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# Building U.S. Responses to Russia's Threats to Use Nonstrategic Nuclear Weapons

## A Game Theoretic Analysis of Brinkmanship

**R**ussia launched its war against Ukraine in early 2022, expecting a rapid victory. Ukrainian resistance in the ensuing months not only dispelled any notion of that outcome but instead has raised the possibility that Ukraine might win the war. President Vladimir Putin has staked everything on this invasion, and he is unlikely to accept defeat without exhausting

significant resources at his disposal. This dynamic between Ukrainian momentum and Russia's desperation has raised concerns that Russia might resort to nuclear escalation to turn the tide of the war (Cole, 2022). Given this reality, U.S. policymakers and planners must consider responses to what would be the most destabilizing event in European security since 1939 (O'Conner, 2022).

In this report, we attempt to identify such responses and levers using a game theory approach to the problem. We do so by first providing an overview of Russia's nuclear doc-

### KEY FINDINGS

- Emphasizing the high stakes for the United States in the conflict could deter Russia but presents a significant challenge for policymakers because Russia likely believes that the United States would seek to avoid nuclear conflict at all costs.
- Messaging to Russia that the costs of using nonstrategic nuclear weapons in Ukraine would be higher for Russia than for the United States could deter Russia, but this message requires careful calibration—it must be severe enough to impose significant costs on Russia but also be perceived as credible.
- The United States could message that it expects Russia to back down if facing further escalation.
- Persuading Russia that forgoing escalation is preferable to the outcome should it escalate requires developing options short of escalation that are acceptable to Russia.
- Uncertainties and misunderstandings inevitably arise when relying on assumptions of other actors' perceptions in decisionmaking.

## Abbreviations

ALCM	air-launched cruise missile
G8	Group of Eight
ICB	International Crisis Behavior
NATO	North Atlantic Treaty Organization
NSNW	nonstrategic nuclear weapon
SLCM	sea-launched cruise missile
SRBM	short-range ballistic missile

trine and capabilities, considering its discourse on nuclear escalation and declaratory policies relevant to the possible use of nonstrategic nuclear weapons (NSNWs). We then look at Russia's nuclear escalation through the lens of game theory, examining which potential levers for shifting decisionmaking and outcomes exist in the game. Finally, we assess how a particularly relevant historical example, the Kargil War, sheds light on possible U.S. responses for avoiding escalation without conceding to adversary demands.

## Brief Overview of Russia's Nuclear Doctrine and Capabilities

Russia's doctrine on nuclear use is based on a high-intensity war scenario with a nuclear and conventional power, such as the North Atlantic Treaty Organization (NATO) or China. The conditions under which Russia says it would employ nuclear weapons therefore correspond to a preemptive nuclear strike against Russia or "conventional aggression against the Russian Federation that puts the very existence of the state in jeopardy" (Presidential Decree No. 355, 2022). There is no unequivocal evidence on what the latter condition means in practice. Because Russia's president ultimately decides on nuclear escalation, the answer is known only to him in the particular circumstances. Could Putin perceive that a military defeat in Ukraine would put the Russian state in jeopardy? It cannot be ruled out, but there is no way to know.

In Russia's military and political discourse, the most likely conventional scenario that Russia has in mind when contemplating nuclear first use is a massed aerospace attack by NATO on Russia's capi-

tal and other critical military and economic infrastructure (e.g., rapid destruction of Russia's dual-use platforms; strategic nuclear facilities; or strategic command, control, and communications) that might inhibit Russia's ability to respond with nuclear weapons or maintain control of the country.<sup>1</sup> Russia has closely observed U.S. and allied actions in Yugoslavia, Iraq, and Libya and fears an expanded version of those scenarios against Russia. In 2018, Putin spoke at length about scenarios that he believed would warrant nuclear use. He painted a dire picture in which missiles were inbound toward Russia, and Russia had to retaliate with nuclear weapons (Putin, 2018). The war in Ukraine does not obviously meet these criteria if one were to strictly follow Russia's declared policy on nuclear use.

However, there is only so much that can be gleaned from any country's declaratory policy. There is no law that says Russia must adhere to a presidential decree or to what is stated in the military doctrine. And Russia itself cannot predict the myriad circumstances that threaten Russia's military security that do not exactly replicate what policy documents or military officers might have imagined. Russia's war in Ukraine is a case in point. Could anyone in the Kremlin or the Ministry of Defence of the Russian Federation have forecasted that Russia would find itself bogged down in a war with Ukraine, suffering massive casualties while struggling to hold a relatively small portion of territory; that NATO would aggressively and persistently support the Ukrainians with key weapons systems and intelligence; or that Russia would have to mobilize an additional 300,000 troops to manage the conflict? It is clear the war has entered a previously unimaginable state for Russia, and much could be on the table that was not before things took a disastrous turn for the Kremlin.

There is contradictory evidence in Russia's military literature about using nuclear weapons in a *local war*, which is defined in Russia's military doctrine as "a war pursuing limited military-political objectives when military actions take place within the borders of the warring states and affecting mainly the interests (territorial, economic, political, etc.) of these states" (President of the Russian Federation, 2014).<sup>2</sup> In 2004, General Makhmut

Gareev, a former deputy chief of the Soviet General Staff, noted that limited or selective nuclear use by Russia’s strategic nuclear forces (likely nuclear air-launched cruise missiles [ALCMs]) in a local war was a component of Russia’s “system of strategic actions of the Armed Forces.”<sup>3</sup> More recently, authoritative Russian military authors have suggested that local wars are the purview of the general-purpose forces, whereas NSNWs are best suited for deterrence (and presumably warfighting) of regional wars involving multiple states.<sup>4</sup>

Despite the ambiguity in Russia’s military literature, if Putin were to decide to use nuclear weapons in Ukraine, what capabilities does Russia have and how might they be employed? Russia puts nuclear weapons into three categories: strategic, operational strategic (theater), and operational tactical (see Table 1). According to Gareev’s writing, it is at least possible that Russia could use a weapon from any of these categories to strike a target in Ukraine; the most likely strategic weapon is the Kh-102 nuclear ALCM.<sup>5</sup> Outside of nuclear mines and torpedoes, the lowest yield Russia possesses is a 10 kiloton warhead that could be attached to an Iskander short-range ballistic missile (SRBM) or a sea-launched cruise missile (SLCM). Yields on such warheads go up to 100 kilotons. Russia has approximately 2,000 of these warheads, according to the Bulletin of Atomic Scientists (Kristensen and Korda, 2021).

Hard military targets (critical economic infrastructure, such as dams and energy storage facilities, which are usually associated with conventional long-range attacks) are the most common targets associated with Russia’s NSNWs (Kokoshin et al., 2021; Burenok and Pechatnov, 2011). A 2021 Russian publication on conflict escalation suggested that a demon-

stration nuclear strike or test in an uninhabited area was possible as the conflict crept closer to requiring a nuclear response (Kokoshin et al., 2021). In any case, dispersed targets, such as deployed, armored forces in the field, are not ideal for a single, low-yield NSNW airburst, although the employment of larger numbers would increase the destructive effects (McDonald and Brode, 1976). Cities or large, concentrated military bases or infrastructure are the most vulnerable in terms of high casualties or damage. In a city with a relatively dense population of 700,000, a 10 kiloton warhead airburst might cause nearly 50,000 fatalities and 160,000 injuries in the first 24 hours.<sup>6</sup> As noted earlier, however, Russia’s literature tends to emphasize trying to reduce civilian casualties in the early stages of nuclear use; large population centers are targeted as a last resort.<sup>7</sup> Thus, if Russia were to employ a nuclear weapon against a target in Ukraine, what little evidence is available suggests that it would use a lower-yield warhead on a cruise or SRBM against a large military target where infrastructure and/or personnel are concentrated.

To conclude, it is far from certain that Russia will cross the nuclear threshold in Ukraine. The Kremlin, should it decide, could employ significant conventional capacity as the war drags on. There are millions of people who could be mobilized and deployed over time. Russia’s military-industrial complex could produce artillery systems, tanks, and long-range precision munitions at some scale in the latter part of 2022 and early months of 2023. Russia’s declaratory policy suggests that the war in Ukraine is not a circumstance in which Russia would preemptively use nuclear weapons because Ukraine cannot threaten Moscow or any major city in Russia with long-range missiles or land forces. Finally, it is worth bearing

TABLE 1  
Russia’s Categorization of Nuclear Weapons

Strategic Nuclear Weapons	Operational-Strategic (Theater) Nuclear Weapons	Operational-Tactical Weapons (NSNWs)
Intercontinental ballistic missiles	ALCMs (Tu-22)	Gravity bombs
SLBMs	SLCMs (sub and surface)	SRBMs and artillery rounds
ALCMs (Tu-95 and Tu-160)		Surface-to-air and antiballistic missiles; nuclear mines and torpedoes

SOURCE: Levshin, Nedelin, Sosnovskii, 1999; Stoltenberg, 2021.

in mind that the threat of nuclear use may be more valuable to the Kremlin than employing it and risking actual and figurative fallout.

However, we do not have a window into Putin's mind. We know that the war is not going well for Russia and that Ukraine holds a critical place in Russia's strategic thinking. Furthermore, the West is playing a crucial—albeit indirect—role in a country that Russia sees as a strategic interest. The situation is becoming more fraught for the Kremlin, and Russia does have nuclear options to try to coerce an end to the war and a political settlement to consolidate territorial gains. The gambit may not work, but Russia could try. Therefore, it would be a serious planning omission for U.S. policymakers to fail to prepare for this situation.

## Why Examine Russia's Nuclear Use Using Game Theory?

Although there are varying views on whether Russia would indeed use NSNWs to coerce the termination of the conflict, we can examine conditions that might make such a decision a more plausible one for Russia and assess possible U.S. levers that could affect Russia's decision to use these weapons.

The objective for the discussion in this report is not to definitively say whether Russia would consider the use of nuclear weapons in Ukraine but rather to explore how the United States could respond to the potential for such use. This exploration of possible responses is intended to inform U.S. policymakers' thinking on how to best prepare for and respond to Russia's actions that could precede the use of NSNWs, including threats, mobilization, and attempts to establish redlines.<sup>8</sup> A key part of this task will be understanding and shaping Russia's perceptions.

Although the following discussion can be applied more generally to hypothetical threats from other nation states to employ NSNWs to shape U.S. behavior, the conflict in Ukraine may provide a more specific set of conditions to consider in that these conditions could turn Russia toward the use of NSNWs on the battlefield. Motivations for Russia's use of NSNWs could include the perceived threat to the

Kremlin should it lose in Ukraine and the inability of Russia's military to achieve objectives using conventional means. Understanding response options to Russia's nuclear use will support the development of an improved overall U.S. strategy and a more insightful way of examining options in the geopolitical landscape of 2023.

## A Game Theoretic Assessment of Decisionmaking on Nuclear Employment

When exploring concepts of escalation and adversary decisionmaking, analysts often use a game theoretic model as a tool to represent the relationships among these possible outcomes and the strategic interaction between players. Game theory can be leveraged to examine different strategic situations in which the outcome of one player's choice is affected by the choice of the other player(s). By using the tool of game theory, we can better understand adversary decisionmaking if we know something about player objectives and if decisionmakers are rational about choosing their strategy. These caveats often seem like they could significantly degrade the utility of this mathematical tool. Historical examples abound in which adversaries miscalculated each other's objectives; adversary intent is laden with uncertainty.<sup>9</sup> However, if we recognize these caveats and understand the limitations of this tool, game theory can help us assess the decisionmaking process of each player and identify potential approaches for shifting adversary decisionmaking and changing game outcomes.

For this discussion, we use game theory to explore a scenario in which a player may decide to use a deliberately escalatory move in an attempt to improve their expected outcome. The other player would like to shape the game to deter such use, and in this exploration, we seek to identify potential levers for deterrence. To provide a general description of such an escalation scenario, we use an *extensive form game* model that represents sequential decisionmaking.<sup>10</sup> We set up this model to reflect generic decisionmaking in a scenario in which one player, *Red*, may choose to escalate, and the other player,

*Blue*, chooses whether to respond or acquiesce.<sup>11</sup> The game setup and moves are described below.

**Game start.** This is the context for the game and takes place before the first move. Red has made an initial move that is unfavorable to Blue given Blue's interests in the region in which the move has taken place. In doing so, Red attempts to set a *red line*, attempting to communicate a limitation on acceptable behavior from Blue, and Blue expects that Red may consider the use of NSNWs if this red line is crossed, for example, through certain types of Blue intervention in the conflict. For the purposes of this discussion, we create a scenario that forces a consequential decision from Red in move one. To do so, we assume that without a deviation from the status quo, Red expects an unfavorable outcome to the conflict. The game is described in two moves:

- **Move one:** The game begins with Red deciding to continue in the status quo operations or to escalate by employing NSNWs.
- **Move two:** If Red decides to escalate, Blue now decides whether to respond by escalating, using nuclear weapons or other means, or to acquiesce and allow Red to achieve their objective.

The following discussion is based on this basic game structure, but we will explore how outcome preferences and an extension of response options could affect Red's perceptions and ultimately its decisionmaking in the game. In doing so, we can look at possible levers that Blue has to deter Red from escalation.

In conducting this analysis, we maintain several assumptions. First, this assessment of decisionmaking is based on assigning nonmyopic players to this game. This means that player decisionmaking in this game is informed by both players anticipating the second-stage consequences of their decisions in the first stage. Second, we assume that Red is willing to be the first to escalate but Blue is not. Because of this, Red is the first mover in each of the games discussed.

## Brinkmanship, the Chicken Game, and First-Mover Advantage

The first game we discuss is one in which both players prefer to avoid mutual escalation above all else. To facilitate this discussion, we use the construct of the *chicken game*, a common construct in game theory used to describe a situation of brinkmanship in which both players would prefer a win over other outcomes, but each would take a loss over the outcome of mutual destruction. In this game, both players may choose to engage in some aggressive, or escalatory, action against the opponent, hoping that the other player will back down and concede the game. Players in a chicken game risk outcomes that are both collectively and individually worse for both should neither concede. The situation for a chicken game is often described as the equivalent of two drivers headed toward each other on a collision course. If one of them swerves, the other wins and the driver who swerves is called a "chicken" for that driver's purported cowardice. If neither of them swerves, the players crash into each other.

In this game, the outcome preferences for **Red**, in order of most preferred to least preferred, are the following:

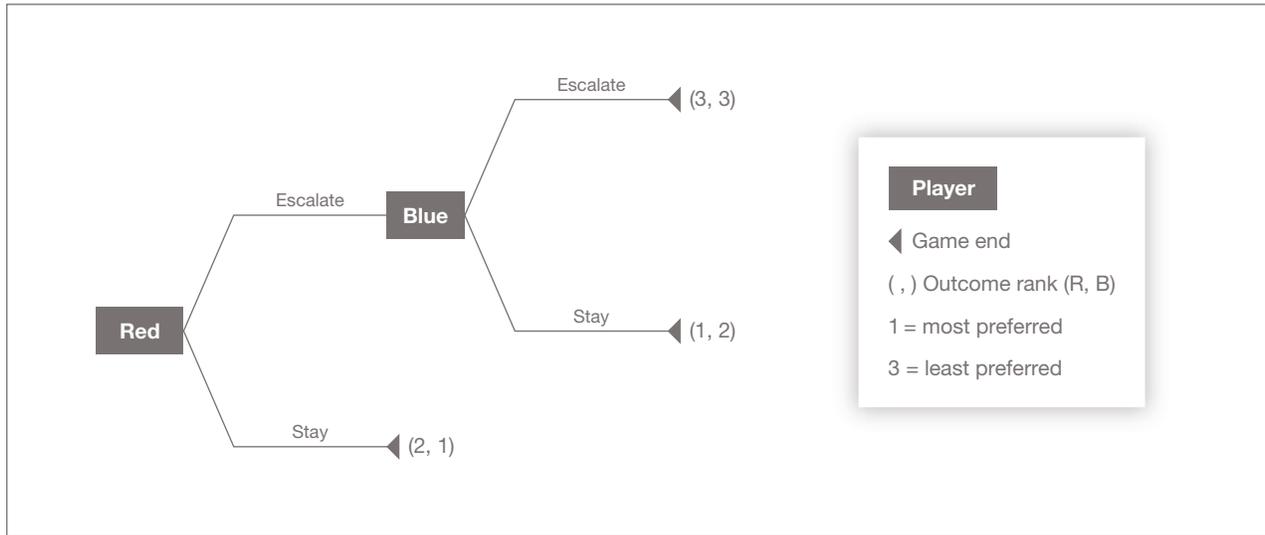
1. Red escalates; Blue does not.
2. Red decides not to escalate; Blue also does not escalate.
3. Red escalates; Blue escalates.

The outcome preferences for **Blue**, in order of most preferred to least preferred, are the following:

1. Red decides not to escalate; Blue also does not escalate.
2. Red escalates; Blue does not.
3. Red escalates; Blue escalates.

These outcome preferences are indicated in Figure 1, and we can see from this ordering that, given Red escalation, subsequent escalation from Blue puts both players in their least preferred outcome. We can use *backward induction* to elucidate the decisionmaking sequence of rational players in this game.<sup>12</sup> If we start move two with the assumption that Blue prioritizes avoiding escalation and work backward, the above game tree makes apparent that the only choice for Blue, should Red decide to

FIGURE 1  
Chicken Game Structure and Outcomes



SOURCE: Features information from Von Neumann and Morgenstern, 1947, pp. 65, 77.  
NOTE: This is a hypothetical and oversimplified version of a more nuanced set of decisions, and it is intended only to exhibit the general arc of the decisionmaking process.

initially escalate, is to back down and give in to Red demands. Red, knowing this, would choose at move one to escalate, expecting to achieve their highest preferred outcome.

In this situation, we see a distinct advantage to committing to aggressive action first by either sending a credible threat or engaging in aggressive action before the other player.<sup>13</sup> It is clear from this construct, then, that the best way to play the game as depicted here is to convince your opponent that you are prepared to escalate and compel them to acquiesce.<sup>14</sup> In this decisionmaking environment, each player faces a stark decision about risk and commitment; if they risk moving forward with aggressive action, how committed does the opponent think they are—that is, how certain is the opponent that the first mover will go down that branch of the game tree? A standard depiction of this commitment is throwing the steering wheel out the window as you drive toward the other player’s car to signal that you are not backing down. In this scenario, your opponent then would prefer to acquiesce than to face the outcome that results from mutual escalation.<sup>15</sup> In this chicken game, we can clearly observe a first-mover advantage

in the ability to essentially choose the outcomes of the game.

The chicken game has also been called a *game of preemption* because of this significant first-mover advantage that constrains the options of the second mover.<sup>16</sup> If the second mover’s only choices are escalation to conflict or acquiescing to the first mover, and the cost of escalation to conflict is unacceptable, then they are motivated to choose concession. In our game, if Blue would prefer to avoid escalation over conceding to Red, then its options are limited to acquiescence. If we assume that each player’s preference is known to its opponent, this game is a losing one for the second mover. But what if Red can be persuaded that Blue is willing to escalate to conflict after all? The next section will explore how decisionmaking in the game changes if the perceived costs of escalation to conflict shift.

### Conflict Cost Perceptions and Deterrence

In the chicken game example, neither player would prefer escalation because of the high perceived cost should the situation escalate to a conflict. Because

of this high cost of conflict, the player that moves first compels the second player to give in. We would like to know what happens if we modify this assumption, changing the perceived cost of conflict. More specifically, what happens if we modify the game so that each player perceives that the other player is *willing* to escalate to avoid giving in. To examine this aspect, we change the game outcome preferences so that each player would now actually prefer escalation to giving in.

We continue to use the game construct with the same two moves, and the outcomes are similar to the chicken game but with the ordering of preferences modified (see Figure 2). In this game, each player prefers to be the only aggressor, just as is the case in the chicken game. However, in contrast to the chicken game, Blue now prefers the outcome of mutual escalation to acquiescence to the other player.<sup>17</sup> The **Red** outcomes from most preferred to least preferred are the following:

1. Red escalates; Blue does not.
2. Red decides not to escalate; Blue also does not escalate.
3. Red escalates; Blue escalates.

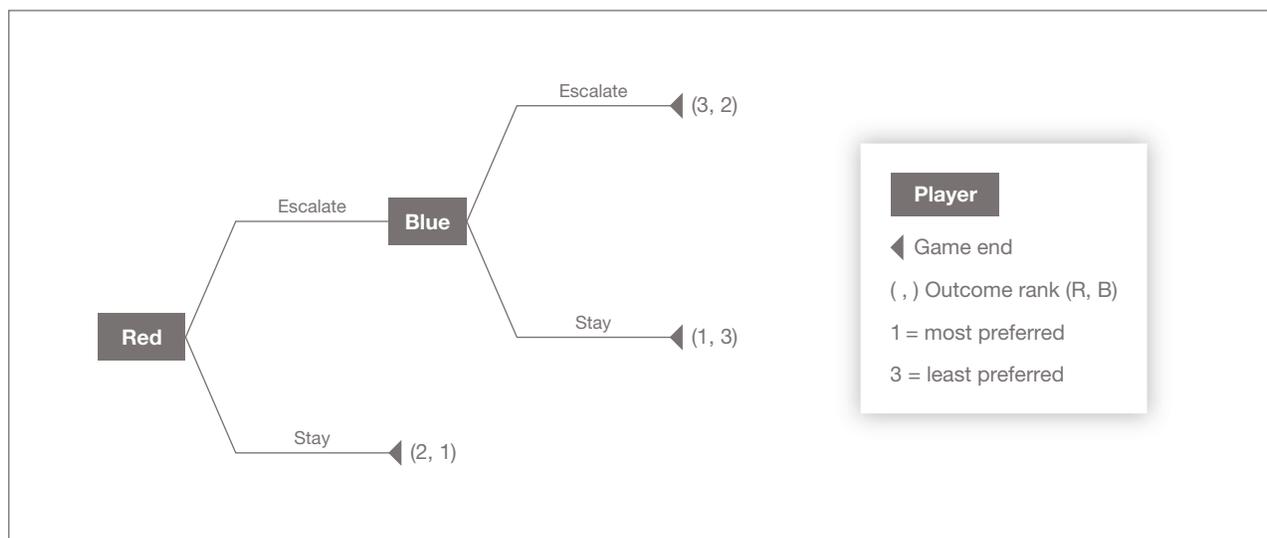
The **Blue** outcomes from most preferred to least preferred are the following:

1. Red decides not to escalate; Blue also does not escalate.
2. Red escalates; Blue escalates.
3. Red escalates; Blue does not.

We can again use backward induction to walk through the decisionmaking for each player. Starting at move two, in which Blue decides whether to respond to Red by escalating or to acquiesce and allow Red to achieve its objective, we see that a Blue player with the updated preferences will now press ahead to an escalated conflict because backing down will allow Red to win. Red then must decide in move one whether they would prefer to escalate or if they would rather acquiesce if they expect Blue's response to be escalatory. In this game, again, the best outcome for Red is to convince Blue that it is willing to escalate and compel Blue to acquiesce. But now, acquiescing when facing potential escalatory action from Red is no longer an equilibrium solution. In this case, a rational Blue may choose to escalate rather than acquiesce and be left with their lowest value payoff.<sup>18</sup>

This game is distinguished from the chicken game by the shift in the order of outcome preferences for one player. By altering the cost of escalation to conflict, we see that the game could be shifted from

FIGURE 2  
Game Structure and Outcomes with Modified Preferences



SOURCE: Features information from Von Neumann and Morgenstern, 1947, pp. 65, 77; Quackenbush and Zagare, 2016.

one of preemption to one of deescalation or deterrence. From Red's preferred outcomes, we can see that, in this game, Red would rationally choose to cooperate *if they are sufficiently convinced* that Blue would be willing to escalate.<sup>19</sup>

This game can be described as one of asymmetric deterrence, in which a credible threat from the second player can make a difference in the first player's decisionmaking. Quackenbush and Zagare (2016) provide a discussion of asymmetry and how this shift in the perceived cost of escalation to conflict could deter a potential first mover from choosing an escalatory action in the first place.<sup>20</sup> Their research includes a scenario of asymmetric deterrence in which one of the players has a credible threat while the other does not. In this case of asymmetric deterrence, a credible threat from the second player can make a difference in the first player's decisionmaking. This credible threat takes the form of a commitment to fight as perceived by the first player. We can see from the preferred outcomes that a second player would rationally decide now to deny the first player at the second node rather than concede. The first player, knowing this, would then choose to either maintain the status quo or escalate to conflict. We can see from the preferred outcomes in this game that Blue would rationally decide now to deny Red at move two rather than concede. Red, knowing this, would now choose to forgo escalation to avoid their least preferred outcome.

## Policy Implications for Changing the Cost of Conflict

Deterrence in this game depends on Red's perception that the cost of conflict to Blue is sufficiently low and the stakes to Blue are sufficiently high that it would prefer escalation to conceding to Red's demands. The policy implication here is that if the United States prefers escalation, including nuclear use, over the outcome if it concedes to Russia's demands, then it needs to convey that its own stakes in the conflict are high enough such that it would risk such escalation. In other words, a credible threat from the United States hinges on persuading Russia that the United States has a significant stake in the outcome of the

war.<sup>21</sup> This approach has its own challenges because it is difficult to credibly convince any stakeholder in this conflict that the United States has more at stake in the future of Ukraine than Russia.

However, establishing a credible stake in the war could be accomplished by highlighting its broader geopolitical importance. For example, the United States may choose to message that global security and geopolitical influence is at stake and, because of this, the United States has a significant interest in avoiding concession to Russia's demands.<sup>22</sup> A focus on broader geopolitical implications of Russia's actions in Ukraine in this way could enhance deterrence of further Russia's escalation, assure U.S. regional allies, and shape U.S. and NATO strategy as they support Ukraine. *Strategic messaging to this effect should continue to be a focus of U.S. communications and statements on the conflict in Ukraine.*

Deterrence in this game also relies on Red's perception that pursuing an escalatory path would lead to worse outcomes than if they were to forgo escalation. One way to improve the likelihood of this perception would be to message that a Blue response to Red escalation will be escalatory and costly in return. However, this is especially challenging and risky, given uncertainties inherent in U.S. understanding of Russia's goals and decisionmaking.<sup>23</sup> Furthermore, Washington, D.C., has been clear about not wanting to risk escalation to a larger conflict involving a strategic exchange of nuclear weapons; threatening to do so is both dangerous and not credible. Although *there might be carefully calibrated responses available that impose significant costs on Russia in a manner that does not further escalate the conflict, these are certainly not straightforward to identify, and developing these responses is a persistent challenge for policymakers.*<sup>24</sup>

## Second-Order Response Options in Extended Games

In the previous section, we outlined an approach that creates a deterrence outcome by shifting Red's perception of the outcome preferences for Blue. By shifting this perception, Red is persuaded not to escalate in the first place because the outcome is less favorable

to them because of the expected Blue response. In that game, we assume that a Blue response is binary; it will be escalatory in a manner that propels the situation to a nuclear conflict, or Blue will acquiesce and choose to not escalate. We next explore what happens in this game if we expand the variety of possible Blue responses to an initial escalation from Red.

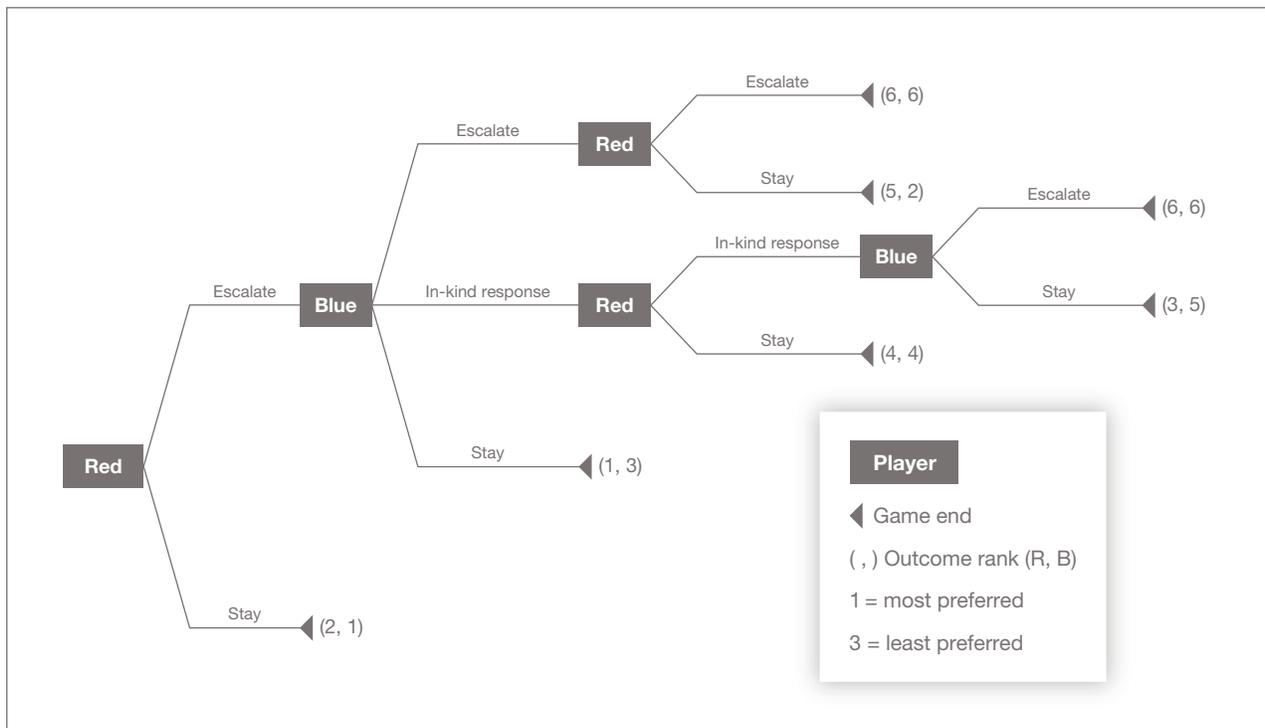
To do this, we restructure the game by changing the response options for each player by allowing retaliation when facing an escalatory move from the opponent. To illustrate this, we turn to the analysis from Zagare on two-stage escalation.<sup>25</sup> Specifically, Zagare defines a *double chicken game* in which players start from a status quo position and decide whether to engage in aggressive action, defecting from this status quo. If both players decide to defect, each player can then choose whether to forgo a response and essentially acquiesce to the aggressive player, respond to aggression with an *in kind* action, or further escalate. If either player chooses

deliberate escalation in response to aggressive action, the other player has the option to respond in kind or further escalate. This adds a move option to the game by allowing a third response option of increasing the escalation level in response to aggressive action rather than just ending the game when mutual aggressive action results in conflict. This modified game tree is illustrated in Figure 3.

In this game, if a player decides to escalate, the other has a chance to respond in kind or to further escalate. Two moves are thus added to the game, as follows:

- **Move one:** The game begins as Red decides to either maintain the status quo when facing Blue intervention or to escalate.
- **Move two:** If Red decides to escalate, Blue now decides whether to respond in a manner that further escalates, to acquiesce to Red by *not* responding, or to *respond in kind*. If Blue decides to acquiesce to Red by forgoing a

FIGURE 3  
Zagare’s Double Chicken Game



SOURCE: Adapted from Zagare, 1989.

response, the game is over and does not proceed to move three.

- **Move three:** If Blue decides to escalate or to respond in kind, Red now has an additional move to retaliate.
- **Move four:** If Red decides to retaliate with an in kind response, Blue can choose to further escalate.

The outcome preferences for **Red** we will use for this analysis are as follows:

1. Blue acquiesces in move two to initial aggression from Red.
2. Red does not escalate in the first place.
3. Blue responds in kind to Red aggression; Red retaliates in move three with an in-kind response, causing Blue to acquiesce.
4. Blue responds in kind to Red in move two, and Red acquiesces.
5. Blue deliberately escalates in move two, and Red acquiesces.
6. Red responds to deliberate escalation from Blue in move two with further escalation in move three or responds to an in-kind response from Blue in move two with its own in-kind response, prompting Blue to deliberately escalate.

Similarly, the outcome preferences for **Blue** are the following:

1. Red does not escalate in the first place.
2. Blue deliberately escalates in move two, and Red acquiesces.
3. Blue acquiesces in move two to initial aggression from Red.
4. Blue responds in kind to Red, and Red acquiesces in move three.
5. Blue responds in kind to Red aggression; Red retaliates in move three with an in-kind response, causing Blue to acquiesce.
6. Red responds to deliberate escalation from Blue in move two with further escalation in move three or responds to an in-kind response from Blue in move two with its own in-kind response, prompting Blue to deliberately escalate.

In the outcomes described here, each player would prefer to further escalate than to acquiesce when facing aggression from the opponent but *only if they are assuming that the other player will not also further escalate*.<sup>26</sup> We arrive at this conclusion using backward induction as in the other games. If the game has proceeded to move four, Blue has responded to Red escalation in kind, and Red similarly has responded in kind to Blue. Blue now must decide whether to stay at this current level of escalation, responding in kind, or to further escalate. Using the preferences we established, Blue will choose to stay, resulting in payoff (3, 5). In move three, Red is in two possible places on the tree. If they are responding to a previous in-kind response from Blue in move two, Red will choose either to also respond in kind, giving them the (3, 5) outcome, or to acquiesce and stay, giving them the (4, 4) outcome. Given their outcome preferences, Red will choose to then respond in kind. If Blue has in the previous move chosen escalation, Red will choose either to further escalate, resulting in the (6, 6) outcome, or to stay and acquiesce to Blue, resulting in the (5, 2) outcome. Now Red's best choice is to acquiesce to Blue, Red's second worst outcome, to avoid their worst outcome. Blue, knowing Red's optimal choices in move three, will then choose between the (5, 2) outcome should they choose to deliberately escalate, the (3, 5) outcome should they respond in kind, or the (1, 3) outcome should they acquiesce. Blue's best choice in move two is then to deliberately escalate. Red, knowing this, will in move one decide whether to initially escalate, resulting in a (5, 2) outcome, or to maintain the status quo, resulting in the (2, 1) outcome. Red will then rationally choose the preferred status quo, and the conflict is deterred.

This outcome is notable in that, in the single-stage chicken game, the first mover is motivated to aggressive action because the best choice for the second player would be conceding to this aggression. In the two-stage game, the option to escalate by the second mover changes the decisionmaking of the first mover such that they are no longer motivated to initiate aggression. The first mover sees that forcing the second to choose between accepting their demands or escalating leads to the second player choosing escalation, resulting in the less preferred outcomes for the first player.

## Policy Implications for Extending Response Options

In this game, we see that a longer-term consideration of the possibility of retaliation could promote deterrence of initial escalation from Red. Deterrence in this game relies on managing Red's perception of how Blue expects Red to play; Red must perceive that Blue expects Red to back down if Blue escalates in response to Red. This discussion illustrates how nonmyopic decisionmaking and multistage play can result in deterrence, which is unlikely in a single-stage game. In the game we described, we see that extending the game to two stages essentially adds a response option for the second mover that is not available in a single-stage game. Therefore, the two-stage game essentially sets up a situation in which Russia could be deterred from employing NSNWs because it would expect that the United States would choose to further escalate in a manner that would be more costly to Russia than it would be to the United States. In this double chicken game, we see from the analysis that if Russia expects the United States to continue to escalate, Russia will end up at a less preferred outcome than it would if it foregoes escalation in the first place. Messaging here could focus on *establishing that the United States perceives that Russia is not willing to further escalate*, setting the expectation that the United States *will* escalate and that Russia will back down if facing an escalatory response from the United States.

## Observations from the Games: Adversary Perceptions and U.S. Levers

The games we described are generic representations of a conflict in which one player is contemplating a preemptive escalatory move. Although acknowledging that the United States is a third party to the conflict in Ukraine, the United States has a vested interest in the outcome of this conflict, and the conflict has geopolitical implications that affect U.S. interests. Recognizing that games are simplifications of a much more nuanced set of decisions and strategies, we nevertheless can use these game models to identify a general set of levers to guide the development of potential strategies when facing Russia's possible use

of NSNWs in the region. These strategies involve shaping Russia's perceptions of U.S. willingness to escalate and Russia's own perceptions of the cost of escalation and the potential benefits of such escalation. Many of these strategies have significant implementation challenges; we describe each here.

### **Emphasizing the high stakes for the United States in the conflict could deter Russia but presents a significant challenge for policymakers.**

Policymakers could focus on building the perception of U.S. stakes in the outcome of the conflict as a means of deterring Russia's escalation. Modifying the chicken game to one in which the United States is perceived as being less willing to concede to Russia's demands helps to establish the credible threat of retaliation required for effective deterrence. This strategy involves raising the stakes for the United States, as perceived by Russia, and communicating to Russia that the United States would rather escalate than concede to Putin's demands. However, the success of this strategy relies on persuading Putin that the cost of escalation to the United States is acceptable given the high stakes. Given statements from Washington, D.C., Russia likely believes that the United States would seek to avoid nuclear conflict at all costs. Russia also likely recognizes that the United States would prefer to retaliate using means other than engaging in a conflict with Russia. Crafting a means of changing this perception may not be feasible, and attempts to message otherwise would likely be perceived as a bluff.

**Messaging to Russia that the costs of using NSNWs in Ukraine would be higher for Russia than for the United States could deter Russia, but such a message requires careful calibration.** From the asymmetric conflict costs game, we see the importance of messaging a mismatch in the costs of conflict should things escalate. This strategy requires establishing the perception of asymmetric costs to support the credible threat from the United States and push Russia to seek ways to avoid a perceived high cost of conflict. To leverage this asymmetry strategically in the conflict in Ukraine, the United States could build the perception that, if the war escalates, Russia has more to lose than the United States. Establishing this perception could involve the development of carefully calibrated responses

that impose costs on Russia without escalating to a nuclear conflict. These responses must be severe enough to impose significant costs on Russia but also be perceived as credible by Russia. A challenge here is in determining what exactly those carefully calibrated responses would be.

**The United States could message that it expects Russia to back down if facing further escalation.**

In the double chicken game, we see from the analysis that if Russia expects the United States to continue to escalate, it will end up at a less preferred outcome than it would should it forgo escalation in the first place. Messaging here could focus on establishing that the United States perceives that Russia is not willing to further escalate, setting the expectation that Russia will back down if facing an escalatory response from the United States. Here instead of attempting to establish that the United States would be willing to escalate because it is willing to accept the costs of escalation, the United States could message that it is willing to escalate because it expects Russia to back down if it does. The challenge here is that the United States knows that Russia has committed vast resources to preventing an outcome in which it is forced to acquiesce. Given U.S. awareness of this rhetoric, building a perception that the United States believes that Russia would back down may be difficult. Recognizing the enormous challenge in shifting Russia's perceived utility for escalation and acquiescence, the United States may instead consider dedicating resources to persuading Russia that "the [W]est is not bluffing. It will maintain a unified and permanent pushback, from sanctions to diplomacy, from lethal arms supplies to humanitarian assistance."<sup>27</sup>

**Persuading Russia that forgoing escalation is preferable to the outcome should it escalate requires developing options short of escalation that are acceptable to Russia.** In the game setup, we are assuming that Russia expects the outcome of the conflict will not be favorable to it if operations continue as is. As the conflict progresses, Russia may indeed feel increasingly backed into a corner. Developing options that appear less costly than the cost of escalated conflict could be a key lever for deterring Russia in a manner that does not require the United States to issue its own threats of escalation.

The observations that arise from the game theory analysis require the United States to develop carefully calibrated responses to potential Russia's use of NSNWs, persuade Russia that the United States is willing to escalate beyond Russia's own escalation, or persuade Russia that there are preferable options for them than escalation. To look at how these levers might work in a real-world example, we provide the following historical discussion based on the 1999 Kargil War. (See the "Rationale for Case Selection" text box for information on why we selected this confrontation.)

## **A Historical Assessment of Possible U.S. Responses: An Examination of the 1999 Kargil War**

Although game theory can help elucidate some available levers for shaping perceptions, highlight conditions under which Russia might escalate, and identify possible levers for deterring Russia from this escalation, this analysis relies on the assumption that players in this game are nonmyopic and rational, and the geopolitical context of the game is not explicitly considered. For this reason, we seek to enhance the preceding analysis through the examination of a real-world example. In the next section, we will look at a historical example that highlights how escalation can be managed and outcomes shaped and, in doing so, seek to identify key features that can inform potential U.S. responses to the crisis in Ukraine and potential use of NSNWs by Russia.

Prior to the outbreak of armed violence near the Indian city of Kargil, India and Pakistan had a long history of tense relations. Of particular importance for the Kargil War were the reciprocal nuclear tests conducted in May 1998. India initially conducted a series of five test explosions, known as Pokhran-II.<sup>28</sup> Pakistan responded with a series of underground nuclear tests, known as Chagai-I.<sup>29</sup> The Kargil War began in spring 1999 when Pakistan crossed over the line of control in the disputed Jammu and Kashmir region.<sup>30</sup> Pakistan hoped to revive the insurgency in Kashmir, internationalize the Kashmir cause, and avenge a series of previous Indian advances.<sup>31</sup>

## Rationale for Case Selection

To explore the historical frequency of escalate-to-deescalate strategies, we examined the International Crisis Behavior (ICB) dataset.<sup>65</sup> For our purposes, ICB data have several significant advantages over other commonly used datasets of international conflicts, such as the Correlates of War project or the Uppsala Conflict Data Program. The ICB dataset offers more nuance to the causes of crisis escalation with variables on the triggering event to international crisis and the aggressor of the international crisis. Moreover, it contains data on whether the crisis escalated or whether tensions were reduced over the ensuing five-year period. These measures allow us to create a much more accurate universe of cases. The ICB dataset initially contained 487 observations, but we introduced two criteria to properly select the cases of interest:

- The aggressor (or triggering entity) in the conflict needs to possess nuclear weapons.
- The breakpoint or trigger of the crisis needs to involve a violent act to seize territory.

These restrictions are necessary because the premise relies on a state seizing territory and then making nuclear threats to deter a response. Of the initial set of 487 observations, there are 15 potentially relevant cases based on these criteria. From these 15, we selected the Kargil War between India and Pakistan as the case most relevant for deliberate escalation as a strategy. This is based on several important criteria. First, the conflict reflected the most serious confrontation in the dataset. Many of the other cases reflected border clashes or other relatively minor disputes. Given the stakes of the Kargil War, we think it as the most plausible for a possible escalation scenario. Second, it represented a clear-cut case of attempted nuclear coercion. Finally, and most important, the Kargil War most closely resembles the Russia-Ukraine conflict, wherein a nuclear power invades a neighbor to seize strategically important territory and then makes nuclear threats in defense of that captured land.

## Pakistan's Nuclear Threats

One of the central assumptions on which Pakistani military planners banked was that the country's nuclear arsenal would dissuade India from making any serious challenge to recover the strategically important area. This situation exhibits the important tendencies of an escalate to-terminate, or escalate-to-coerce, strategy: Pakistan seized an important piece of territory and attempted to present India with a fait accompli, relying on nuclear threats to dissuade any attempts to recover the area. Pakistani leaders issued several ambiguous nuclear threats during the conflict. Prime Minister Muhammad Nawaz Sharif said, "If there is war, or if the present confrontation continues on the borders, it will bring so much devastation, the damage of which will never be repaired."<sup>32</sup> Sharif had earlier indicated that Pakistan would also meet India on "equal terms," which many took to mean as a reference to nuclear weapons.<sup>33</sup> Information Minister Mushahid Hussain said, "Kashmir has been the natural flash point, and now it has the potential to become a nuclear flash point as well."<sup>34</sup> Foreign Secretary Shamshad Ahmad declared, "We

will not hesitate to use *any weapon* in our arsenal to defend our territorial integrity" (emphasis in original).<sup>35</sup> Minister of Religious Affairs Raja Zafar ul Haq also indicated that Pakistan had developed nuclear weapons to use them, saying, "The purpose of developing weapons becomes meaningless if they are not used when they are needed."<sup>36</sup> Moreover, Bell and Macdonald (2019) argue that Pakistan actually had an incentive for the first use of nuclear weapons because of the country's numerical inferiority compared with India.<sup>37</sup>

## India's Response

How did India respond, both to the seizure of its territory and to the nuclear threats? India launched Operation Vijay, a combination ground, air, and sea approach to expel Pakistan from the Kargil region. One of the key aspects of India's response was the degree to which it controlled escalation, preventing the conflict from spiraling into a wider confrontation. To start, India attempted to use ground troops to expel the militants. It was only after the initial attempts failed to dislodge Pakistani units from the

heights that India turned to air power.<sup>38</sup> The use of the air force was itself an escalation because it was the first time since 1971 that India employed air power against Pakistan's troops.<sup>39</sup> However, both air and ground assets were not allowed to cross the line of control.<sup>40</sup> So although there was fighting across a 150 km front, Indian forces had strict instructions (from Prime Minister Atal Bihari Vajpayee) not to enter Pakistan's territory.

Indian leaders also did not engage with Pakistan's nuclear threats or make their own. Prime Minister Vajpayee later said, "We never thought atomic weapons would be used."<sup>41</sup> Chief of army staff General V. P. Malik said, "Jingoistic rhetoric apart, there was no credible evidence or threat that nuclear weapons would be used during the conflict."<sup>42</sup> Malik would also say that Pakistan would not use nuclear weapons "unless Pakistan's vital interests are threatened and its very existence is at stake."<sup>43</sup> India's national security adviser Brajesh Mishra said, "Anyone with a small degree of sanity would know that [nuclear war] would have disastrous consequences for Pakistan."<sup>44</sup> India's response to the conflict can be summed by saying it responded with conventional forces in the area of operations, did not widen the conflict by attacking outside the theater, prevented escalation by not crossing the line of control, and dismissed the nuclear threats as not credible. But these efforts were not sufficient to expel Pakistan from Kargil.

## Role of International Pressure

The conflict ultimately concluded because of international pressure. World opinion opposed Pakistan's incursion. The United States, in particular, brought its diplomatic efforts to bear to force Pakistan to withdraw behind the line of control. In late June 1999, the Clinton administration dispatched U.S. Central Command Commander Gen. Anthony Zinni, along with senior State Department official Edward Gibson Lanpher, to Islamabad to discuss the conflict. Zinni and Lanpher met with both Pakistan's military leader General (and later President) Pervez Musharraf and Prime Minister Nawaz Sharif in an attempt to end the conflict. Zinni reportedly said, "If you don't pull back, you're going to bring war and

nuclear annihilation down on your country. That's going to be very bad news for everybody."<sup>45</sup> In return, Zinni and Lanpher promised that the United States would guarantee safe passage for Pakistani troops back to the line of control. More substantively, Zinni said, "What we were able to offer was a meeting with President Bill Clinton, which would end the isolation that had long been the state of affairs between our two countries."<sup>46</sup> Prime Minister Sharif accepted that offer and traveled to Washington, D.C., to meet with President Clinton on July 4, 1999.

Sharif, realizing he would get no assistance from international partners (especially after China declared its neutrality), ultimately acceded to the demands: Pakistan would withdraw its forces back behind the line of control.<sup>47</sup>

## Lessons Learned from the Kargil War Example

What lessons can we draw from the Kargil conflict as it relates to an escalate-to-deescalate strategy? From this preliminary examination, there are several points worth raising. First, the defender has the ability to militarily respond to a forceful seizure of territory, but that response must be tightly controlled to prevent wider escalation. Second, international pressure could carry significant weight in the resolution of the conflict. Finally, nuclear threats need not be met with reciprocal nuclear posturing. We discuss each of these factors in turn to highlight their generalizability to escalate-to-deescalate-strategies.

**Controlled response.** In terms of responding to an escalate-to-deescalate strategy, the Kargil case is highly instructive in the ways that the defender can react, possibly in ways that do not lead to a wider conventional or nuclear war. Of course, these responses are predicated on possessing the means to do so. After Pakistan seized the Kargil region, India immediately deployed ground troops in an attempt to wrest back control of the area. When initial forays proved ineffective, India used air power in support of those ground attacks. It also mobilized reserves, placed units on alert, and altered its naval exercise schedule. What is important about these moves, however, is how tightly controlled they were.

As noted, Prime Minister Vajpayee ordered that no ground or air missions take place across the line of control. This order ensured that India could have a forceful response but not threaten Pakistan as to make nuclear war more likely. Furthermore, India contained the fighting to the Kargil region. Although India threatened to expand the war and fight along a broader part of the international border, military operations ultimately did not expand beyond the initial theater. This ensured that the conflict stayed localized to the Kargil and Kashmir issue and did not escalate into more-substantial fighting.

In their framework for understanding nuclear crises, Bell and Macdonald (2019) also highlight the degree to which the Kargil crisis was highly controlled by both India and Pakistan. Despite Pakistan's nuclear posture of delegating command and control systems to lower echelons (which increases the possibility of unauthorized or accidental use), other salient elements pointed to a higher degree of control. Bell and Macdonald note that India kept a tight leash on its own nuclear forces, how Pakistan had clear and well-understood red lines, how there was a high degree of separation between the conflict zone and nuclear command and control centers, and that communication remained open throughout the war.<sup>48</sup> These elements combined to make for a more stable escalation dynamic, allowing India to respond militarily without prompting nuclear war. India's controlled response was also cited by the *Kargil Review Committee Report* as the main reason the conflict did not escalate. The report says, "Since India did not cross the [line of control] and reacted strictly within its own territory, the effort to conjure up escalation of a kind that could lead to nuclear war failed. Despite its best efforts, Pakistan was unable to link its Kargil caper with a nuclear flashpoint, though some foreign observers believe it was a near thing."<sup>49</sup>

Overall, India's constrained response helped prevent a wider escalation of the war. By limiting operations to Kargil in Kashmir, India was able to ensure that it did not threaten Pakistan's safety and stability but was still able to guarantee that it would fight for its territory. Moreover, India's restraint helped influence public opinion on the crisis, making it much more difficult for Pakistan to win friends and support from international partners.

**International pressure.** In their analysis of the lessons drawn from the Kargil War, Tellis, Fair, and Medby write that Pakistan was surprised at the widespread condemnation of its invasion.<sup>50</sup> The actions of the United States have been noted, along with the Zinni-Lanpher mission and Prime Minister Sharif's visit on July 4. However, the United States was not the only actor to pressure Pakistan to withdraw its forces behind the line of control. In a communique released during the summit in Cologne, Germany, the Group of Eight (G8) wrote, "We are deeply concerned about the continuing military confrontation in Kashmir following the infiltration of armed intruders which violated the Line of Control."<sup>51</sup> The G8 would go on to say, "We therefore call for the immediate end of these actions, restoration of the Line of Control and for the parties to work for an immediate cessation of the fighting, full respect in the future for the Line of Control and the resumption of the dialogue between India and Pakistan in the spirit of the Lahore Declaration."<sup>52</sup>

In addition to the G8, China also declared its neutrality in the conflict. Tellis, Fair, and Medby write, "The eventual position taken by China did not live up to any of Pakistan's highest expectation. In the days and weeks after the disappointing visits to China by Foreign Minister Sartaj Aziz and then Prime Minister Nawaz Sharif, there was palpable shock at China's position."<sup>53</sup> Singh (1999) writes, "It was clearly China's continued posture of neutrality that provided the most decisive input in convincing the Pakistani leadership of the futility of continuing to back up its losing armed forces as also of seeking to internationalise the Kashmir issue in the face of Pakistan's growing global diplomatic isolation."<sup>54</sup> Despite China's stance as a traditionally pro-Pakistan voice, President Jiang Zemin's administration did not provide the support for which Prime Minister Sharif and General Musharraf had hoped.

International condemnation played a key role in Pakistan's eventual decision to withdraw its forces back behind the line of control. Tellis, Fair, and Medby write, "This accumulating international isolation and opprobrium, among other strategic and tactical concerns, likely precipitated Pakistan's decision to withdraw from Kashmir."<sup>55</sup> Pakistan's efforts to win international friends were complicated after it started

issuing nuclear threats. As one of the first examples of nuclear powers going to war, the Kargil War brought the concept of nuclear coercion to the fore.

**Nuclear threats.** After seizing the territory in Kashmir, Pakistan faced a series of military setbacks after India deployed ground troops and air power to retake the territory. Confronting multiple setbacks, Pakistan started issuing nuclear threats. The use of such threats raised the stakes of the conflict, made it more difficult to gain international support, and were ultimately ineffective in achieving any strategic objective.

President Clinton would later say, “Now you have a subcontinent with a fair number of nuclear weapons, with uncertain doctrines for use and somewhat questionable security of the weapons themselves and the materials used to make them. And all of a sudden, we’ve got this huge crisis. No one had thought through, in my opinion, on the Pakistani side—and maybe on the Indian side—how much they were increasing the risk to the whole world by precipitating this huge crisis when they’re both sitting on nuclear arsenals.”<sup>56</sup>

Pakistan’s use of nuclear threats also caused its efforts to internationalize the Kashmir crisis to backfire. The *Kargil Review Committee Report* says, “The international community does not favour alteration of the status quo through nuclear blackmail as this would not be in the interest of the five major nuclear powers. Pakistan obviously overlooked this factor.”<sup>57</sup> From the standpoint of the international community, the major diplomatic players certainly had an incentive to ensure that nuclear blackmail would not be an effective strategy.

This leads to the final point: Pakistan’s nuclear threats did not succeed in forcing India to negotiate from a weak position over the Kashmir issue. Tellis, Fair, and Medby write that Pakistan’s threats were actually not designed to coerce India, writing, “Islamabad’s nuclear signaling is likely to have been driven, at least partly, by the prudential objective of cautioning New Delhi against any further escalation.”<sup>58</sup> Sechser and Fuhrmann agree, arguing, “Pakistan’s nuclear threats did not appear to coerce India in 1999, but . . . [the] nuclear threats may have deterred India from escalating the Kargil War.”<sup>59</sup> Although Pakistan’s nuclear threats may have suc-

ceeded in deterring India from escalating the war, they did not help Islamabad achieve any of the aims of the conflict (reviving the Kashmir insurgency, internationalizing the cause of Kashmir, or avenging past Indian actions).<sup>60</sup> In other words, nuclear threats did not help Pakistan achieve coercion. More substantively, from an escalate-to-deescalate standpoint, nuclear threats may not help the aggressor obtain its objectives, particularly when the defenders do not engage with the threats. Instead, nuclear threats just serve to raise the stakes of a conflict and make it more difficult to win international support.

In sum, the Kargil War serves as an effective example of how states might respond when an aggressor employs an escalate-to-deescalate strategy. This example suggests consideration of the following potential approaches when facing potential adversary nuclear use:

**Engage in tightly controlled escalation to accomplish objectives without escalation spiraling out of control.** In the Kargil case, this approach allowed the Indian military to take back the seized territory. However, it must be emphasized that the escalation has to be tightly controlled: Expanding the conflict or engaging in reciprocal nuclear threats may make it more difficult to confront the aggressor. India demonstrated controlled escalation by preventing its ground and air forces from crossing the line of control. New Delhi also did not respond in kind to Pakistan’s nuclear threats.

**Loss of international support can influence the actions of the aggressor.** Pakistan ultimately decided that its efforts were futile after being abandoned by international partners. Both China and the United States refused to support Islamabad’s adventurism, and other Western powers also condemned Pakistan’s actions. The lack of support severely hampered Pakistan’s ability to achieve its war aims, so it was instead forced to retreat behind the line of control. This loss of international support adds to the cost of conflict for the aggressor.

**Nuclear threats make it more difficult for the aggressor to accomplish its objectives.** Nuclear threats raise the stakes of the conflict, hamper efforts to gain international sympathy, and are usually an ineffective tool for coercing an opponent into giving up the disputed territory.

## Limits of the Analysis

The Kargil War is instructive for how a defender might respond to an escalate-to-deescalate strategy. However, just as the game theory discussion on U.S. levers in response to a escalate-to-deescalate threat from Russia presented challenges and required significant assumptions, the historical example presented here also has limitations. First, and perhaps most important, there was no possibility of tactical nuclear use. At the time, there was no evidence that Pakistan possessed NSNWs; there were broader discussions about its development in the mid-2010s.<sup>61</sup> One of the preeminent concerns with Russia's invasion of Ukraine is Putin's potential use of NSNWs.<sup>62</sup> With Russia's escalate-to-deescalate strategy, there has been significant speculation over Putin's nuclear threshold and the point at which the use of a tactical nuclear weapon in an otherwise conventional conflict becomes feasible.<sup>63</sup> The Kargil War sheds no useful light on the possibility of tactical nuclear weapon use, so it remains an open question what the role of such weapons would be in a conflict between nuclear powers.

The second limitation is that international pressure cannot necessarily be counted on to bring a conflict to a successful close. In the case of Kargil, the diplomatic actions of the United States and others helped to bring the war to an end before it escalated into other theaters. However, there are three salient concerns about the role of international opprobrium: What happens if the aggressor does not care about its international reputation? What if there is no greater power to mediate and act as peacemaker? And what happens if international pressure does not uniformly support the side of the defender?

There are some states that would not be deterred even if they were to become an international pariah. Consider North Korea as an example. Despite long-standing sanctions and isolation from the rest of the international community, North Korea has not demonstrated any desire to change its strategic outlook. It is difficult to say that North Korea would alter its plans should it face stern international condemnation for any adventurism. Moreover, there are other nuclear weapons states that are powerful enough to weather potential storms brought about by seiz-

ing territory in an escalate-to-deescalate strategy. For example, although Russia has felt the ill-effects from sanctions following its invasion of Ukraine, it remains to be seen whether the widespread condemnation in the international community will play any role in resolving the conflict. With these factors in mind, it may not be wise to rely solely on international pressure to resolve escalate-to-deescalate conflict because the aggressor may just not care about its reputation.

Another question is what happens in the absence of a greater power to mediate and act as peacemaker. In the Kargil War, both India and Pakistan possessed nuclear weapons, but neither was considered a great power. The power disparity allowed the United States to serve as an effective broker for peace. What happens if no greater power exists? Consider, for example, the possibility that China seizes control over a disputed territory and makes nuclear threats to solidify that gain. The United States does not have the kind of military edge over China that it did over Pakistan and India. Without such a power disparity, the possibility remains that no country could serve as an effective mediator to settle the dispute. Without a peace broker, an escalate-to-deescalate conflict may need to be resolved militarily, which increases the likelihood of nuclear war.

During the Kargil War, international pressure came down firmly on India's side. Even China, one of Pakistan's long-standing patrons, declared neutrality in the conflict. Future conflicts may not have such a uniformity of international response. Russia's invasion of Crimea in 2014 is a prime example of this. Although many countries condemned Russia's actions, there was little in the way of unified action to confront Putin. If world opinion is split on the merits of a conflict, countries that support the aggressor could help undermine sanctions, provide an outlet for economic goods and currency, and even potentially serve as a military ally if the confrontation widens beyond its initial parameters. This is all to say that the information side of an escalate-to-deescalate conflict should not be underestimated, and defenders would be well served to counter the aggressor's narrative as much as possible.

There is a final limitation to consider, which centers on the variety of threats that defenders need

to counter to prevent a fait accompli. Tellis, Fair, and Medby argue that the most important lesson India learned is that “it must be prepared to counter a wide variety of Pakistani threats. . . . India must therefore develop the robust capabilities it needs to thwart surprise and to win even if surprised by Pakistan.”<sup>64</sup> This lesson still holds largely true: Defenders should be prepared to act against a wide variety of threats and develop the necessary capabilities to prevent surprise. However, this is easier said than done, especially when confronting possible threats across the globe, as opposed to a regionalized conflict.

## Concluding Thoughts

The Kargil War presents several instructive lessons for how defenders might respond to an escalate-to-deescalate strategy. Confronted with military stalemate and international opprobrium, Pakistan conceded and withdrew its troops behind India’s line of control. The conflict thus resolved without the conflict widening or escalating into nuclear war. The Kargil War highlights the importance of a controlled response, the role of international pressure in resolving the conflict, and the limitations of nuclear threats. However, there are important caveats to the analysis with regard to NSNWs, how international pressure might be applied to a variety of aggressors, and the feasibility of preparing for strategic surprise. Further research is required to better understand the role of these caveats in developing appropriately calibrated responses, including responses to the conflict in Ukraine.

## Conclusion and Proposed Future Work

Examining the conflict in Ukraine that began in February 2022 through a game theoretic lens provides some insight into how the United States can think about expanding its options to potentially produce better outcomes. This game theory discussion highlights the important implications of

establishing high stakes for the United States in this conflict, communicating asymmetrically higher costs to Russia should it go to conflict, identifying calibrated responses that avoid escalation, and persuading Russia that backing down is preferred to escalation to conflict. There are important caveats to this analysis, including that there are uncertainties and misunderstandings that inevitably arise when we rely on perceptions for shaping decision-making. In the games used in our discussion, we recognize that a more realistic representation of the interaction between these two players will illustrate the effects of imperfect information shared among the players, a wider set of action options, and incomplete information about the values and objectives of each player. Much work has been done in game theory and behavioral economics that can inform this more nuanced thinking, and further research should leverage this literature to identify how this may apply to such scenarios as the one that is the focus of the report.

An analysis of the conflict in Ukraine through the lens of a historical example highlights the importance—and the difficulty—of crafting a calibrated response. This example also indicates the important role of international pressure in resolving the conflict short of escalation. Lessons taken from this discussion indicate that increased engagement with allies and partners could help to increase international pressure, thereby imposing costs on an aggressor, and could help to develop appropriate responses to aggressors; future research and analysis that facilitate the growth of these relationships could help support this development.

Lastly, this preliminary study points to several specific approaches and methodologies for future work. First, researchers might consider a more robust set of case studies, building off the initial work begun in this report. Second, a series of tabletop games may inform decisionmaking and provide useful insights as to likely options and outcomes. Third, these insights might be used to inform the construction of branches and sequels of larger-conflict games.

## Notes

<sup>1</sup> In the Russian view, it would make little sense for NATO to attack Russia and leave untouched Russia's ability to respond with nuclear weapons. Soviet strategy emphasized the need to sever NATO's link between conventional and nuclear war.

<sup>2</sup> *Local war* is the most apt description of the conflict in Ukraine, although the indirect participation by Western countries may change this perception among Russian decisionmakers.

<sup>3</sup> The condition of the Russian military as of 2004 did not instill much confidence in conventional management of the full scope of local war scenarios.

<sup>4</sup> Sterlin, Protasov, and Kreidin, 2019.

<sup>5</sup> The Kh-102 is believed to carry a 250 kiloton nuclear payload. See CSIS Missile Defense Project, undated.

<sup>6</sup> Calculations run at Nuclear Secrecy, undated. We recognize that NSNWs can have high enough yields to cause severe damage and casualties, and although their use is often assumed to be lower yield when compared with strategic nuclear weapons, NSNWs can have significant consequences.

<sup>7</sup> Kokoshin et al., 2021.

<sup>8</sup> This phenomenon has played out across numerous Joint Staff and combatant command games, effectively neutering the United States' ability to respond to Russian aggression.

<sup>9</sup> See for instance, Zagare, 2014; Anderson, 1966; Brams, 2002; Danilovic, 2002; Fearon, 1997; Geller and Singer, 1998; Myerson, 2009, Brams and Kilgour, 1988a; Myerson, 1997.

<sup>10</sup> An *extensive form game* is one that uses a game tree, or decision tree, to represent sequential and interactive decisionmaking among the players. See, for example, Huttegger, 2009.

<sup>11</sup> Although we present this more generic scenario here, readers could consider the more specific situation in Ukraine with Russia as the first mover in its invasion of Ukraine on February 24, 2022. See Krauss, 2022. In addition to attempting to seize territory in Ukraine, Russia has also threatened to respond to any potential U.S. intervention in the region. See O'Connor, 2022; "Lightning-Quick' Response if NATO Intervenes in Ukraine: Putin," 2022.

<sup>12</sup> *Backward induction* is a tool for determining optimal decisions in a sequence by starting at the last decision point, identifying the optimal decision there, and reasoning backward through the remaining decision nodes.

<sup>13</sup> This leads to a first-mover advantage in the game if the first move is perfectly observed and presents a credible commitment to aggression.

<sup>14</sup> There are also equilibria in the above game with mixed strategies in which a player acquiesces with some probability. The probability  $p(\text{acquiesce}) = (C - L)/(D - L - W + C)$ . Here  $W$  is the most preferred outcome for each player: a "win" in which the other player acquiesces.  $D$  is the second most preferred, in which each player acquiesces, or is "deterred."  $L$  is the third most preferred, in which the player "loses" to the aggressor.  $C$  is the least preferred, in which both players pay the "cost" of mutual aggression. This means that if there is uncertainty about whether your opponent will acquiesce, you will adopt a strategy of aggression

based on this value. The higher the likelihood of your opponent's acquiescence, the higher your likelihood of aggression. We can also note that these outcomes are Pareto efficient except for  $D$ , *D. Pareto efficiency*, or Pareto optimality, occurs when no player could better their own outcome without making the other player worse off.

<sup>15</sup> The conflict in Ukraine, alongside the worry that Russia could be contemplating the use of NSNWs, shares some of the characteristics of the chicken game. In this instance, the aggressive action would be the use of NSNWs, and we can think of this game as one with the following possible outcomes: The United States is deterred from intervening while Russia is deterred from the use of nuclear weapons; the United States intervenes, and Russia is pushed back from Ukraine; Russia deploys nuclear weapons on the battlefield, and the United States backs down; Russia deploys nuclear weapons, and the United States responds by escalating conflict. If we are truly in the game as described, Russia is motivated to take aggressive action preemptively to dissuade the United States from intervening or as a way of coercing it to pull back from its current level of support for Ukraine. This, in essence, shifts the game from one of simultaneous decisionmaking (neither player truly knows what the other will decide) to one of sequential decisionmaking. Russia confronts the United States with a fait accompli and threat of nuclear use in an attempt to deter the United States from intervention. Because it perceives a low probability of war, Russia is rational to act in this way.

<sup>16</sup> For further discussion, see Brams and Kilgour, 1988b. This is also discussed extensively in Quackenbush and Zagare, 2016.

<sup>17</sup> Note that this work looks only at symmetric utility functions, which is almost certainly unrealistic, but we can use this as a tool to better understand decisionmaking to develop general insights about the strategic situation.

<sup>18</sup> This game as depicted here is the classic prisoner's dilemma if both players decide on their moves without prior knowledge of the other player's move. If you expect the other player to be aggressive, you will yourself choose an aggressive move to avoid the worst outcome. We can see that this is in contrast to the chicken game, in which players are incentivized to choose opposite strategies. In a normal form game with simultaneous moves, the Nash equilibrium solution is for each player to defect, in this case, choose the aggressive action. Here, a first mover would still decide to go forward with the aggressive action because they know that the second mover would rationally choose to do the same. To avoid risking the worst outcome in a simultaneous game, each player chooses aggression. The key in the discussion here is that the second player has prior knowledge.

<sup>19</sup> In the context of the conflict with Russia in Ukraine, this gives the United States an option to deter Russia from further aggression, such as use of NSNWs, by presenting a credible threat and persuading them that the outcome of this further aggression *would be costlier for Russia* than for the United States.

<sup>20</sup> Quackenbush and Zagare, 2016. Also see Zagare and Kilgour, 1993.

<sup>21</sup> For further discussion, see the discussion on power transition theory in Tammen, Kugler, and Lemke, 2017. This research presents a scenario in which one party—a dissatisfied state—seeks to challenge the status quo power of the defender.

- <sup>22</sup> The impact on the conflict in Ukraine on global economic stability is one such example of U.S. stakes in the region, as expressed in White House, 2022. Relatedly, there is a reputation cost to conceding that is discussed in, for example, Kydd, 2015.
- <sup>23</sup> The express consideration of the impact of uncertainty and how adversaries perceive and respond to it is an important area of research beyond the scope of this report.
- <sup>24</sup> In games with a high cost of conflict, there is a distinct advantage to moving first. In this game, Red assumes that Blue will never risk a conflict and is motivated to preempt; here the outcomes are strategic substitutes. However, if there is a lower cost of conflict, players may be more inclined to risk surprise attacks that could escalate to conflict, and the game is then one of strategic complements. See also Brams and Kilgour, 1988a.
- <sup>25</sup> Brams and Kilgour, 1988b; Zagare, 1990.
- <sup>26</sup> For simplicity, we assume symmetric utilities for each action in this game description. We recognize that this is seldom the case, and further exploration of this topic should include a more detailed study of the effects of asymmetry in objectives.
- <sup>27</sup> Hadfield, 2022.
- <sup>28</sup> “India Releases Pictures of Nuclear Tests,” CNN, May 17, 1998.
- <sup>29</sup> Burns, 1998.
- <sup>30</sup> Krepon, 2021.
- <sup>31</sup> Gill, 2019.
- <sup>32</sup> As quoted in Sechser and Fuhrmann, 2017.
- <sup>33</sup> Sechser and Fuhrmann, 2017.
- <sup>34</sup> Constable, 1999. As quoted in Sechser and Fuhrmann, 2017, p. 148.
- <sup>35</sup> Dugger, 1999a. As quoted in Sechser and Fuhrmann, 2017, p. 148.
- <sup>36</sup> Malik, 2006. As quoted in Sechser and Fuhrmann, 2017 p. 148.
- <sup>37</sup> Bell and Macdonald, 2019.
- <sup>38</sup> Bearak, 1999.
- <sup>39</sup> Bell and Macdonald, 2019.
- <sup>40</sup> Gill, 2019.
- <sup>41</sup> Kapur, 2007.
- <sup>42</sup> Malik, 2006.
- <sup>43</sup> Malik, 2006.
- <sup>44</sup> Kapur, 2007.
- <sup>45</sup> As quoted in Lavoy, 2009.
- <sup>46</sup> Lavoy, 2009.
- <sup>47</sup> Dugger, 1999b.
- <sup>48</sup> Bell and Macdonald, 2019.
- <sup>49</sup> Subrahmanyam et al., 2000.
- <sup>50</sup> Tellis, Fair, and Medby, 2001.
- <sup>51</sup> G7 Research Institute, 1999.
- <sup>52</sup> G7 Research Institute, 1999.
- <sup>53</sup> Tellis, Fair, and Medby, 2001.
- <sup>54</sup> Singh, 1999.
- <sup>55</sup> Tellis, Fair, and Medby, 2001.
- <sup>56</sup> Public Broadcasting System, 2003.
- <sup>57</sup> Subrahmanyam et al., 2000.
- <sup>58</sup> Tellis, Fair, and Medby, 2001.
- <sup>59</sup> Sechser and Fuhrmann, 2017.
- <sup>60</sup> Sechser and Fuhrmann, 2017.
- <sup>61</sup> Ahmed, 2016.
- <sup>62</sup> For one example, see Corera, 2022.
- <sup>63</sup> Olikier and Baklitskiy, 2018.
- <sup>64</sup> Tellis et al., 2001.
- <sup>65</sup> Brecher, 2023. The theoretical foundation of the dataset and how this dataset informs the understanding of crisis behavior are described in Brecher, 2020.

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## **About This Report**

Using a game theory approach, we examine U.S. tools and levers to respond to Russia's potential employment of nonstrategic nuclear weapons (NSNWs). We do so by first providing an overview of Russia's nuclear doctrine and capabilities, considering its discourse on nuclear escalation and declaratory policies relevant to the possible use of NSNWs. We then look at Russia's nuclear escalation through the lens of game theory, examining which potential levers for shifting decisionmaking and outcomes exist in the game. Finally, we assess how a particularly relevant historical example, the Kargil War, sheds light on possible U.S. responses for avoiding escalation without conceding to adversary demands.

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