programs demonstrate attempts at cognitive strategies. Likewise, efforts to reassure certain states that their rivals are not proceeding with nuclear development programs would work by simply making information available. In these ways, states may become convinced not to undertake a nuclear development program that would otherwise appear to be desirable.

### **Normative strategies**

Normative strategies change behavior by altering targets' deep-seated values rather than the

instrumental incentives that more proximately determine target decisions and actions. Regimes establish normative strategies to induce targets to "change their practices because they have come to understand the world in a way that promotes certain actions over others" /25/. Normative strategies involve either collective or hierarchical efforts at consciousness-raising /13/. During regime negotiations and recurring meetings, "leaders" 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.

Regimes using normative strategies a) establish broad hortatory goals with few specific proscriptions or prescriptions, b) avoid attempts to alter the opportunities or consequences that targets face, and c) establish ongoing procedures for dialogue 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. As under a cognitive strategy, transparency has little import, since normative strategies "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" /9, 17/. Normative strategies face the implementation difficulties posed by resistance to "imperialist" efforts at normative education, the inherent difficulty of altering deeply held beliefs, and the time needed to induce normative change and any corresponding behavioral change. If successful, however, normative strategies promise wider-ranging, deeper, and more stable behavioral changes.

The exhaustive and exhausting debates regularly held in the five-year reviews of the NonProliferation Treaty regime have sought, at least in part, to convince the nuclear "have-nots" that nuclear weapons development would be morally wrong. Of course, the unwillingness of nuclear "haves" to forego nuclear testing, let alone dismantle their nuclear arsenals have tended to undercut such arguments. 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.

Although no regime relies exclusively on one of these strategies, they delineate a collectively exhaustive range of strategies regime members can institute within a regime to induce behavioral change.

### 3. Hypotheses

The features of these strategies suggest five hypotheses regarding the interplay between factors deemed important by existing theory and the regulatory strategies posited as important here. Three hypotheses examine how the impact of target commitment to regime norms, target capacity to fulfill regime requirements, and regime transparency on regime effectiveness is contingent upon the strategy incorporated in the regime. Two additional hypotheses compare the strategies with respect to the ease of implementation and the degree to which each encourages behavioral change beyond some minimum level.

*Hypothesis 1) Target commitment to regime norms: The exogenous commitment of targets to regime norms will be crucial to the behavioral effectiveness of regimes using generative and cognitive strategies, less important to regimes using deterrent and remunerative strategies, and of little importance to regimes using preclusive and normative strategies.*

Although most regimes attempt to increase target commitment to regime norms over time, regulatory strategies differ in the degree to which their success depends on targets having some degree of exogenous commitment. Generative and cognitive strategies assume that targets support regime norms, only failing to behave desirably because they lack the capacity or information needed to lead them to do so. Given this, strategies that successfully create new opportunities or disseminate new information will alter the behavior of targets that hold exogenously-driven commitments to regime norms but not of targets that do not hold such commitments. Contrarily, a regime that successfully precludes targets from engaging in an undesirable activity will alter the behavior of targets that strongly oppose regime norms just as effectively as the behavior of targets that support those norms. For example, the preclusive strategy of the nonproliferation regime has largely prevented even states strongly desiring to acquire nuclear weapons technology from doing so. Normative strategies only target actors who lack an exogenous commitment to regime norms, with the goal of using regime processes to create such a commitment. Deterrent and remunerative strategies sit between these two extremes: they can exert influence over the behavior

of targets lacking any exogenous commitment to regime norms but that influence is less than that which they exert over the behavior of targets holding such an exogenous commitment.

*Hypothesis 2) Target capacity to conform to regime rules: The exogenous capacity of targets to conform to regime rules will be crucial to the effectiveness of regimes using deterrent, remunerative, cognitive, and normative strategies, but of little importance to the effectiveness of regimes using preclusive and generative strategies.*

Deterrent, remunerative, cognitive, and normative strategies do not attempt to remedy incapacity problems. The first two assume targets could adopt regime-consistent behavior, and simply attempt to increase the incentives for doing so. In remunerative strategies, the rewards to induce a reluctant target to alter its behavior may simultaneously remedy capacity deficits, assuming they are relatively small. Cognitive strategies likewise assume that targets could adopt socially desirable behaviors and provide information to induce them to see such behaviors as privately desirable. Normative strategies also assume that targets, once they internalize regime goals, will find they have, or will develop, the resources necessary to move toward those goals.

In contrast, regimes incorporating preclusive strategies will reduce the undesirable behavior of most actors since most actors have at least some alternatives to the precluded behavior, even if these are not the behaviors regime members view as optimally desirable. Generative strategies are the only ones that directly target incapacity as a cause of regime-inconsistent behavior, and hence their success is uninfluenced by the exogenous capacity of targets to fulfill regime norms.

*Hypothesis 3) Transparency regarding target behavior: Transparency regarding past target behavior will be crucial to the effectiveness of regimes using deterrent, remunerative, and generative strategies, but of far less importance to the effectiveness of regimes using preclusive, cognitive, and normative strategies.*

Regime transparency about actor behavior has consistently been touted as crucial to regime success. This hypothesis suggests that the truth of such claims varies depending on the regime's regulatory strategy. Deterrent, remunerative, and generative strategies have demanding transparency requirements, with all three requiring differential responses depending on past behavior: regime members must know whether a target met or ignored regime commitments in order to know how to respond. In contrast, preclusive, cognitive, and normative strategies treat all targets identically,

regardless of past behavior. Since these latter three strategies do not respond differently to targets based on past behavior, they need develop far fewer and weaker transparency mechanisms.

*Hypothesis 4) Ease of implementation: Implementation difficulties will create the largest "wedge" between nominal and actual policy in regimes using deterrent, remunerative, generative, and normative strategies, with this wedge being considerably smaller in preclusive and cognitive strategies.*

Regime members often will fail to implement deterrent strategies that they helped negotiate and nominally support because of the collective action problems that face sanctioning internationally and because of the costs to the regime member imposing sanctions /13/. Remunerative, generative, and normative strategies will face similar, though less severe, collective action problems of inducing supportive regime members to provide the resources necessary to implement such strategies properly. In contrast, regime members tend to implement preclusive and cognitive strategies more fully because they usually require dedication of fewer resources and evoke fewer specters of infringing sovereignty or imperialism.

*Hypothesis 5) Extent of behavioral change: Regimes using deterrent, remunerative, and preclusive strategies will tend to induce behavioral changes that rarely exceed minimal standards of desirable behavior whereas regimes using generative, cognitive, and normative strategies will tend to induce behavioral changes that often exceed such minimal standards.*

As noted, the models underlying deterrent, remunerative, and preclusive strategies suggest that they often induce reactive resistance by targets such that any positive behavioral change reflects instrumental responses to transient changes in incentives and opportunities. In contrast, the models underlying generative, cognitive, and normative strategies, at a minimum, avoid such reactive resistance, and, at their best, produce an internalized commitment to regime norms that leads actors to look behind minimal standards of behavior to identify both additional and superior means by which to accomplish regime goals. These latter strategies induce targets to focus on furthering regime goals rather than on complying with regime rules.

#### 4. Conclusion

The regulatory strategies states incorporate in regimes to alter behavior can be categorized into six ideal-types: deterrent, remunerative, generative,

preclusive, cognitive, and normative. Actors committed to having members fulfill regime commitments can alter behavior by a deterrent strategy which decreases the expected utility of the undesirable behavior or by a remunerative strategy that increases the expected utility of the desirable behavior. These carrot and stick approaches do not exhaust the possibilities, however. Regime strategies can also alter behavior by creating new opportunities for desirable behavior and foreclosing opportunities for undesirable behavior. Regimes can be designed to facilitate the transfer of information that alters what targets perceive as in their interests. And, finally, regime design can establish procedures that actually alter the underlying values and levels of concern that motivate behavior in the first place. These six categories provide the foundation for systematically comparing how effective these different strategies are at altering behavior in international environmental affairs. This paper has delineated the paths by which these different strategies influence behavior and generated hypotheses regarding the factors that effect when they will be most effective at doing so. The effectiveness of each strategy depends, at least in part, on the exogenous commitment of targets to regime norms, the capacity of these targets to fulfill regime rules, and the inherent transparency of the behavior targeted. The next step must be to conduct empirical analyses to evaluate whether these hypotheses hold up empirically, and to identify whether their conclusions can help facilitate more effective achievement of international efforts to reduce nuclear proliferation.

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