

**Improving the Efficacy of Arms Control:  
From Risk Reduction to Uncertainty Management  
in Nuclear and Conventional Weapons Negotiations**

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## ABSTRACT

Arms control attempts represent coordinated efforts to reduce uncertainty about capabilities. A puzzle concerning the efficacy of arms control endeavors stems from the wisdom of eliminating uncertainty about intentions through the reduction or elimination of “capabilities,” or weapons: negotiated security agreements that seek to reduce uncertainty about capabilities by establishing thresholds or ceilings for weapons are not necessarily conducive to achieving security goals in the long run because they do not effectively manage uncertainty—about capabilities as well as other factors. Best practices for arms control negotiations, therefore, call for effective “uncertainty management,” which will in turn enhance the overall durability of any agreement reached. The argument developed in this paper goes as follows: 1) Arms control and IR theory advocate and are consistent with standard practices of risk reduction, which seek to manage uncertainty about the intentions of potential adversaries through the elimination of uncertainty about arsenals or military equipment; 2) Risk reduction practices also prescribe limitations on the duration of agreement despite the fact that arms control efforts are aimed at obtaining and ensuring long-term stability; 3) These practices leave additional sources of uncertainty (beyond capabilities) largely unmanaged in arms control negotiations, which presents obstacles to reaching durable agreements; and 4) In order to produce more effective arms control agreements, we need to do two things better: manage uncertainty about capabilities and the threats they pose, and manage uncertainty stemming from additional sources. To illustrate existing practices and outcomes and explore how they might vary across capability-type, I analyze the first Strategic Arms Limitation Treaty (SALT I) and the Conventional Forces in Europe Treaty (CFE).

**Key Words:** arms limitations, disarmament, negotiation, Knightian uncertainty, risk reduction, threat elimination

## **Improving the Efficacy of Arms Control: From Risk Reduction to Uncertainty Management in Nuclear and Conventional Weapons Negotiations**

### **Introduction**

Numerous approaches to the study of international politics have sought to address the role of risks, threats and uncertainty in determining or explaining state behavior. With respect to reaching international agreements, some suggest that risks (defined as potential losses) be minimized so as to maximize utility. In order to accomplish this for arms control specifically, it has been suggested that particular threats be reduced or eliminated, which has, in turn, led to recommendations for best practices in the negotiation of arms control measures that consist largely of setting thresholds or ceilings for arsenals. Related that focus on risk advocate limiting to scope, scale and duration of arms control agreements, as well. I argue that such practices a) privilege risk over general uncertainty, and b) are not necessarily conducive to sustaining the goals or accomplishments of arms control because approaches based on risk and threat alone do not effectively manage the uncertainty surrounding these agreements.

Traditional approaches to establishing best practices for arms control negotiations have relied too heavily on risk reduction and threat elimination, both of which are consistent with and perhaps recommended by international relations and arms control theory. In the abstract, these are not bad practices or recommendations, per se, but they do not adequately take into account the effect of uncertainty on behavior or the kind of uncertainty management required of the complexity of arms control: while they may

maximize utility or security, they can also cause agreements to falter. This phenomenon is consistent with and/or the product of three schools of thought: international relations and arms control theory, game theory and rational choice approaches, and the misapplication of the decision-making literature.

### *International Relations and Arms Control Theory*

International relations (IR) theory as a whole may be viewed, by and large, as encouraging the use of approaches favoring the reduction or elimination of capabilities as a means of reducing uncertainty. A tenet of IR theory takes treats the kind of “self-help” behavior that results in conflict as a product of uncertainty about capabilities and intentions (Mearsheimer 1994). Mearsheimer actually argues that uncertainty about intentions is more critical than uncertainty about capabilities because uncertainty about intentions make capabilities, whatever they may be, threatening. Charles Glaser, meanwhile, has a different take on uncertainty and intentions, and places emphasis on capabilities over intentions: “Intentions are knowable, and even if known, could be different tomorrow...States must not overlook the possibility that potential adversaries will use their full capabilities against them, and they therefore must focus on adversaries' capabilities rather than their intentions.” (Glaser 1994, 56)

Summarizing conventional arms control wisdom, Schelling and Halperin write of the tendency to suggest that the rational response to uncertainty about intentions consists of reducing uncertainty about capabilities. They explain that many believe that because “estimates of each others' *intentions* will necessarily be uncertain, measures reciprocally to

reduce *capabilities* for preclusive attack may help both.” (Schelling and Halperin 1985, 13) [italics mine] However, presuming that the path to security is achieved through strict capability and threat reduction would be misguided: the direct reduction of capabilities alone does not capture all sources of uncertainty pertaining to the crafting of arms control agreements. Schelling and Halperin suggest, in fact, that a more nuanced approach to goal setting for capabilities would be consistent with the reduction of the likelihood of the onset of war, which is best accomplished by reducing *incentives* that lead to war, rather than reducing national *capabilities*, per se. They define incentives as determined by the nature of military technology and military expectations: “The over-all level of potential destruction might be substantially reduced by arms arrangements that did not focus on numbers and sizes of weapons *per se*.” (Schelling and Halperin 1985, 18).<sup>1</sup>

It is also difficult to reduce uncertainty about intentions via the reduction of uncertainty about capabilities because intentions are necessarily vague or nebulous, and often come across as ambiguous or even ambivalent. This was true for U.S. assessments of Soviet intentions in the 1960s: “We ourselves do not know how we might respond to certain crises or provocations, and the Soviets do not know in detail just what actions they would take in support of their national goals.” (Brennan 1961, 31). This means that even if uncertainty about capabilities is eliminated, uncertainty about intentions can remain high.

### *Game Theory and Rational Choice*

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<sup>1</sup> They suggest instead that invulnerable retaliatory systems would work better as a deterrent and might also lead to reductions in number naturally.

Game theory approaches go hand-in-hand with utility-based and rational choice theories of politics. The existing literature on the subject has primarily addressed capabilities through an analysis of risks they pose. Some scholars in this tradition have made recommendations based on risk analysis for best practices in international negotiations (Starkey, Boyer and Wilkenfeld 2005; Luce and Raiffa 1989; and Raiffa 2002). Perhaps most relevant to the study of uncertainty in arms control negotiations, Richard B. Bilder's work identifies numerous risks associated with entering into an international agreement, including many of the security and non-compliance risks associated with arms control. Bilder also provides recommendations for risk reduction based upon this typology of possible losses (Bilder 1981). The typology is useful and potentially conducive to establishing best practices, but it suggests that straightforward utility maximization will lead to the optimal outcome. It cannot address how states can pursue agreements that simultaneously achieve a desired state of security and also have the capacity to endure.

*The Application of Decision Theory the Study of State Behavior*

Problems arise in general when applying concepts from decision theory directly to state behavior because the processes generating foreign policy and those generating human decisions are emphatically different. One of the insights decision theory *can* provide to the study of international relations, however, is a demarcation of empirical conceptual situations or scenarios, which serves as further justification for an "uncertainty management" approach to arms control negotiations.

Risk and ambiguity describe two different kinds of environments that could equally map onto the reality in which states function. The difference between risk and ambiguity is, essentially, the presence of information about probability. Per its definition, risk is appropriate for establishing goals or adjudicating between choice options under the following conditions: when specific potential gains or losses can be identified, and when the likelihood of incurring these “costs” is assessable.<sup>2</sup> When these conditions are satisfied, it is possible to calculate the total cost or benefit of any outcome in order to make a rational choice. Absent that information, however, risk cannot provide prescriptive guidance, and reveals little in the way of systematic implicit responses to and under uncertainty generally. When this probability information is missing, people respond in a manner that can be technically “irrational” but variably systematic.

Prescriptive approaches in the study of international politics, however, tend to elide over the technicalities of risk: when such information about probability is not available, work in this vein has often employed a kind of layman’s sense of the word instead that eschews the use of formal risk assessments. Bilder (1981), for example, uses “risk” to refer to the potential losses associated with making an international agreement, applying the concept of risk to potential losses, regardless the availability of probability information. While it is useful to have a typology of potential loss that identifies all possible losses, this leads to recommendations for minimizing loss (risk reduction) typically provided in a series of “if, then” statements. For example: “a nation may reduce its risks by limiting the size or scope of its agreement with another nation,” Bilder writes in the section of his book entitled

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<sup>2</sup> May require a citation.

“General Risk-Management Techniques.” (Bilder 1981, 43) He isn’t wrong and states often seek to minimize risk through related tactics.<sup>3,4</sup> However, this can be detrimental to crafting agreements are able to manage uncertainty effectively and are, therefore, durable.

International arms control negotiations take place under conditions that more closely resemble this kind of uncertainty than risk. It is my contention that the use of risk as a concept in our approaches and methods has led to establishing goals that maximize gain or minimize losses in arms control. This emphasis on potential losses tends to lead to practices of risk reduction and threat elimination, which translate into negotiation goals consisting of establishing thresholds and ceilings or reducing holdings for weapons or arsenals, in order to achieve stability and security. If under risk, a straightforward utility maximization reveals the optimal strategy. Under uncertainty, however, these calculations are not possible, either due to missing information or high situational complexity. If we wish to better understand how the goals we set for arms control may be most effective in the long run, we need to better understand the effect of uncertainty on the negotiation of these agreements.

### **Sources of Uncertainty Relevant to Arms Control**

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<sup>3</sup> Indeed, there is evidence that states do this somewhat systematically for high uncertainty type negotiations. Barbara Koremenos (2005) reveals that for security negotiations, all of which she categorizes as “high uncertainty,” states tend to sign onto agreements of shorter durations.

<sup>4</sup> Bilder himself acknowledges the distinction. “While risk presupposes uncertainty, uncertainty does not in itself necessarily involve risk. Thus a nation will often be uncertain as to whether another nation will perform its obligations under an agreement or as to other events relating to the agreement. But these uncertainties will not in themselves involve risk unless, under the most pessimistic assumptions, a nation’s participation in that agreement could result in that nation’s experiencing a net loss, leaving it in a worse position than if it had not entered into the agreement.” (Bilder 1981, 13).



In general, uncertainty is prevalent during arms control negotiations not simply because security efforts is predicated on uncertainty about capability and intentions, but also due to fact that arms control entails requires collaboration to ensure national security and self-preservation—often requiring mutual and reciprocated cooperation.<sup>5</sup> Additionally, arms control frequently involves “setting lower levels of arms than would otherwise appear prudent based on a strict threat assessment.” (Larsen 2002, 5) All of these factors have the net effect of increasing ambient uncertainty and perceived vulnerability. Further sources of specific types of uncertainty are explored here.

### *Calculating Gains and Losses*

Arms control and security negotiations are actually more complicated than other types of international negation, like trade for example, due to the difficulty of making calculations associated with security. First, it is difficult to calculate overall weapon effectiveness. This is particularly true for certain weapon types. Defensive weapons, for example pose a unique problem: while the destructive power of offensive weapons is, in theory, estimable, it is difficult to estimate the gains associated with defensive technologies.<sup>6, 7</sup> Furthermore, people have difficulty grasping the units of measurement of the degree and effect of yield of nuclear bombs. Brennan has pointed out that it is difficult to estimate the effects of megaton-class weapons (Brennan 1961, 33).

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<sup>5</sup> An analysis of cooperation under anarchy is beyond the scope of this paper. For further information on the subject, see Jervis 1978 and eohane and Wallander 2002.

<sup>6</sup> This was the case for discussions over antiballistic missile technology during SALT I.

<sup>7</sup> Despite cuts to offensive strategic weapons, this is one justification for continued development of ABM technology—to hedge against the rapid change of offensive technologies, despite these cuts. This was an issue during Reagan and Gorbachev’s discussions during the Reykjavik Summit.

Second, it can be even more difficult to calculate what constitutes parity, particular when weapons differ across negotiating parties. Technology also contributes to uncertainty in arms control. Factors like rapidly changing technology make these calculations all the more difficult: arms control negotiations are also vulnerable to the effects of uncertainty due to the “technology creep” that changes the strategic landscape and drives the competition for new weapons.<sup>8</sup> (Newhouse 1978) Winham explains:

“Negotiators today spend more time discussing technology than did their predecessors because technology-whether it takes the form of information systems, industrial processes, or nuclear weapons-has a proportionately greater impact on human existence now that it did in the past. And technology is in a state of rapid change, often at an exponential rate; it creates an enormous problem of comprehension and adaptation for contemporary society.” (Winham 1977, p. 88)

Third, it is difficult to establish an arms control program that improves security in the short- *and* long-term, because it is impossible to calculate future gains. This conundrum stems from the fact that short-term gains may prove detrimental in the long term. Donald G. Brennan writes: “Both the hazards [arms control] may protect us against or reduce and the hazards it may introduce are often subtle, complicated and difficult to understand.” (Brennan 1961, 32) This makes it all the more challenging to establish meaningful goals for negotiation.

### *Environmental Uncertainty*

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<sup>8</sup> This was a factor during SALT I with MIRV technology.

“Environmental uncertainty” refers to factors that can potentially change the future state of the world in a way that impacts the anticipated benefits of agreement. Factors contributing to environmental uncertainty include regional volatility, regime change, and economic shifts. Reagan made reference to this kind of uncertainty on the margins of his negotiations with Gorbachev: “Who knows?” he said, “Governments change.”<sup>9</sup> Likewise, although negotiators were able to arrive at an agreement during the SALT II process, the resulting treaty was not ratified by the United States due to uncertainty stemming from the Soviet invasion of Afghanistan, which the U.S. perceived to be destabilizing.

It has been argued that the act of negotiation for all kinds of international agreements ought to “limit the free play of certain variables in the future.” (Winham 1977, 94). The free play of variables stemming from these additional sources of uncertainty must be managed in order for effective arms control agreements to be reached.

### **Heuristics in Arms Control**

Consistent with the notion that the uncertainty, which results from scenarios for which probability information is missing, has unique effects on individual decision-making, the sources of uncertainty relevant to arms control also effect notable responses evident in negotiations. While the decision sciences have revealed that decision-makers delay, exhibit implicit biases, and rely on the use of heuristics under uncertainty (Tversky and Kahneman

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<sup>9</sup> Will require a citation.

1974, McDermott 2001, Kanwisher 1989), the same appears true within the realm of security.<sup>10</sup>

### *Capabilities and Calculations*

Due to uncertainty about gains and losses, or the difficulty experienced when trying to calculate them, states and their negotiators tend to resort to the use of cognitive shortcuts, or heuristics. First, an inability to compare capabilities can result in uncertainty about what constitutes parity. Robert Jervis explains how this can lead to a kind of preoccupation with number of weapons, as well as who is trailing whom by how many. (Jervis 1993, 350) Second, complexity makes calculating gains and losses exceedingly difficult: “Here, the benefits remain to be calculated. And the calculus of benefits can in some cases be so complex that only very crude estimates can be given.” (Underdal 1991, 110) Third, when uncertain about future gain or benefits, states tend to use the current state of the world as a baseline (this is called “framing” or “anchoring”), which can often lead to diverging estimates by decision makers (Underdal, 111) or intelligence analysis.<sup>11</sup> Fourth, under uncertainty about outcomes, a focus on “outputs” tends to supersede a focus on “inputs” in the effort to overcome difficulty with calculations. Jervis explains:

“In general, it is very difficult to estimate what would happen in the event of a war—the ‘outputs of the weapons.’ The interaction of what each side will do is terribly complex. It is

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<sup>10</sup> Suboptimal approaches to establishing goals are largely implicit or subconscious.

<sup>11</sup> A discussion of framing, anchoring and work on Prospect Theory lays outside the scope of this paper.

much easier to measure the 'inputs'—what weapons each side has—even though the relationship between inputs and output is tenuous.” (Jervis 1993)

Fifth, negotiators and their advisors tend to identify *specific* potential losses or threats based on the use of use of worst-case scenarios, like surprise offensive attacks.

Uncertainty here precipitates a kind of focus on potential loss, which leads to the identification of potential threat and, in turn, threshold setting as a solution or risk reduction device. Joseph Nye corroborates that risk reduction practices are aimed, almost exclusively, at responding to this perceived threat via the reduction of the risk of outbreak of nuclear war. (Nye 1985, 10-11)

Steven Kull provides an illustration of this kind of “doomsday thinking” in his discussion of efforts to adapt to or even grapple with the new reality posed by nuclear weapons in the 1950s:

President Dwight D. Eisenhower said in 1954, ‘Atomic War will destroy civilization... If the Kremlin and Washington ever lock up in a war, the results are too horrible to contemplate.’ And later, ‘It would literally be a business of digging ourselves out of the ashes, starting again.’” (Kull 1990, p. 6)

As a result, Eisenhower advocated unilateral reductions—independent of Soviet commitments to reduce the size of their nuclear arsenal because he didn’t think it mattered how much strength each side had.

Additionally, it can be difficult to think of nuclear war as “limited war,” which also means that it is difficult to anticipate non-worst-case-scenario outcomes. Brennan writes that

people are “disinclined” to do so as a result of the imagery of human destruction associated with atomic bombs, and find it abhorrent to describe such large-scale human devastation in any kind of “limited” terminology.

All of these, I argue, contribute to a proclivity for threshold-setting, which is not advantageous for arms control in the long run. One reason is that “static arms control provisions become obsolete because they fail to provide for changing weapons technologies.” (Smith 1991, 1562). Likewise, Schelling and Halperin lament the unfortunate trend, which they argue has existed since SALT I and consists of focusing on numerical limitations as targets for arms control, rather than selective targets consistent with the reduction of the likelihood of a sudden attack.

### **Uncertainty Management**

In addition to more effective management of uncertainty about capabilities, successful arms control treaties require effective uncertainty management with regards to other sources of uncertainty, as well. A large swath of the organizational behavior literature actually focuses on uncertainty management at the firm or institutional level. A limited exploration of this approach in this paper helps shed light on the justification for and goals of uncertainty management.

#### *Uncertainty Management at the Institutional Level*

Whereas people largely try to avoid uncertainty, firms tend to actively manage it by identifying and prescribing ways to either reduce or absorb the negative consequences of

uncertainty about the future state of the world, or “state uncertainty” (Milliken 1987). The effective management of state uncertainty is considered critical for both organizational stability and performance. (Perminova 2008) Consistent with decision theory, the perceptual experiences produced by state uncertainty are characterized by the inability to assign probabilities<sup>12</sup> to the likelihood of future states of the world. (Duncan 1972; Pennings 1981; and Pfeffer and Salancik 1978)

Because uncertainty about the state of the world makes going through the steps of a linear decision model<sup>13</sup> difficult or even impossible, uncertainty about the state of the world is believed to precipitate a variety of outcomes. Some suggest that, at the firm level the behavioral consequences of state uncertainty include the following: “muddling through” (Lindblom 1959); the use of the garbage can or multiple streams model (Cohen, March and Olsen 1972); and protective responses (hedging against loss), avoiding committing resources (preventing loss), and anything that may diminish vulnerability (Milliken 1987). Consistent with the multiple streams model, at the level of the nation-state, Gilbert R. Winham has described a “proliferation of bureaucracy” used to create structure under uncertainty (Winham 1977, 93). We see further evidence of an organizational response to uncertainty at the level of international organizations dealing with security issues: cooperative security arrangements adjust their responses to changing threats (Wallander and Keohane 2002). Wallander and Keohane have described how security institutions

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<sup>12</sup> The Ellsberg Paradox actually illustrates uncertainty about the state of the world. This well-known thought experiment reveals how missing information about the actual distribution of red and black balls causes uncertainty in the decision-maker. The decision-maker can *interpret* or *judge* the likelihood of a red ball in any one of a number of ways (from 0 to 100 reds). Each of these potential red-ball-configurations corresponds to a potential state of the world.

<sup>13</sup> Based on risk.

evolve in response to changing threats, which keeps security regimes relevant and durable. In order to keep arms control regimes durable, we need similar evolving, adapting commitments.

### *Uncertainty Management in Arms Control*

Uncertainty management in arms control can be accomplished by a variety of measures. These are discussed in their likely order of use. First, prior to coming to the table, Lax and Sebenius advise that: “parties should anticipate the possible later problems. They should carefully analyze the chances of self-destruction from considerations of ex-post unfairness, surprises, new information, illegitimacy, or changed alternatives. They should compare the value of continued agreement for all parties with the value of alternatives to continued agreement under a variety of possible contingencies.” (Lax and Sebenius 1989, 289) In essence, they advise advanced scenario planning beyond the scope of military strategy.<sup>14</sup>

Other prescriptions for uncertainty management in international negotiation concern the negotiating process. Winham suggests that “process” be privileged over “outcome,” which requires a kind of trial and error search. (Winham 1977, 97, 101) He explains:

The principle problem for contemporary negotiators is not to outwit their adversaries, but rather to create a structure out of a large mass of information wherein it is possible to apply human wit.<sup>15</sup> (Winham 1977, 89)

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<sup>14</sup> Such tactics are actually quite rare in arms control negotiations, for which incidents of noncompliance evoke little reaction (Smith 1991), likely due to a lack of anticipated consequences and countermeasures.

<sup>15</sup> It follows that negotiations that are guided by an estimate or desired outcome would not do very well... It also implies that use of “hard bargaining” techniques that are thought to be so successful in inducing patterns of concessions are not likely to be optimal in these situations...the search for information, however, is. Winham advises that the “development of common perceptions” ought to supersede the “exchange of



There is evidence of this use of negotiation as a process to reduce uncertainty in the meeting between President Gerald Ford and Soviet leader Leonid Brezhnev at Vladivostok during the 1974 Strategic Arms Limitation Talks. The leaders were able to establish an understanding conducive to crafting a basic framework for the SALT II agreement that was characterized as a “major breakthrough,” although their meeting did little (according to “hardliners”) to manage the threat of Soviet first strike (Newhouse 1989, 300). Knowing this, however, U.S. bureaucracy preferred to pursue the agreement in order to at least curb the threat, which would later be subject to further “erosion,” they argued, via future efforts and agreements. (Newhouse 1989, 300)

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concessions” in the process of negotiations. When this process goes well, therefore, we would not expect to see the patterns of compromise and convergence advocated by some negotiation theorists/scholars. (Winham 1977, 100, also citing Ikle and Leites).

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### *Goals and Treaty Terms:*

Even if we privilege process over outcomes and take negotiation as a search for more information, we still must have goals for treaty making—parties must come to the table with proposals. Recommendations for uncertainty management, therefore, may also be directed at goals that states pursue and the terms to which they agree during arms control negotiations. Each is considered in turn.

#### 1. Dynamic Obligations

Legal scholar Edwin M. Smith has explored the issue of crafting durable agreements under conditions of uncertainty, and argues that treaty making is conducive to uncertainty management when treaties are structured to allow for “evolving commitments” that permit adaptation to “uncertain or unpredictable circumstances.” (Smith 1991, 1549) Smith defines “dynamic international obligations” as resulting “from agreements that are structured to allow consensual changes in the obligations imposed in order to fulfill the object of the treaty in *uncertain* conditions.” (Smith 1990, 1557) [italics mine] They arise under conditions of uncertainty that lead to the desire to “mutually adjust commitments while maintaining a shared perception of reciprocal responsibility.” (Smith 1991, 1557). Smith explains that this makes for more durable agreements, which is conducive to future cooperative endeavors. (Smith 1991, 1560) Dynamic obligations result in more successful agreements, he says, because they allow for the relationship between treaty parties to naturally evolve, which is endemic to the process of negotiation; in this way they help facilitate agreement.

Lax and Sebenius would seem to concur. In their discussion of how flexibility leads to more durable agreements they write:

Perhaps the most effective contingent mechanism is a long-term relationship in which the parties trust each other. Needed changes can be renegotiated in the context of their many dealings over time. (Lax and Sebenius 1989, 288)<sup>16</sup>

The authors would also appear to agree with the notion that uncertainty is manifest in these situations, and that robust agreements call for its effective management: “Change is a given,” they write, and “the environment, the organization, the needs of other actors, and all manner of unforeseen circumstances can sometimes require that agreements be modified. *Renegotiation may be avoided if the initial agreement includes a way to handle unforeseen contingencies.*” (Lax and Sebenius 1989, 287) [Italics mine.] Lax and Sebenius also suggest that measures that allow for this include a mechanism for dispute resolution through an arbitrating body or the use of issue linkage and contingencies (see below).

## 2. Limited versus Comprehensive Agreements

Arms control agreements may substantively range from “limited” to “comprehensive” in scope. Agreements that place thresholds on capabilities are often characterized as limited. According the Brennan, they are the result of strategies that seek to “examine current and projected armament policies, to isolate their major unnecessary hazards, and to attempt to reduce or eliminate these, one at a time, leaving the basic armament policies largely

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<sup>16</sup> If this notion were true, we would expect that the U.S. and Russia would develop increasingly robust agreements over time. However, we might also expect changes in leadership and environmental uncertainty to continue to have the capacity to derail agreements, despite the trust and confidence that come from long-term cooperation.

unchanged.” (Brennan 1961, 37). Limited measures are considered particularly useful given certain goals: when they are aimed at inhibiting the use of existing armaments (a kind of targeted deterrence or disincentivization), which is useful for dealing with conflicts that involving escalation or “catalytic nuclear war” (initiated by the provocations of a smaller power). Limited agreements are also useful in pursuing non-proliferation, as they impede the ability of nuclear weapons to spread to non-nuclear powers. (Bilder 1981, 86). Bilder also advises: “such ceilings can work only when the competitive situation can be defined in terms of numbers alone.” (Bilder 1981, 86)

As one might expect, comprehensive approaches tend to cover more ground. According to Brennan, comprehensive approaches to arms control agreements “attempt a survey of the basic requirements for armaments to implement the various types of deterrence that must be provided for the participating nations, and to adjust all types of armament to fit these basic needs in such a way as to give maximum net security.” (Brennan 1961, 38) Such agreements are at the same time more effective in the long run and also more difficult to negotiate. The paradox is that, while the minimization of potential losses associated would seem to point to specific, detailed, pared-down outcomes (per risk reduction recommendations), successful security ambitions actually require broad, comprehensive agreements to manage uncertainty.

### 3. Duration provisions

Like limited agreements, duration provisions pose a true puzzle for arms control. Whereas the longevity of agreements may add to the uncertainty of arms control efforts, high

uncertainty negotiations tend to be correlated with treaties of shorter durations, which limit risk. (Koremenos 2005) Bilder's discussion of risks speaks to the concerns that precipitate agreements of shorter durations:

Every nation knows that the future is uncertain and unpredictable, that even its best judgments and assessments may prove wrong, and that, under certain circumstances, a proposed agreement which now seems to be a good deal may turn out to be a bad one which leaves it worse off than before. (Bilder 1981, 12)

It is unclear what are best practices for establishing duration provisions for arms control.

#### 4. Special Tribunals

In recent years we've seen the trend in arms control negotiations of establishing special tribunals for the purpose of maintaining the treaties, resolving ambiguities, and dealing with non-compliance issues. In fact, noncompliance with arms control treaties never results in adjudication via neutral international courts or tribunals. Instead, the states like the U.S have sought to maintain "national control" over dispute management (Smith 1991, 1563). Examples include the Standing Consultative Commission (SCC) for the ABM Treaty and the Joint Consultative Group (JCG) for the CFE treaty. Smith argues that such tribunals help facilitate dynamic obligations.

#### 5. Verification and Compliance Measures

Verification and compliance provisions (also called confidence and security-building measures or CSBMs) comprise a set of treaty terms that are by and large unique to arms control. They are defined as follows: "provisions that allow each party to observe and

evaluate the other parties' behavior in relation to treaty obligations." (Smith 1991, 1563).

They provide early warning and minimize risks of defection by non-complying parties to an agreement (Smith 1991, 1582).<sup>17</sup> This is acquired through such measures as inspections and data exchange.

## 6. Withdrawal Provisions

Withdrawal provisions also present as a double-edged sword for arms control agreements. While they facilitate dynamic obligations and help individual states manage their own uncertainty, the downside comes from the fact that withdrawing from an agreement can reduce trust between negotiating parties (Lax and Sebenius 1986, 288), which may in turn impact the likelihood of future cooperative agreements (by essentially augmenting uncertainty about cooperation). The INF and ABM treaties are two examples of agreements that included withdrawal provisions. The U.S. did actually withdraw from the ABM Treaty under George W. Bush in order to pursue plans for a European Phased Array Missile Defense (MD) System. The Russians are currently balking at these plans.

### **A Limited Study in the Variation of Threat in Arms Control Agreements**

The following section examines how suggested best practices for uncertainty management in arms control have or have not played out in a nuclear (SALT I) and conventional (CFE) agreement. While impossible to do each case justice here, this paper highlights some of the most salient aspects pertaining to uncertainty and its management.

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<sup>17</sup> Add Bilder 1981 on verification regimes (p. 119)

*Strategic Arms Limitation Talks (SALT I)*

The first series of Strategic Arms Limitation Talks produced a limited agreement (the Interim Agreement on Certain Measures with Respect to the Limitation of Strategic Offensive Arms) that froze the number of strategic missiles at existing levels for the U.S. and the Soviet Union. These levels were “asymmetric,” with the U.S. permitted their maximum 1710 missiles, which included both intercontinental ballistic missiles (ICBMs) and submarine-launched ballistic missiles (SLBMs), and the Soviet Union permitted their 2358, of which 313 could be “heavy” ICBMs. (Carter 1989, 111) Notably, both of these classes of weapons were capable of being verified by national technical means (NTM) due to new satellite technology. The negotiations also produced the ABM Treaty, which limited the number of antiballistic missile sites to two per country. The ABM Treaty was of unlimited duration and included provision for withdrawal with timely notification, while the Interim Agreement was designed to last five years and be followed with a “more comprehensive and lasting treaty” that would effectively curb the arsenals of both sides (Carter 1989, 105).

Insomuch as the Strategic Arms Limitation Talks were the first in a series of bilateral nuclear arms control treaties between the U.S. and the Soviet Union that came to mark the easing of tensions between the two countries as well as the emergence of a period of détente, they were conducted under conditions of secrecy and utmost uncertainty: “An underlying purpose of SALT was control of uncertainty,” writes Winham. (Winham 1977, 94) Likewise John Newhouse writes, “Precisely because SALT was a novel and major

departure in great power relations, it was mired in uncertainty.” (Newhouse, 1973, p. 125) Nothing in the U.S.’s experience with the Soviet Union presented viable template or precedent for these talks. Furthermore, unique attributes of the Soviet Union as a negotiating partner also contributed to uncertainty for the U.S. The Soviet Union had “passion for secrecy” (Newhouse, 1973, 63), and the Russian penchant for *maskirovka* consisted of concealing Soviet intentions by misleading adversaries about the “nature, scope and timing of an operation.” (Hansen, 2007 or 2002)

Ultimately, the numeric limitations detailed in the Interim Agreement failed to capture a number of aspects of the weaponry that were critical to military strategy. First, U.S. missiles were more accurate than Soviet missiles, although this did not factor into any calculations. Second, the nature and state of the weapons (many of which were still in development) made it difficult to calculate overall weapon effectiveness, and what constituted parity. This was exacerbated by the fact that U.S. and Soviet weapons were so different: “To compare American and Russian systems...is to talk about apples and oranges,” writes Newhouse. Yet, this is exactly what the two sides did: both came to the first round ready to discuss quantity—the number of weapons—and were much less prepared to talk about quality or effectiveness. (Newhouse 1973, 174)

A number of weapons were excluded from the agreements for this and related reasons. Omitted weapons included such emerging technologies as MIRV. The real impact of MIRV was unknown at the time and its destructive power difficult to calculate. The technology also couldn’t be verified by national means. Additionally, many in the U.S. government



wanted to “retain the flexibility to modernize the USA’s nuclear arsenal,” presumably because they believed that would need to, and therefore came out against a ban on MIRVs in the SALT agreement (Carter 1989, 108). Nor were strategic bombers included in the agreement, primarily due to lack of interest on both sides (Carter 1989, 109). This may have been a misstep, or at least cause of lack of durability, and the Soviet Union would pursue the inclusion of strategic bombers more aggressively in future negotiations.<sup>18</sup> Likewise, the banning and deployment of long-range cruise missiles was not addressed by the agreement, as discussion on the subject was abandoned when the attempt for a comprehensive agreement was discarded. (Carter 1989, 110)

Regarding treaty goals and threshold setting, the immediate goal for SALT was to reduce weapons, but the broader impetus was to “stabilize defense relations between the United States and the Soviet Union.” (Winham 1977, 94). It was believed that reducing uncertainty about future capabilities would ensure long-term stability.<sup>19</sup> According to Chief Negotiator Gerald Smith: “Assurance about the future minimum size of the forces [number of launchers]...should encourage stability in the American-Soviet strategic relationship.” (Smith 1975, 8) The main threats to this stability were believed to be “a competitive arms race, uncertainty about future force levels, and the consequent need to assume the worst in projecting defense needs in the future.” (Winham 1977, 94) SALT I negotiations also proceeded with the twin goals of deterring a nuclear attack and of defending against it should it occur.

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<sup>18</sup> This will require documentation.

<sup>19</sup> Reducing the risk of accidental war was left to a parallel agreement signed in 1971.

Indeed, common practice at the time emphasized reducing the risk of the outbreak of war, and in the 1960s it was believed that war would in all likelihood begin with a surprise nuclear attack (Larsen 2002). Such a surprise attack would be possible given the “unrestrained competition” in ballistic missile, guidance and control, and nuclear weapon technology. (Larsen 2002) Larsen further explains:

Therefore, those weapon systems employing technologies that, in theory, most contributed to the ability to execute a surprise nuclear attack against the nuclear retaliatory forces of the other side, or that undermined the ability of either side to hold deterrent targets at risk, became principal candidates for arms limitation agreements. (Larsen 2002)

This was a meaningful target for capabilities, but it was not achieved during the negotiations. Nevertheless, the Joint Chiefs took the position of preferring limitations on numbers of weapons to limitation of technology (Newhouse 1989, 207). Newhouse writes:

The chiefs were wary; an agreement with Russia to limit the weapons that mattered most was an alien concept. Aside from how to verify any such arrangement, the key issues were ABM limits and whether to ban the testing of MIRVs before that activity began. (Newhouse 1989, 207)

The preference for discussing what was most easily quantified was pervasive during SALT. Debate was exceedingly focused on the question of who was ahead in terms of stockpiles and research and development. This, too, is a much more manageable question than “estimating how much was enough to deter the Soviets and how various configurations of forces could have contributed to terminating a war in the least possible unfavorable way.” (Jervis 1993, 351) Even on ABMs, Newhouse writes, the Russians “would discuss only

numbers of interceptor missiles, but not their performance or that of the radars and other elements vital to the system; such matters, they said, were simply too complex for negotiation." (Newhouse 1973, 174)

While goals of reduction dominated the negotiations, there is evidence of the use of some recommended practices for uncertainty management. The negotiations were also conducive to the reduction of complexity, in a sense, as both sides pursued common perceptions on "strategic vocabulary," "definitional problems," and "referent principles," (Winham 1977, 98, also citing Zartman and Newhouse) which applied to the subject of parity and the use of the strategy of deterrence.

The treaty also had provisions for verification via satellite reconnaissance exclusively. These kinds of provisions were unprecedented in an arms treaty. Previous attempts by the U.S. to include onsite inspections had been treated as "deal breakers" for the Soviets.

The Interim Agreement had no provision for withdrawal, but was of an exceptionally limited duration. While the ABM treaty did manage to "codify strict parity" the U.S. recently withdrew from the treaty in order to pursue more advanced technology targeted at new threats. (Carter 1989, 112)

Although the SALT agreement ended up being an extremely limited agreement and was classified as a "modest" success by many according to Newhouse, one could argue that the negotiations themselves did much to shed light on intentions. On the part of the U.S. we

know this to be the case.<sup>20</sup> However, those who were disappointed argued that “the greatest failure of SALT I concerned the lack of any controls on qualitative improvements in offensive missiles. In particular, SALT I failed to place any restrictions on the development and deployment of MIRVs.” (Carter 1989, 112) Henry Kissinger has publically voiced regret that he failed to heed guidance on curbing MIRVs during SALT I negotiations. In this way, for some, it is viewed as a failure in the attempt to slow or halt the arms race, which happened as a result of the “inexorable pace of technological developments,” and the fact that “negotiators did not seize the opportunity to curb weapons under development when such a curb was apparently still possible.” (Carter 1989, 112)

#### *Case Study: Conventional Forces in Europe Treaty*

Like SALT, the CFE treaty was an agreement of an unprecedented nature. Signed in 1990, the multilateral agreement established a set of limitations on conventional (non-nuclear) military equipment over a fixed territory in Europe stretching from “the Atlantic to the Urals.” Crafted with the idea of curbing the likelihood of sudden conventional attack in mind, the agreement designated treaty limited equipment (TLE) in the following five categories: combat aircraft, tanks, artillery pieces, armored combat vehicles (ACVs), and attack helicopters. The treaty also had provisions for ceilings on TLE as well as for the destruction of weapons that exceeded these limitations. It was initially negotiated by groups of states-parties—the 22 states within the Warsaw Pact and NATO—with equal ceilings for both sides—and therefore included limitations on the amount of TLE that could

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<sup>20</sup> Will require documentation.

be with active military units, and limitations for how much TLE could be found in any one state in either alliance. The CFE Treaty was later modified to dispense with the pact-to-pact format. Follow-on talks, which were a product of the same mandate that guided CFE talks—resulted in the CFE-1A agreement. These placed a ceiling on military personnel and provided for information exchange on manpower. The Treaty was accompanied by additional parallel agreements that enacted more intrusive CBSMs than had ever before existed. The treaty is of unlimited duration.<sup>21</sup>

The CFE Treaty shared SALT's goal of curbing the ability to launch a sudden attack, and might have been as limited as a result. However, it was actually much more durable due to the fact that advancements in conventional weapons research and development alter the field of battle more in smaller, more incremental ways. Additionally, the incredibly intrusive inspections and CSBMs can be said to have provided some extraordinary uncertainty management—such that states would be unwilling to do without it even if the treaty was no longer managing capabilities effectively. This seemed to be the case for quite some time, although perhaps no longer.

The Treaty also included flexibility provisions in the form of regular review conferences set to occur every five years. While those may have been used to productive ends at one time, they have not been since the Russian Federation's withdrawal in 2007. The Russian Federation withdrew for reasons pertaining to unfairness, highlighting the treaty's inability

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<sup>21</sup> Notably, the agreement rose out of the rubble of a failed set of negotiations that preceded it (Mutual and Balanced Force Reductions), which had been given its mandate by the Helsinki Final Act of 1975.

to effectively provide the country with TLE where it was needed due to “subregional conflicts.”<sup>22</sup>

In their recommendations for durable agreements, Lax and Sebenius have argued that “the costs of holding to the agreement in all contingencies include perceptions of unfairness...if the parties can anticipate these factors they should be considered for inclusion in the original agreement. (Lax and Sebenius 1986)<sup>23</sup> This was, evidently, not the case for CFE negotiations, or such circumstances were unforeseeable in this case. Furthermore, the review conferences could neither prevent nor deal with Russian suspension<sup>24</sup> directly. NATO Alliance countries have instead resorted to unilateral countermeasures on a state-by-state basis, ceasing implementation of the treaty vis-à-vis the Russian Federation exclusively, effective December 2011. Arguably, many of these factors have prevented the regime from falling apart entirely, but there are now calls for the negotiation of an entirely new treaty.<sup>25</sup>

Lax and Sebeius have also suggested that the costs of failure to comply with an agreement be carefully analyzed in advance. Notably, this is rarely the case for arms control agreements. Instead, efforts are made to ensure compliance. In the case of CFE, the agreement was in a fragile state for four years, it took one state party to the treaty to lead

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<sup>22</sup> The Russian Federation used this as justification for suspension and then proceeded to invade Abkhazia and South Ossetia the following year.

<sup>23</sup> This requires a page number.

<sup>24</sup> The more accurate term, per international treaty law and justification invoked by the Russian Federation, may be “withdraw” here.

<sup>25</sup> The Russian Federation would like this to be based on overall military capability, rather than TLE or weapons.

the charge for countermeasures, and six months of effort to recruit other allied states party to the treaty to impose “costs” or consequences.

## **Conclusion**

CFE and SALT were both successful negotiations in that their negotiation processes yielded ratified agreements that limited existing conventional and nuclear weapons stockpiles. Both had unprecedented and intrusive verification and inspection regimes. However, SALT was comparatively limited with respect with existing and forthcoming technologies and its durability suffered as a result. Unlike for SALT, negotiators of the CFE treaty experienced little or difficulty in calculating what constituted parity for conventional threats, which made thresholds meaningful. After over twenty years, however, CFE showing its age and appears to be wearing thin—it is outdated with respect to munitions and territorial constraints, given sub-regional concerns.

Of the Vienna Convention on the Law of Treaties, which governs the legality of these treaties, Smith has argued that its drafters assumed that the adjustment of interests reached by the parties upon execution of the agreement would endure for the term of the agreement. In a disputed arms control agreement, Smith explains, that assumption is almost always false. “Changing technology can easily alter the interests and the perceived threats facing the parties in ways that can only rarely be foreseen at the execution of agreement.” (Smith 1991, 1582). Both treaties seem to have this in common.

Efforts towards arms control in climates of uncertainty can lead to modular thinking about threats and capabilities, which impairs the ability of crafted agreements to manage uncertainty both effectively and in the long term. This paper presents an argument for effective uncertainty management in arms control by identifying the shortcomings of risk-based approaches and challenges in the application of decision theory; examining organizational responses to uncertainty; and suggesting fruitful approaches for reaching durable arms control agreements through uncertainty management. The paper reveals how a better understanding of uncertainty and its effects on behavior can help inform negotiation practices. However, it would appear that even when uncertainty is not effectively managed, there may be political, as opposed to military, benefits of arms control regimes and security cooperation. All of these findings highlight the need for further empirical exploration.



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