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Tristan A. Volpe

ABSTRACT
Nuclear proliferation is not a binary outcome with uniform consequences, but instead spans a continuum of latent capacity to produce nuclear weapons. At various thresholds of technical development, some countries leverage nuclear latency to practice coercive diplomacy. How and when does nuclear technology provide a challenger with the most effective means to extract concessions in world politics? This article claims that compellence with nuclear latency puts a challenger on the horns of a credibility dilemma between demonstrating resolve and signaling restraint, and identifies a sweet spot for reaching an optimal bargain where the proliferation threat is credible while the assurance costs of revealing intent are low. Historical studies of South Korea, Japan, and North Korea validate this Goldilocks principle and find that it consistently reflects the ability to produce fissile material. Contrary to conventional wisdom about proliferation, nuclear technology generates political effects long before a country acquires nuclear weapons.

When does nuclear technology provide a country with bargaining leverage in world politics? In the past, nations have attempted to compel concessions from the United States by wielding the threat of nuclear proliferation. Some governments played the nuclear card by choice as part of a compellence strategy. During the Cold War, officials in Rome and Tokyo threatened to retain unrestricted civil nuclear programs to pressure Washington into complying with various requests, from enhanced military assistance under the NATO alliance for Italy, to the territorial reversion of Okinawa in the case of Japan.[1] The South Koreans tried to acquire a plutonium capability to prevent the withdrawal of US forces in the early 1970s. In June 1979, officials at the US Department of State believed that Pakistan's quest for nuclear technology was driven, in part, by a desire to acquire "a 'bargaining chip,' and that the [government of Pakistan] might be willing to hold its nuclear capability at a stage short of actual weapons

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[1]Leopoldo Nuti, "'Me Too, Please': Italy and the Politics of Nuclear Weapons, 1945–1975," *Diplomacy and Statecraft* 4, no. 1 (1993): 137, 121.

development" for the right price.[2] In the early 1990s, North Korea threatened to produce plutonium for nuclear weapons unless US officials provided energy assistance. Much more recently, Saudi Arabia promised to match Iran's uranium enrichment capability in 2015 to gain leverage over the White House in negotiations for a formal defense treaty and conventional weapons.

Other nations engaged in coercive diplomacy as a tactical response to alleviate pressure or buy time. The North Koreans returned to concession-seeking diplomacy during the Six-Party Talks after a US delegation confronted them with evidence of a covert enrichment program. In 2003, Libya traded its uranium gas centrifuge program away for sanctions relief, while the revelation of covert nuclear facilities in Iran forced Tehran to open a diplomatic channel to ward off preventive military action. These nations preferred to develop nuclear capabilities in secret, but diplomacy afforded each the opportunity to transform a besieged nuclear program from a liability into a means of leverage. Indeed, a former spokesman for Tehran's nuclear negotiating team claimed that Iran was pursuing a strategy of "turning threats into opportunities" by seeking to "obtain maximum concessions from their foreign counterparts in return for cooperation."[3]

As this track record underscores, some US allies and even adversaries used offers to limit nuclear technology as a means to extract concessions when at the bargaining table with Washington. At other times, the threat of proliferation was not enough to coax US officials into complying with expensive demands, or even worse, generated dangerous and costly backlash. Given the wide spectrum of nuclear capabilities below the actual possession of nuclear weapons, when will a country be in the strongest position to extract concessions from the United States?

The central claim of this article is that there is an optimal range of nuclear technology for compellence because challengers are caught on the horns of a credibility dilemma. They must demonstrate sufficient resolve to cross the nuclear weapons threshold while also reassuring the target with costly signals that compliance will be rewarded with a nonproliferation commitment. The challenger's level of latent capacity to produce nuclear weapons drives the severity of this tension between issuing credible threats and assurances. Moving closer to the bomb ratchets up threat credibility and the strength of the costly signals needed to convince the target to comply. The theory derives a series of specific claims about when the challenger will be in the best position with its nuclear program to resolve this dilemma and identifies the presence of a sweet spot between having too little and too much nuclear latency to extract coercive benefits. When a nuclear enterprise is in this middle zone, the challenger should be most able to reach an optimal bargain because the proliferation threat puts enough pressure on the target to comply, and the assurance costs of signaling

[2]US Department of State Cable 145139 to US Embassy India, "Non-Proliferation in South [Asia]," 6 June 1979, National Security Archive [hereafter NSA] Electronic Briefing Book 377.

[3]Seyed Hossein Mousavian, *The Iranian Nuclear Crisis: A Memoir* (Washington, DC: Carnegie Endowment for International Peace, 2012), 99–100.

strategic intent are low relative to the concessions reaped from the nuclear deal. An empirical effort to identify the lower and upper boundaries of the sweet spot in actual nuclear programs finds that it consistently reflects the ability to produce fissile material at enrichment and/or reprocessing (ENR) facilities across different US allies and adversaries over the last six decades.

This finding about the bargaining utility of nuclear latency overturns the conventional wisdom that nuclear weapons are a binary capability with uniform deterrent effects. Proliferation is not a dualistic outcome, "with states either having a fully-fledged arsenal or nothing at all. It spans a continuum" of latent nuclear capabilities, from countries struggling to operate uranium centrifuges to sophisticated programs with stockpiles of fissile material.[4] Yet the literature "suffers from a considerable 'existential bias,' focusing almost entirely on a state's quest for a nuclear weapons capability."[5] Aside from a few notable pioneers, "the existence of a tier of states technically capable of making weapons offering them significant military options in war and political leverage in peace is hardly noticed."[6] But the analytic focus is shifting down the capability spectrum as key countries in the Middle East and East Asia continue to retain nuclear latency in lieu of the bomb.[7] This article joins an ongoing effort to understand the political implications of nuclear latency by explaining how "various thresholds in nuclear power technology" can be leveraged to practice compellence.[8]

The article is organized into four parts. The first crafts the logic of nuclear latency as an instrument of compellence, and derives hypotheses about the optimal extraction of coercive benefits. The second scopes out where the sweet spot might be in practice before devising a research design to select cases from the historical record. The third part studies episodes of compellence with nuclear latency to validate the theory and finds that the sweet spot is consistent over time and across challengers as different as South Korea, North Korea, and Japan. The conclusion situates these findings within the nuclear and crisis

[4]Austin Long, "Proliferation and Strategic Stability in the Middle East," in *Strategic Stability: Contending Interpretations*, ed. Elbridge A. Colby and Michael S. Gerson (Carlisle, PA: US Army War College Press, 2013), 387.

[5]Vipin Narang, *Nuclear Strategy in the Modern Era: Regional Powers and International Conflict* (Princeton, NJ: Princeton University Press, 2014), 299.

[6]Brad Roberts, "VNAs and the Contemporary Latent Weapon State," in *Nuclear Weapons in a Transformed World: The Challenge of Virtual Nuclear Arsenals*, ed. Michael J. Mazarr (New York: St. Martin's Press, 1997), 264. For the classics on nuclear latency, see George H. Quester, "Some Conceptual Problems in Nuclear Proliferation," *American Political Science Review* 66, no. 2 (June 1972): 490–97; Albert J. Wohlstetter, *Swords from Plowshares: The Military Potential of Civilian Nuclear Energy* (Chicago, IL: University of Chicago Press, 1979); Stephen M. Meyer, *The Dynamics of Nuclear Proliferation* (Chicago, IL: University of Chicago Press, 1986); Ariel E. Levite, "Never Say Never Again: Nuclear Reversal Revisited," *International Security* 27, no. 3 (Winter 2002/03): 59–88.

[7]Wyn Bowen and Matthew Moran, "Living with Nuclear Hedging: The Implications of Iran's Nuclear Strategy," *International Affairs* 91, no. 4 (July 2015): 687–707; Mark Fitzpatrick, *Asia's Latent Nuclear Powers: Japan, South Korea and Taiwan* (London: Routledge, 2016); Vipin Narang, "Strategies of Nuclear Proliferation," *International Security* (forthcoming).

[8]Scott D. Sagan, "Nuclear Latency and Nuclear Proliferation," in *Forecasting Nuclear Proliferation in the 21st Century: Volume 1, The Role of Theory*, eds. William C. Potter and Gaukhar Mukhatzhanova (Stanford, CA: Stanford Security Studies, 2010), 81. See also Matthew Fuhrmann and Benjamin Tkach, "Almost Nuclear: Introducing the Nuclear Latency Dataset," *Conflict Management and Peace Science* 32, no. 4 (2015): 443–61; Gene Gerzhoy, Rupal Mehta, and Rachel Whitlark, "The Determinants of Nuclear Latency," (paper presented at the 2016 Annual Conference of the International Studies Association, Atlanta, GA, 16–19 March 2016).

diplomacy literature, and explores the implications of the theory for US nonproliferation policy.

The Logic of Compellence with Nuclear Latency

This core section builds a theory of compellence with nuclear latency by first explaining how a challenger dials up its threat to produce nuclear weapons until the target capitulates, and then sends costly signals to solve a commitment problem about its strategic intent. As a result, challengers are often caught on the horns of a credibility dilemma—they must demonstrate resolve to go nuclear, but they also need to adequately reassure the target that compliance will be rewarded with nuclear restraint. The second part deducts a series of hypotheses about when the challenger will be in the best position with its nuclear program to resolve this dilemma, and identifies a logical Goldilocks zone or sweet spot for the optimal extraction of coercive benefits.

Nuclear Latency and the Credibility Dilemma

Compellence refers to a situation in which one state (the challenger) inflicts, or threatens to inflict, some form of pain against another country (the target) until it complies with an explicit set of demands. How does a country's ability to produce nuclear weapons translate into a means of compellence? Unlike threats of economic or military punishment, a nuclear program bestows a nation with the capacity to move, or threaten to move, closer to the bomb. Since nuclear weapons are the great strategic equalizers among nations, a proliferation threat puts pressure on other countries to forestall an adverse shift in the balance of power before it is too late.[9] Adversaries fear a loss in relative military power. With only a few nuclear weapons, a weak state can undercut the conventional capabilities of a superior rival by creating an entirely new strategic calculus.[10] Within an alliance, proliferation by a protégé increases the risk of entrapping a patron in a local conflict and restricts freedom of action. Rather than endure these costs and risks, the United States in particular has long opposed the spread of nuclear weapons.[11] Yet this opposition creates an opportunity for a challenger to threaten proliferation unless the target provides concessions, backed with an assurance to foreswear nuclear weapons once compliance is forthcoming.

The effectiveness of compellence depends on whether the challenger's mix of threats and assurances puts enough pressure on the target to comply. Success is

[9] Jack S. Levy, "Declining Power and the Preventive Motivation for War," *World Politics* 40, no. 1 (October 1987): 82–107.

[10] Michael C. Horowitz, *The Diffusion of Military Power: Causes and Consequences for International Politics* (Princeton, NJ: Princeton University Press, 2010), 106.

[11] Francis J. Gavin, "Strategies of Inhibition: US Grand Strategy, the Nuclear Revolution, and Nonproliferation," *International Security* 40, no. 1 (Summer 2015): 9–46.

measured by (1) how closely the target complies with the challenger's demands; and (2) the costs paid by the challenger to cut a deal relative to the benefits reaped from coercion.[12] These metrics scope out three possible outcomes based on the target's response: noncompliance, suboptimal compliance, and optimal compliance. A compellent threat obviously fails if the target refuses to change the status quo. When the challenger achieves compliance, however, the costs paid to pressure and reassure the target also must be factored into the outcome. As Lawrence Freedman notes, if these "enforcement costs" exceed the value of the concessions extracted from the target, this "Pyrrhic victory … is always likely to be sub-optimal."[13] Instead, compellence is deemed to be successful when the challenger employs coercive instruments that allow it to quickly extract maximum benefits from the target at minimal cost.

How does a challenger make threats and assurances with its nuclear program to reach such an optimal bargain? The competing objectives of threatening proliferation while promising nuclear restraint present the challenger with a dilemma. On one hand, the challenger has to demonstrate sufficient resolve to follow through on the threat. The target estimates the credibility of this threat in terms of the challenger's capability and intent to produce nuclear weapons. Intelligence monitoring helps the target "determine the magnitude, pace, and capabilities" of the nuclear program by focusing on measures of nuclear latency: how quickly it would take the challenger to produce the fissile material—highly enriched uranium (HEU) or plutonium—at the heart of a nuclear weapon with enrichment and/or reprocessing (ENR) technology.[14] The challenger's intent to proliferate is "far more difficult to discern than capabilities," as the "focus of intelligence efforts will be on gauging *strategic* intention; the desire to acquire a nuclear weapon in the first place.[15] The challenger needs to credibly demonstrate that it will proliferate only if the target fails to comply with the compellent demands.

But at the same time, the target must be assured that coercive diplomacy is not a ruse by a determined proliferator. For compellence to work, the proliferation threat should be backed up with "a convincing, self-binding promise" to refrain from nuclear weapons or further harassment once the target complies.[16] Otherwise the target will drive up the enforcement costs as it resists the challenger's demands, and may leave the negotiation table. The goal is for the challenger to demonstrate that (1) it will no longer be resolved to acquire nuclear weapons once the target complies; and (2) this nonproliferation pledge will be

[12] Robert J. Art, "To What Ends Military Power?" *International Security* 4, no. 4 (Spring 1980): 8.
[13] Lawrence Freedman, "Strategic Coercion," in *Strategic Coercion: Concepts and Cases*, ed. Lawrence Freedman (Oxford: Oxford University Press, 1998), 30.
[14] Robert Blackwill and Ashton Carter, "The Role of Intelligence," in *New Nuclear Nations: Consequences for U.S. Policy*, eds. Robert Blackwill and Albert Carnesale (New York: Council on Foreign Relations Press, 1993), 218.
[15] Wyn Q. Bowen, Robert Dover, and Michael S. Goodman, "Intelligence and Nuclear Proliferation: An Introduction to the Special Issue," *Intelligence and National Security* 29, no. 3 (2014): 319, emphasis in original.
[16] Thomas C. Schelling, *Arms and Influence* (New Haven, CT: Yale University Press, 1966), 76.

relatively immune to future geopolitical or domestic change.[17] The underlying issue is that the challenger's incentives to remain a nonnuclear weapon state may change over time, "making it unwilling to live up to its promise at a later date. The change in incentives can be anticipated and is the source of others' doubts about the promise."[18] Compellence makes this commitment problem acute because the challenger is trying to convince the target that noncompliance will be punished with proliferation.

The solution is for the challenger to send costly signals that reveal its nuclear intentions and bind the nuclear program to a nonproliferation pledge. Two ideal typical mechanisms exist for the challenger to send information about its incentives to keep a promise. Hand-tying actions increase the ex post costs of reneging and boost the benefits of keeping the promise, while sunk-cost signals increase the ex ante costs of making the promise in the first place, and act as an investment that only a committed challenger would be willing to make.[19] Even though costly signals are a sine qua non for successful compellence, this type of nonproliferation assurance has "not generally been a focus of empirical research."[20] To close this gap, the rest of this section deducts a menu of four complementary options the challenger can pick from to reassure the target, and illustrates the employment of each by countries attempting to reassure the United States.

First, the challenger can roll back or limit its technical capacity to produce nuclear weapons, and/or accept an intrusive monitoring regime to verify compliance. Since a revisionist state interested in the rapid production of nuclear weapons would not agree to incur delay, impose limits, or accept enhanced monitoring provisions, the challenger signals its benign motives to cooperate with the target.[21] The strength of the signal required to assure the target depends on the challenger's level of nuclear latency. For instance, consider the technical steps taken by North Korea in 1994 compared to Iran in 2015. In the early 1990s, North Korea cleared an important hurdle by bringing a nuclear reactor and plutonium reprocessing plant online, but had not yet produced large quantities of fissile material. North Korea reassured the United States by verifiably shutting down operations at the plutonium complex. By contrast, Iran's large centrifuge capacity and enriched uranium stockpile put its program on the cusp of the bomb by 2015, so it had to send a costlier signal by rolling back its latent capacity to proliferate.

[17] On the difference between costly signals in the crisis bargaining versus reassurance context, see Andrew H. Kydd, *Trust and Mistrust in International Relations* (Princeton, NJ: Princeton University Press, 2007), 187–88.

[18] James D. Morrow, "The Strategic Setting of Choices: Signaling, Commitment, and Negotiation in International Politics," in *Strategic Choice and International Relations*, ed. David A Lake and Robert Powell (Princeton, NJ: Princeton University Press, 1999), 91.

[19] James D. Fearon, "Signaling Foreign Policy Interests: Tying Hands versus Sinking Costs," *Journal of Conflict Resolution* 41, no. 1 (1997): 69–70.

[20] Jeffrey W. Knopf, "Varieties of Assurance," *Journal of Strategic Studies* 35, no. 3 (2012): 379.

[21] This follows the logic of signaling out of a security dilemma. See Charles L. Glaser, "The Security Dilemma Revisited," *World Politics* 50, no. 1 (October 1997): 171–201.

Second, the nuclear program itself can be given up as a hostage if the infrastructure is made to be vulnerable to preventive action or dependent on foreign suppliers.[22] Again, if the potential proliferator has an extensive and protected nuclear infrastructure, it may need to give up key facilities or make itself more vulnerable to send a costly signal. This is precisely why the fate of Iran's hardened underground enrichment facility at Fordow was critical to cutting a deal in 2015. Since Fordow was the least vulnerable part of Iran's nuclear program, the Iranians had to limit enrichment activities at the facility. For civilian nuclear energy programs, nodes of the nuclear fuel cycle often rely on contracts with foreign suppliers. Japan, for instance, "has enmeshed itself in a web of international agreements … with its nuclear suppliers banning it from using imported materials for purposes other than its civilian nuclear energy program."[23] All else being equal, an exposed nuclear complex reliant on international trade stands to lose more from breaking a nonproliferation promise.

The third option is to bring in another state to help underwrite the challenger's promise. An ideal guarantor would punish the challenger if it reneged on its nonproliferation promise.[24] China's role as lead mediator of the Six-Party Talks between North Korea and the United States illustrates the promises and pitfalls of an outside guarantor. As Pyongyang became dependent on Beijing for energy assistance in the early 2000s, US officials requested the Chinese underwrite diplomacy because Beijing could turn the oil spigot off and on to punish or reward North Korea.[25] Yet China's tepid response to North Korea's first nuclear weapons test in 2006 shows that third parties may also end up playing an unproductive role if they are unwilling to punish the challenger.

Fourth, the parameters of the deal can be structured to build confidence. Between allies, the high level of trust facilitates a frontloaded exchange. Consider the agreement reached in 1969 between Japan and the United States. Japanese officials promised to sign the Non-Proliferation Treaty (NPT) without worrying about whether the United States would live up to its end of the deal. Similarly, US officials agreed to take the irreversible step of returning the western Pacific islands, confident that their Japanese counterparts would not welch on the deal.

In an adversarial relationship, neither side is likely to trust the other to uphold the deal. The challenger can take incremental steps towards a binding nonproliferation promise, such as shipping out fissile material or shuttering facilities, while the target reciprocates with phased concessions. If both sides implement these confidence building measures, "each may be willing to risk a small investment to create

[22] Thomas C. Schelling, *The Strategy of Conflict* (Boston, MA: Harvard University Press, 1960), 43.

[23] Llewelyn Hughes, "Why Japan Will Not Go Nuclear (Yet): International and Domestic Constraints on the Nuclearization of Japan," *International Security* 31, no. 4 (Spring 2007): 73–74.

[24] This logic is derived from H. E. Goemans, *War and Punishment: The Causes of War Termination and the First World War* (Princeton, NJ: Princeton University Press, 2000), 32.

[25] Julia Joo-A Lee, "To Fuel or Not to Fuel: China's Energy Assistance to North Korea," *Asian Security* 5, no. 1 (2009): 47–48.

a tradition of trust," as a precursor to a grand bargain.[26] The July 2015 nuclear agreement reached between Iran and the P5+1, for instance, included an entire annex that described the phased "sequence of actions" each side would take to implement the complex array of commitments.[27] By backloading concessions in this way, the target agrees to provide a stream of benefits contingent on the challenger's continued compliance.

These costly signals provide the challenger with a menu of options to solve the commitment problem. But to convince the target that the promise of nuclear restraint is credible, the challenger must calibrate the signals to countervail the proliferation threat made at the outset. As the empirical examples underscored, the cost of the signals depends on how close the challenger is to the bomb. At a moderate level of nuclear latency, the challenger cannot present the target with a nuclear fait accompli, so the hand-tying and sunk-cost mechanisms do not need to guard against this type of rapid breakout incentive. At an advanced level of latency, the challenger will need to burn sunk costs, decrease its nuclear latency, and accept hand-tying mechanisms to assuage the target's fear of the future. In sum, the costly signals required for successful compellence become increasingly expensive as the challenger ratchets up its nuclear latency.

The Sweet Spot Hypotheses: Too Little, Too Much, and Just Enough Nuclear Latency

Since the success of coercive diplomacy rests on the interaction of credible threats and assurances, the challenger must resolve a dilemma to use nuclear technology as an optimal bargaining chip. The proliferation threat should put sufficient pressure on the target to comply, yet not so much that the reassurance and overall enforcement costs exceed the benefits to be gained from reaching a nuclear deal. The challenger's level of nuclear latency drives the severity of this dilemma: advances in the technical capacity to produce nuclear weapons increase threat credibility, but also escalate the corresponding strength of costly signals needed to convince the target to comply with the compellent demands. This key proposition provides the foundation to derive three main hypotheses about how variation in the challenger's level of nuclear latency influences the outcome of compellence.

With too little technology, the challenger's proliferation threat is not credible for two reasons. First, in the absence of observable indicators, it is difficult for the target to measure nuclear latency or divine intent with high confidence. Tangible investments in nuclear technology show that the challenger is not just inaugurating a program as a bluff. Case in point is Saudi Arabia's failed proliferation gambit during the summer of 2015. Repeated threats by high-ranking Saudi officials to

[26] Schelling, *Strategy of Conflict*, 45.
[27] Iran and the E3/EU+3, "Joint Comprehensive Plan of Action" (Vienna, Austria: 14 July 2015): Annex V: Implementation Plan.

develop enrichment technology were designed to put pressure on Washington for a defense treaty and the transfer of advanced conventional weapon systems, such as the F-35 fighter jet.[28] Yet, given the lack of nuclear infrastructure and expertise in the Kingdom, the White House ended up rebuffing these demands because it was not clear whether the statements about enrichment reflected an official nuclear policy position, or if a few members of the royal family were turning up the heat on Washington. Rather than fulfill expensive demands, US officials decided to wait and see where the Kingdom's civil nuclear program was headed.

Second, announcing intent without actual capabilities on the ground is a risky gambit that leaves the challenger vulnerable to technology denial, coercive sanctions, or military action—the standard levers of nonproliferation policy. The United States has an effective track record of inhibiting the spread of sensitive nuclear technology at a nascent stage of development.[29] In the past, US officials pressured members of the Nuclear Suppliers Group (NSG) to either impose strict conditions on the sale of nuclear technology around the globe, or outright cancel the sale of ENR facilities.[30] Cut off from the ability to import turnkey nodes of the nuclear fuel cycle, and under the threat of sanctions, US allies such as South Korea and Taiwan eventually abandoned the plutonium route.[31] Argentina and Brazil took much longer to develop indigenous enrichment capabilities, while Iran and Pakistan moved onto the illicit market to slowly procure technology at great risk of discovery. In sum, the United States is in a strong position to neutralize progress or levy sanctions before a country has the technical pieces needed to solve the nuclear jigsaw puzzle.

Hypothesis 1 (H1). At a low level of nuclear latency, compellence is likely to result in target noncompliance because (1) the challenger's threat is not credible; and (2) its nuclear program is vulnerable.

If nuclear bluffs are ineffective and risky endeavors, then perhaps a challenger should move as close to the bomb as possible to extract concessions. On initial consideration, it seems as though being a "screwdriver turn away" from having a nuclear weapon should put the burden on the target to cut a deal. Indeed, Henry Kissinger worried in 2012 that if Iran acquired "a military nuclear program at the very edge of going operational," other countries in the region "would be driven to reorient their political alignment toward Tehran."[32] Some analysts contend that Japan's contemporary stockpile of plutonium gives Tokyo a so-called "bomb in the

[28] David E. Sanger, "Saudi Arabia Promises to Match Iran in Nuclear Capability," *New York Times*, 13 May 2015.
[29] Nicholas L. Miller, "The Secret Success of Nonproliferation Sanctions," *International Organization* 68, no. 4 (October 2014): 913–44.
[30] J. Samuel Walker, "Nuclear Power and Nonproliferation: The Controversy over Nuclear Exports, 1974–1980," *Diplomatic History* 25, no. 2 (2002): 215–49.
[31] Rebecca K. C. Hersman and Robert Peters, "Nuclear U-Turns: Learning from South Korean and Taiwanese Rollback," *Nonproliferation Review* 13, no. 3 (2006): 539–53.
[32] Henry Kissinger, "Iran Must Be President Obama's Immediate Priority," *Washington Post*, 16 November 2012, as quoted in Fuhrmann and Tkach, "Almost Nuclear," 443.

basement" that can be used "to signal or increase its leverage with both Washington and Beijing."[33] If more nuclear technology is better, then perhaps the challenger will be in the best position when it can rapidly produce nuclear weapons.

With too much nuclear latency, however, an advanced nuclear program triggers three distinct causal mechanisms that contribute to suboptimal compliance, noncompliance, and the breakdown of diplomacy, respectively. First, high levels of nuclear latency can be leveraged to extract concessions, but the challenger often returns home with a Pyrrhic victory. Case in point is the 2015 Iran nuclear deal that provided the regime in Tehran with sanctions relief and a pathway to normalize the controversial enrichment program. The problem is that the benefits reaped from coercive diplomacy must outweigh the enforcement and assurance costs paid by the challenger to issue a credible promise. One interpretation of the Iran deal that aligns with this logic is that the Iranians burned massive sunk costs and paid high costs in return for the concessions gained under the terms of the Joint Comprehensive Plan of Action (JCPOA). The challenger may still decide to solve the commitment problem with strong costly signals, as the Iranians did, but the final bargaining outcome is not optimal.

Hypothesis 2a (H2a). At high levels of nuclear latency, even effective threats lead to suboptimal bargains because the enforcement and reassurance costs outweigh the concessions gained.

The second mechanism is a path-dependent process that increases the domestic costs of signaling nonproliferation intent, all else being equal. Nuclear latency exhibits path dependency because each step the program takes down a technical route to the bomb produces positive benefits that "increase the relative attractiveness of that path … As such effects begin to accumulate, they generate a powerful cycle of self-reinforcing activity."[34] Nuclear technology tends to generate increasing returns to various players within the state. The scientific complex becomes entrenched in the political system and seeks to retain budget outlays.[35] Politicians accrue power from managing these operations, and may veto any attempts to curtail nuclear projects.[36] Military officers or the energy industry push for tangible returns on the long-term investment.[37] Coalitions form strong incentives to pressure the leadership to stay the course, or at a minimum, not trade away the nuclear infrastructure.[38] The domestic political

[33] Michael J. Green and Katsuhisa Furukawa, "Japan: New Nuclear Realism," in *The Long Shadow: Nuclear Weapons and Security in 21st Century Asia*, ed. Muthiah Alagappa (Stanford, CA: Stanford University Press), 364.

[34] Paul Pierson, *Politics in Time: History, Institutions, and Social Analysis* (Princeton, NJ: Princeton University Press, 2004), 17–18.

[35] Scott D. Sagan, "Why Do States Build Nuclear Weapons? Three Models in Search of a Bomb," *International Security* 21, no. 3 (Winter 1996/97): 54–86.

[36] Jacques E. C. Hymans, "Veto Players, Nuclear Energy, and Nonproliferation: Domestic Institutional Barriers to a Japanese Bomb," *International Security* 36, no. 2 (Fall 2011): 154–89.

[37] Matthew Fuhrmann, *Atomic Assistance: How "Atoms for Peace" Programs Cause Nuclear Insecurity* (Ithaca, NY: Cornell University Press, 2012).

[38] William Walker, *Nuclear Entrapment: THORP and the Politics of Commitment* (London: Institute for Public Policy Research, 1999).

costs of giving up or even restraining the nuclear program rise the more it matures into a valuable operational complex.

To be clear, the first and second mechanisms are distinct but not mutually exclusive in practice. Path dependency can contribute to a Pyrrhic victory by driving up the domestic costs of cutting a deal. The Iranian negotiation team in 2015 fended off a domestic faction that had become deeply vested in the nuclear infrastructure over time, thereby raising the internal costs of cutting a deal for sanctions relief. Path dependency explains why it becomes expensive for a challenger in Iran's position to solve the commitment problem with costly signals. But this mechanism can also cause the challenger to reverse or renege on decisions to curtail the nuclear program. In October 2009, for example, Iranian diplomats agreed to an interim nuclear proposal from US officials during negotiations in Geneva and returned home to sell the deal in Tehran. Yet when discussions resumed two weeks later, the Iranians walked the deal back because hardline elements in Iran had thrown up insurmountable political barriers and costs to trading away the valuable stockpile of enriched uranium.[39]

Hypothesis 2b (H2b). At high levels of nuclear latency, path dependency will increase the domestic costs of constraining the nuclear program, resulting in a suboptimal bargain or an abrupt reversal in bargaining position.

So why would a country with an advanced nuclear program try to extract concessions at this late stage of development? A third mechanism of strategic intent to proliferate must be considered as an endogenous influence.[40] Some challengers may be determined to field nuclear forces, even if they come to bargaining table to avoid costly sanctions or a war. North Korea's behavior during the Six-Party Talks highlights how this mechanism confounds the assurance dilemma. Perhaps the regime in Pyongyang always wanted nuclear weapons. Since the North Koreans built up nuclear latency to achieve this goal, they had no intention of trading it away, and hence there was no credibility problem to solve with the United States.

There are several ways to deal with this endogeneity issue. From an empirical perspective, the research design should specify whether states use advanced nuclear programs as a bargaining chip instead of selecting out of compellence altogether by sprinting towards the bomb. But a challenger's strategic intent need not confound the argument that the costs of cutting a deal tend to be prohibitively high at an advanced stage of nuclear latency. Even a resolute proliferator may consider an offer from the United States to slow down its rate of technical development in exchange for concessions. Yet there is a major phase transition in the utility of the

[39] Japan provides another example of path dependency in action, albeit not in a compellence situation. After the 2011 Fukushima nuclear accident, the shuttering of nuclear reactor operations curtailed Japan's ability to use plutonium, and reduced the need for a new reprocessing plant. But local government was so invested in the operation of the reprocessing plant that they forced Tokyo to reverse a decision to consider shutting down the facility. See James M. Acton, *Wagging the Plutonium Dog: Japanese Domestic Politics and Its International Security Implications* (Washington, DC: Carnegie Endowment for International Peace, 2015).

[40] I thank an anonymous reviewer for raising this issue.

nuclear program once it produces nuclear weapons. As the latent nuclear enterprise approaches this critical development point, the concession offered by the United States must be extremely valuable to have any chance of inducing the determined proliferator away from the bomb.

Hypothesis 2c (H2c). Proliferators build advanced nuclear programs to produce nuclear weapons, so coercive diplomacy is either an attempt to practice deception or requires the United States to provide prohibitively high concessions.

If low levels of nuclear latency undermine threat credibility while advanced nuclear programs increase the assurance costs, there should be a technical sweet spot in between these extremes for extracting coercive benefits. Once the challenger's nuclear latency reaches a certain threshold, the proliferation threat should be credible because the target can readily estimate capability and divine motives. Moreover, it becomes difficult for the target to undo or stop proliferation after the nuclear program develops a cadre of scientists and engineers with the tacit knowledge gained from operating nuclear fuel cycle facilities. This was one crux of the Iran preventive strike debate: the program had the technical knowledge and organizational capacity to reconstitute physical assets in the aftermath of an attack, so limited airstrikes against nuclear infrastructure might just delay Iran's progress.[41] Complying with the challenger's demands may be the best way to inhibit further progress towards the bomb.

The conditions should also be favorable in the sweet spot for sending costly signals to assure the target. Since the nuclear program has not moved to the threshold of nuclear weapons acquisition, the challenger has latitude to convince the target that it is not a determined proliferator. From a domestic perspective, the path-dependent effect should be less pronounced when the program is at an emerging stage of development. The commitment to uphold the deal can also incorporate less costly hand-tying options when the challenger lacks the technical capacity to present a nuclear weapons fait accompli before the target can respond. The enforcement costs should be lower if the target calculates that complying with the challenger's demands is a modest price to pay to keep a potential proliferator at a manageable point on the latency continuum.

Hypothesis 3 (H3). When a nuclear program is in the sweet spot, the challenger is most likely to reach an optimal bargain because the threat puts sufficient pressure on the target to comply while the assurance and enforcement costs of compellence are relatively low.

Although the credibility dilemma points toward this sweet spot, the theory does not stipulate a priori where this Goldilocks zone starts and ends in practice.[42]

[41] For an overview, see Kenneth M. Pollack, "A Return to Arms," in *Unthinkable: Iran, the Bomb, and American Strategy* (New York: Simon and Schuster, 2013), 224–75.
[42] I thank an anonymous reviewer for raising this issue.

There should be a range of possible values in between having no nuclear latency at all and teetering on the brink of nuclear weapons acquisition. With this theoretical foundation established, the next section devises a research strategy to test the validity of the Goldilocks hypotheses and identify where the boundaries of the sweet spot zone are in practice.

Grounding the Logic in the Historical Record

The main objective of this article is to propose and then validate a theory of compellence with nuclear latency. This section scopes out the historical universe of cases and addresses selection-bias issues to devise a research design strategy capable of accomplishing three empirical goals. The first is a plausibility probe of the evidence to show that causal mechanisms exist and influence the bargaining dynamic as stipulated by the theory. The second goal is to conduct a limited correlational test of the hypothesized relationship between nuclear latency and the outcome of compellence. Cases are selected because each represents distinct and increasing values of nuclear latency. The critical third goal is to use these case studies in a heuristic manner to identify the sweet spot zone and see whether its boundaries vary across different types of countries or over time.[43]

As a precursor to establishing the case universe and to avoid engaging in post hoc analysis, this section opens with an inductive assessment of where the lower and upper boundaries of the sweet spot might be in actual nuclear programs. What are the major thresholds in nuclear latency? A country's nuclear latency jumps up as it passes through four technical milestones arrayed along a continuum, shown in Table 1.

On one end of the continuum, a country translates its latent capacity into a first-generation fission weapon. A gun-type design slams together subcritical masses of HEU to enable a nuclear chain reaction, while an implosion weapon surrounds a subcritical mass of plutonium or HEU with high explosives to compress the fissile material into a denser, supercritical mass.[44] These requirements of an operational weapon indicate that a nuclear program has advanced beyond the sweet spot when it can produce and weaponize fissile material before the United States can effectively respond, such as Iran did in 2015 or North Korea in 2006. The upper boundary of the sweet spot therefore lies further down the latency continuum, between the operation (Step 2) and subsequent scale up (Step 3) of ENR technology.

Where might the lower end of the sweet spot lie in practice? On the other end of the latency spectrum are countries that range from having almost no nuclear infrastructure at all (for example, Saudi Arabia in 2015) to more sophisticated nations that remain far away from bringing an ENR facility online (for example, Japan in

[43] Alexander L. George and Andrew Bennett, *Case Studies and Theory Development in the Social Sciences* (Cambridge, MA: MIT Press, 2005), 75.

[44] U.S. Department of Energy, *Restricted Data Declassification Decisions 1946 to the Present* (RDD-7, Office of Declassification, January 2002).

Table 1. Technical milestones of nuclear proliferation.

Step 1: Initiate	Step 2: Operate	Step 3: Scale Up	Step 4: Weaponize
Initiate nuclear program with R&D on ENR technology and rest of the nuclear fuel cycle	Operate uranium enrichment facility or nuclear reactor with plutonium reprocessing capability	Produce significant quantity (SQ) of highly enriched uranium (HEU) or plutonium; or the ability to produce an SQ quickly	Turn fissile material (HEU or plutonium) into a fission weapon

1957). This nascent threshold of latency (Step 1) is too little for a challenger to issue a credible threat because the United States must be able to differentiate cheap talk from a genuine threat. Concrete capabilities lend themselves to high-fidelity intelligence estimates more readily than amorphous intentions. The lower boundary of the sweet spot should capture a range of nuclear programs beyond this point that are on a clear trajectory (capability plus development speed) to operate ENR facilities. By being on the cusp of surmounting a major technical hurdle to the bomb, the challenger can generate a credible proliferation threat while also offering a verifiable assurance before path dependency makes it difficult to trade away an operational ENR facility.

A nuclear latency dataset compiled by Matthew Fuhrmann and Benjamin Tkach provides a comprehensive foundation to scope out the universe of possible cases because it measures levels of latency for thirty-two countries from 1939 to 2012 according to the possession of laboratory or pilot-scale ENR facilities.[45] For this study of compellence, twelve countries that never made an explicit proliferation threat are dropped. The remainder attempted in some way to leverage nuclear latency for political benefit. Of this subset, nine are flagged for further study because they used nuclear latency to achieve various geopolitical objectives, but not as part of an observable compellence strategy.[46] Egypt, Italy, and France are included but tagged as borderline cases because each informally drummed up interest in nuclear weapons to put pressure on the United States. Four episodes are added where the challenger did not have enough nuclear latency to be included in the Fuhrmann and Tkach dataset (no ENR at all), and hence are prime candidates for possessing too little capacity to issue a credible threat. The final universe in Table 2 contains fifteen compellence episodes involving twelve challengers who targeted the United States.

While this universe exhibits full variation along a number of key dimensions, the issue of selection bias emerges because the starting group of nuclear latency is not randomly chosen from a larger set of cases. As noted at the outset, countries develop nuclear technology for a variety of distinct reasons. The subset of countries that pursued a compellence strategy against the United States is even more distinct. This would be a problem if the selection effect introduced an unaccounted variable that confounded the causal logic of the theory by systematically skewing the

[45]Fuhrmann and Tkach, "Almost Nuclear."
[46]The nine are Argentina, Brazil, India, Israel, Norway, South Africa, Sweden, Taiwan, and the United Kingdom.

Table 2. Compellence with nuclear latency.

Challenger	Episode	Nuclear Latency	Outcome
Australia	1968	No ENR	Noncompliance
Egypt	1981–2011*	Laboratory ENR	Noncompliance
France	1951–57*	Full-Scale Plutonium	Noncompliance
Iran	2003–5	Laboratory ENR	Partial Compliance
Iran	2009–10	Full-Scale Enrichment	Noncompliance
Iran	2013–15	Full-Scale Enrichment	Suboptimal Compliance
Italy	1950–68*	Laboratory ENR	Partial Compliance
Japan	1957	No ENR	Noncompliance
Japan	1964–70	Laboratory ENR	Optimal Compliance
Libya	2003	Laboratory ENR	Optimal Compliance
North Korea	1991–94	Plutonium Capacity	Optimal Compliance
North Korea	2003–7	ENR + Weapon Test	Noncompliance
Pakistan	1978–79	Full-Scale Enrichment	Noncompliance
Saudi Arabia	2015	No ENR	Noncompliance
South Korea	1974–75	No ENR	Noncompliance
West Germany	1968	Laboratory ENR	Partial Compliance

results. But the theory guards against this issue by acknowledging that some states develop latency to acquire nuclear weapons. The empirical question to probe further in the case studies is whether the selection effect overdetermines or biases the outcome of coercive diplomacy. The main challenge that remains for the research design, however, is that this nonrandom sample of countries makes it difficult to draw general inferences and conduct a true systematic test of the theory.

Instead, a comparative research design strategy is employed to achieve three more modest goals. The first is a type of plausibility probe to prove the existence of the causal mechanisms associated with the Goldilocks hypotheses. The main evidentiary barrier to overcome here is equifinality, as a number of other factors undoubtedly influenced the bargaining outcome. One solution is to attempt to falsify the mechanisms by selecting hard cases where nuclear latency should have had little effect relative to more pronounced structural variables, such as the challenger's political and material relationship with the United States. If the evidence suggests that nuclear latency drives the compellence outcome through the stipulated mechanisms, then these results would partially validate the theory.

Second, a most-similar approach to case selection is employed to control for other variables and isolate how change in nuclear latency shapes the bargaining outcome. Specifically, the goal is to test the sweet spot argument by selecting cases that represent distinct and increasing values of nuclear latency while holding other key variables constant. If each compellence outcome moves in the hypothesized direction, this can be taken as correlational evidence in support of the theory. Fortunately, there are three countries in the case universe that moved through thresholds of nuclear latency across discreet compellence episodes. Iran, Japan, and North Korea are prime candidates to see whether increases in nuclear latency lead to the outcomes predicted by the Goldilocks hypotheses. Finally, the third goal is to identify the sweet spot boundaries in different types of nuclear programs and countries. The least-similar principle of comparative case selection recommends that the final mix be diverse enough to see whether the sweet spot remains constant

despite variation among all other critical variables, such as being an ally or adversary of the United States, regime type, compellent demands, and root motives for developing nuclear technology in the first place.

Three countries and five distinct compellence episodes are selected that meet these criteria. South Korea in 1975 is a hard case to demonstrate the validity of H1 because Seoul's dependence on Washington should have driven the outcome of intra-alliance negotiations. If the theory is correct, then there should be observable evidence that the premature proliferation threat was primarily responsible for South Korea's inability to extract an enhanced military commitment from the United States. Two episodes of bargaining failure and subsequent success by the Japanese are selected because they provide an ideal comparative set to trace out the leverage gained when an ally's nuclear program moves into the sweet spot over time (H3), all else being equal. If the sweet spot argument is valid, then Japan's development of a fissile material production capability should have bestowed the leadership with the ability to cut an optimal deal. Two compellence episodes of North Korean success in 1994 and failure by 2007 are studied to determine whether the sweet-spot hypothesis (H3) remains valid for US adversaries, and to search for indicators of path dependency at high levels of nuclear latency (H2).

The Practice of Compellence with Nuclear Latency

The aim of this empirical section is to assess the Goldilocks hypotheses' validity across five important episodes of compellence with nuclear latency by South Korea, Japan, and North Korea from 1957 to 2007. By tracing the causal mechanisms through which increasing values of nuclear latency affect the bargaining dynamic, each case study tests the logic of the sweet spot and establishes its technical parameters in nuclear programs. The results are summarized at the end of this section, and it includes a brief discussion of Iran's diplomatic track record from 2003 to 2015.

Assessing H1: South Korea's Empty Trump Card

This section explores a failed attempt by the Republic of Korea (ROK) in 1975 to compel changes in its security relationship with the United States. The case study finds three pieces of evidence to support the mechanisms of bargaining failure outlined by the theory (H1). First, the United States dismissed the proliferation threat as incredible because South Korea did not have ENR technology. Second, in the absence of capabilities, US officials believed the ROK leadership was bluffing to gain leverage. Third, South Korea's premature threat triggered US efforts to prevent it from importing a reprocessing facility.

In the early 1970s, the South Korean government was shocked by the decision of the Nixon administration to withdraw a division of US forces from Korea. President Park Chung-hee appears to have concluded that while he could not reverse this strategic realignment, Seoul needed a "nuclear trump card" to play in case US

officials tried to withdraw more troops or support.[47] Park therefore added a military dimension to South Korea's plans to develop the civil nuclear fuel cycle by creating two new defense agencies in 1970. The Agency for Defense Development (ADD) and the Weapons Exploitation Committee (WEC) were tasked with kick-starting an indigenous nuclear weapons program.[48]

Aside from a research reactor, though, South Korea had no ability to produce fissile material. Park moved to rectify this weakness by procuring a nuclear reactor and plutonium processing facility from French, Belgium, and Canadian firms. The focus on purchasing turnkey facilities made sense since "some participants recalled that acquiring the capability, rather than the actual bomb, was the goal of the time."[49] The fact that other projects languished without proper funding led ROK scientists to believe that Park just wanted "a bargaining card to prevent later US troop withdrawal."[50] A trove of new archival evidence indicates that this prediction was accurate.

In a cable to Washington in February 1975, the US Embassy in Seoul sounded the clarion call over Park's plan and highlighted the nascent stage of technology in South Korea as a key vulnerability. "Evidence accumulated in recent months justifies strong presumption that the Korean [government] has decided to proceed with the initial phases of a nuclear weapons development program."[51] Washington determined that the "ROK nuclear weapon effort has been in part a reflection of lessened ROK [government] confidence in [the] US security commitment."[52] But the program was "still in [a] rudimentary stage and lacking a number of critical items such as fuel reprocessing and plutonium."[53] US officials estimated they had a good chance to "slow the pace of ROK effort," and "increase costs significantly" by inhibiting "ROK access to sensitive technology and equipment."[54] On the diplomatic front, Washington also decided to adopt "a more explicit course" with a series of "direct, early, and firm" demarches over the nuclear issue.[55]

Initial protests from the United States set the stage for President Park to draw out the link between South Korea's nuclear ambitions and demands for enhanced US military support. In a public interview, Park cast doubt on the commitment of the United States to defend Seoul after the fall of Saigon, and raised the prospect of "developing our nuclear capability … If American ground troops were removed."[56] Park's comments "plainly indicated that he would develop a nuclear weapon unless

[47] Lyong Choi, "The First Nuclear Crisis in the Korean Peninsula, 1975–76," *Cold War History* 14, no. 1 (2014): 81.
[48] Seung-Young Kim, "Security, Nationalism and the Pursuit of Nuclear Weapons and Missiles: The South Korean Case, 1970–82," *Diplomacy and Statecraft* 12, no. 4 (2001): 58.
[49] Ibid., 56.
[50] Ibid., 60.
[51] US National Security Council, "Development of US Policy Toward South Korean Development of Nuclear Weapons," Memorandum, 28 February 1975, Nuclear Proliferation International History Project [hereafter NPIHP] #114627.
[52] US National Security Council, "ROK Weapons Plans," Memorandum, 3 March 1975, NPIHP #114628.
[53] US National Security Council, "Development of US Policy."
[54] US National Security Council, "ROK Weapons Plans."
[55] US Department of State, "ROK Plans to Develop Nuclear Weapons and Missiles," Cable, 12 March 1975, NPIHP #114615.
[56] *Washington Post*, 12 June 1975, quoted in Choi, "First Nuclear Crisis in the Korean Peninsula," 78.

[President] Ford promised an American defense commitment," which many "interpreted as bluffing to steer ongoing negotiations with the US toward a desired direction."[57] Several months later, Park and his cabinet met in private with the US secretary of defense to ask for greater reassurances and deliverables, but were once again rebuffed. The ROK demand for a pledge that the United States would "react instantaneously in the event of an attack" on a series of contested islands in the Northern Sea was simply "too expensive to exchange for a South Korean promise to end its fledging nuclear scheme."[58]

The nuclear bluff proved to be counterproductive as US officials ramped up pressure on the South Koreans to cancel their plutonium-reprocessing contract with the French. At first, the ROK government refused to cave because the "leadership considered its nascent nuclear program a trump card in negotiations with the US."[59] In December 1975, the Ford administration authorized the strongest demarche ever issued to the South Koreans: "We must make indelibly clear that far more than our nuclear support is at stake here, that if ROKs proceed as they have indicated to date [the] whole range of security and political relationships between us and ROK will be affected."[60] After the US ambassador to Korea and the secretary of defense both delivered this blunt message, President Park and the ROK leadership finally agreed to cancel the French reprocessing contract.

Assessing H1 and H3: Japan Moves into the Sweet Spot

Japan's efforts from 1957 to 1970 to negotiate the territorial reversion of the western Pacific islands from the United States constitute an ideal longitudinal study for tracing the leverage gained when an ally's nuclear program moves into the sweet spot. In several instances, Japanese leaders made veiled threats to step out from under the US nuclear umbrella if the status of Okinawa festered. Since the asymmetric nature of the alliance relationship carried into the next decade, the failure of the 1957 threat to influence negotiations establishes a firm baseline to hone in on the advantage bestowed by the acquisition of nuclear technology in the 1960s.

H1: Washington Ignores Japan's Nuclear Bluff

From 1957 to 1960, Japan and the United States endured the first crisis in the alliance over the territorial reversion of Okinawa. Trouble started to brew in 1957 when Prime Minister Kishi Nobusuke assumed office and passed the American ambassador in Tokyo a list of Japanese stipulations for renewal of the US–Japan security treaty. The premier's main request was for the return of Okinawa and the Bonin Islands to Japanese control.[61] With support from former Premier Shigeru

[57] Choi, "The First Nuclear Crisis in the Korean Peninsula," 78, 82.
[58] US Department of State, "ROK Nuclear Reprocessing," Cable, 8 September 1975, NPIHP #114609; Choi, "The First Nuclear Crisis in the Korean Peninsula," 83.
[59] Ibid., 81.
[60] US Department of State, "ROK Nuclear Reprocessing, Cable, 10 December 1975, NPIHP #114612.
[61] Walter LaFeber, *The Clash: US-Japanese Relations Throughout History* (New York: W. W. Norton, 1998), 316.

Yoshida, Kishi attempted to back his position by suggesting that Japan might pursue an independent nuclear deterrent. In January 1957, Yoshida laid out the case for Japan to acquire nuclear weapons as an option to counter entrapment scenarios from the American New Look defense reorientation.[62] Kishi then told his cabinet, "[t]here would be nothing against using nuclear weapons if they were within the limits of self-defense."[63] This signaled that proliferation might be legal under Article IX of Japan's Constitution, which permitted the buildup of military force only for defensive purposes. Yoshida and Kishi used the nuclear question to suggest that Japan might chart a more independent foreign policy.

Yet this diplomatic maneuvering rested on a shallow technical foundation, as Japan had just started its nuclear energy program in 1956 with the backing of the United States, and was dependent on foreign assistance. Washington exerted too much control through technology transfers and uranium fuel supply and could have prevented Japan from acquiring key nodes in the nuclear fuel cycle.[64] Since Japan did not have the nuclear latency necessary to credibly threaten proliferation, Yoshida and Kishi made the untimely decision to engage in a veiled form of proliferation diplomacy.

The Japanese narrowly avoided the fate of the South Koreans because the proliferation threat had little impact on the political leadership in Washington. Premier Kishi visited the White House in June 1957 to bargain over the renewal of the security pact. No evidence exists in the public domain that the Eisenhower administration considered Japanese proliferation to be a concern when negotiations began. Eisenhower stonewalled Kishi, who then faced electoral challenges in the Japanese Diet when he failed to obtain concessions over the western Pacific islands.[65] Premier Kishi's gambit ended his political career, but not Japan's nuclear energy program.

H3: Premier Sato's Nuclear Gambit Pays Off

Less than a decade later, Prime Minister Eisaku Sato also found himself under domestic duress to resolve the territorial status of the western Pacific islands. Sato turned to Japan's burgeoning civil nuclear industry to help him succeed where his predecessors had failed. Three pieces of evidence highlight the impact of the Japanese nuclear energy program on intra-alliance negotiations from 1965 until 1970.

First, declassified reports show how the United States started to take Japan's proliferation potential seriously as its civil nuclear program glided into the fissile material sweet spot. In December 1964, State Department analysts concluded that whereas Japan had the technical capacity to quickly "create a deliverable nuclear

[62] John Welfield, *An Empire in Eclipse: Japan in the Postwar American Alliance System* (Atlantic Highlands, NJ: Athlone Press, 1988), 110–111, 157.
[63] LaFeber, *The Clash*, 316.
[64] Victor Gilinsky and Paul Fritz Langer, *The Japanese Civilian Nuclear Program* (Santa Monica, CA: Rand Corporation, 1967), 1–4, 15–26.
[65] LaFeber, *The Clash*, 318.

force, probably comparable to any in the world," the government in Tokyo was unlikely to exercise this option.[66] Over the next six months, progress on plutonium reprocessing experiments and a large nuclear reactor project led to a revised estimate from Foggy Bottom: "A realistic assessment of Japan's prospects in the nuclear weapons field must thus recognize Japan's capacity to build its own nuclear force as a near-certainty."[67] The "important question" for the United States now became "whether the decision to develop this potential is likely to be made."[68] Japan was on track to acquire the full nuclear fuel cycle just as uncertainty started to emerge over its future nuclear ambitions.

Second, summaries of private meetings between Japanese and American leaders shed light on the tactics employed by Premier Sato and his cabinet. Since public threats would have damaged the alliance and Japan's economy, Sato drummed up doubt about Japan's nuclear intentions during private consultations with top US officials. In 1965, the premier set the stage for a meeting at the White House by telling the US ambassador that China's nuclear test made it "only common sense for Japan to have nuclear weapons," and then went on to link together Chinese proliferation, Japan's nuclear latency, and the reversion of Okinawa in a conversation with President Lyndon B. Johnson and a flummoxed Dean Rusk, his secretary of state.[69] When discussions over Okinawa broke down in 1969, Sato told a stunned room of American diplomats that his recent pledge to the Japanese public to remain a non-nuclear-weapon state was "nonsense."[70]

Over the course of four years, the premier and his cabinet used these threats to sell a bargain to the Johnson and then Nixon administration. If the Americans agreed to return the Pacific islands to the Japanese, the renewed strength of the alliance would obviate any need for Japan to go its own way with an indigenous nuclear force. The executive branch of the US government reached the same conclusion. As one report forecast, a failed Okinawa bargain might "constitute a turning point" in the alliance by stimulating a "Japanese decision to plot a more independent military course" that would "entail serious consideration of nuclear arms development."[71] By January 1969, Washington had coalesced around the core deal proposed by Premier Sato: if Japan signed the Nuclear Nonproliferation Treaty (NPT), Okinawa would be returned on favorable terms to ensure a nonnuclear Japan.

[66] US Department of State, "Background Paper on Factors Which Could Influence National Decisions Concerning Acquisition of Nuclear Weapons," Background Paper, 12 December 1964, NSA #NP01079, 10. Emphasis in original.

[67] US Department of State, "Japan's Prospects in the Nuclear Weapons Field: Proposed US Courses of Action," Memorandum, 15 June 1965, NSA #JU00485, 2.

[68] Ibid.

[69] US Secretary of State Dean Rusk, "Your Meeting with Prime Minister Sato," Memorandum, 9 January 1965, NSA #JU00430, 3; US Department of State, "Current US-Japanese and World Problems [Part 2]," Memorandum of Conversation, 12 January 1965, NSA #JU00437.

[70] US Embassy in Japan, "Ambassador Johnson's Farewell Call on Prime Minister Sato," Cable, 14 January 1969, NSA #JU01039.

[71] US Department of Defense, "Response to NSSM 9: Review of the International Situation as of January 20, 1969, Volume V—Noncommunist Far East-Japan," 20 January 1969, NSA #JA00036, 28.

Third, since path dependency had not set in, Japan's leaders were willing to trade ascension to the new NPT for the return of Okinawa. Premier Sato benefited from Japan's nuclear program being in the Goldilocks zone. Japan was on a rapid trajectory to operate the complete nuclear fuel cycle by the mid-1970s but had not begun reprocessing plutonium from the reactor complex. This was a prime opportunity for the government to further lock the nuclear program into the civil energy pathway by joining the NPT. If Japan joined the vanguard of the NPT to "limit the proliferation of nuclear weapons world-wide," the US government believed that "its involvement would tend to commit Japan more firmly to a non-nuclear role."[72] Even deep skeptics of the NPT, most notably President Nixon and Henry Kissinger, regarded Japan's participation in the regime to be an essential exception.

The quid pro quo was finally hashed out at a November 1969 summit between Premier Sato and President Nixon. Nixon dangled the reversion of Okinawa in an attempt to entice Japanese cooperation over trade and security issues. On the US–Japan security relationship, defense-burden sharing and nonproliferation became intertwined into a single demand. Nixon wanted Japan to "assume a greater role" in the region. But the president repeatedly "emphasized that he had been talking in terms of conventional military forces," and "did not mean that this should include a nuclear capability."[73] If Sato promised to expand defense spending, keep the country on its nonnuclear path, and cut back textile exports, Nixon was willing to return Okinawa.

Nixon's offer was the first proposal from a US president to return Okinawa on terms favorable to Japan's sovereignty. Sato praised Nixon for such a "magnanimous" decision, and agreed to make vague increases to Japan's defense capability and reduce textile exports.[74] The NPT would also be introduced to the next session of the Diet for a vote. Sato returned to Tokyo with a victory for Japan, having successfully bargained for the return of Okinawa without giving up much except a firm pledge to nonproliferation. Sato pushed the Diet to sign the NPT, and after several months of legislative wrangling, Japan became a signatory to the treaty on 3 February 1970. In exchange for Okinawa, Japan bound its burgeoning nuclear energy program to the nonproliferation mast.

Assessing H3 and H2: North Korea Leaves the Goldilocks Zone

North Korea illustrates the bargaining benefits an adversary can reap from a program ostensibly developed to produce nuclear weapons, as well as the path dependency that sets in with operational ENR facilities. The first episode in the early 1990s shows how North Korea leveraged the threat of producing plutonium to pressure the United States but managed to keep open a low-cost assurance option.

[72] US Department of State, "Japan's Prospects in the Nuclear Weapons Field." 14.
[73] US National Security Council, "Prime Minister Eisaku Sato of Japan, The President [Part 1]," Memorandum of Conversation, 19 November 1969, NSA #JT00079, 8–9.
[74] Ibid., 10.

The second episode a decade later during the Six-Party Talks indicates that costly signaling options grew expensive while the government became steadily committed to the weapons pathway as the nuclear enterprise matured.

H3: Proliferation Blackmail in the Sweet Spot

North Korea entered the fissile material sweet spot in 1991 when construction on a reprocessing plant at the Yongbyon nuclear complex neared completion. After the United States opened a diplomatic channel to resolve the nuclear issue, it soon became apparent that the North Koreans were "setting the stage to negotiate with the United States on a package that would secure the greatest benefits on the easiest terms possible."[75] North Korea manipulated the plutonium program on several occasions to increase pressure on Washington. In the most striking instance, North Korea announced that it would begin to separate plutonium because Washington had no intention of complying with Pyongyang's demands.[76] North Korean officials then started a ticking clock by highlighting a crucial qualification: it would take about two months to completely unload all the spent reactor fuel, leaving "ample time for the United States and North Korea to strike a deal."[77] The explicit nature of these brinksmanship tactics indicates that Pyongyang may have recognized the leverage provided by being in the Goldilocks zone.

The ultimatums revealed Washington's bottom line as US officials considered a preventive strike against North Korea in the summer of 1994.[78] Before the situation could escalate out of control, the unexpected visit of former US President Jimmy Carter provided Kim Il Sung an off-ramp to reach a deal. After diplomacy resumed, the United States agreed to buy out North Korea's plutonium program with a package that consisted of $50 million in energy assistance each year, $4 billion in nuclear reactor technology, political normalization, and a negative security assurance. In return, North Korea agreed to freeze operations at the Yongbyon complex, seal the reprocessing facility for eventual dismantlement, ship all spent reactor fuel out of the country, halt construction of two large reactors, and remain party to the NPT.[79] The final Agreed Framework (AF) signed by North Korea and the United States on 21 October 1994 formalized the bargain.

North Korea was able to strike a low-cost and high-reward deal because it could reassure the United States by simply freezing operations at Yongbyon. The nuclear program had not left the Goldilocks zone by producing large amounts of plutonium, so the deal focused on shutting down the reprocessing facility. This was a modest price to pay. Pyongyang avoided military attack and reaped badly needed energy assistance. The lead US negotiator noted that the AF was "not based upon

[75] Joel S. Wit, Daniel B. Poneman, and Robert L. Gallucci, *Going Critical: The First North Korean Nuclear Crisis* (Washington, DC: Brookings Institution Press, 2005), 37.
[76] Scott Snyder, *Negotiating on the Edge: North Korean Negotiating Behavior* (Washington, DC: United States Institute of Peace Press, 1999), 81–85.
[77] Wit, Poneman, and Gallucci, *Going Critical*, 175.
[78] Ibid., 181.
[79] Alan Riding, "U.S. and North Korea Sign Pact to End Nuclear Dispute," *New York Times*, 22 October 1994, A5.

trust," but rather a tit-for-tat structure with the burden of up-front performance falling on the North Koreans.[80] To receive the first shipment of heavy oil, North Korea had to freeze all its declared nuclear operations. Larger benefits would only come later when the United States "had an opportunity to judge [North Korea's] performance and its intentions."[81] The Clinton administration contended that this structure gave them some power to hurt Pyongyang "if North Korea reneges on any of its commitments at any time."[82] Since North Korea needed energy assistance, Pyongyang seemed unlikely to do so in the near future.

H2: Seeking Concessions Beyond the Sweet Spot

A second North Korean nuclear crisis illustrates how nuclear programs generate increasing returns over time as an operational capability but diminishing returns as a bargaining chip. In 2002, US officials claimed North Korea was cheating on the AF with a covert uranium enrichment program, so Washington stopped providing assistance under the agreement. This revelation was problematic, as the North Koreans would have preferred to keep it in place while they secretly acquired a stockpile of enriched uranium. Pyongyang withdrew from the NPT in January 2003, restarted the dormant plutonium program, and began to emulate their playbook from the 1990s. The major problem, however, was that North Korea became unwilling to trade away its nuclear assets for two reasons.

First, North Korea's nonproliferation options grew expensive after it cheated on the AF and then left the Goldilocks zone. The Bush administration made rewards conditional on an agreement for the complete, verifiable, and irreversible dismantlement (CVID) of North Korea's nuclear program, and requested China underwrite the diplomatic process as lead of the Six-Party Talks. Rather than pay the high costs of CVID, Pyongyang attempted to break Washington's tough stance by producing large quantities of plutonium from 2003 to 2005. A senior North Korean official admitted that this move was designed "to force Bush to negotiate on terms more favorable to North Korea."[83] Instead, the United States levied crippling sanctions against the regime's financial assets. The North Koreans boycotted negotiations and tested a nuclear weapon on 9 October 2006. While this move managed to bring US officials back to the table, the nuclear test shifted the bargaining parameters away from nonproliferation to the disablement of nuclear forces and the underlying production complex.

Second, there are several indicators that North Korea became locked into the nuclear weapons pathway soon after the plutonium reprocessing campaign in the

[80] Testimony of Robert Gallucci, "Implications of the US–North Korea Nuclear Agreement," Hearing before the Subcommittee on East Asian and Pacific Affairs, United States Senate, 1 December 1994 (Washington, DC: Government Printing Office, 1994), 12.
[81] Testimony of Secretary of State Warren Christopher, "North Korea Nuclear Agreement," Hearings before the Committee on Foreign Relations, United States Senate, 24–25 January 1995 (Washington, DC: Government Printing Office, 1995), 7.
[82] Ibid.
[83] Narushige Michishita, *North Korea's Military-Diplomatic Campaigns, 1966–2008* (London: Routledge, 2010), 168.

winter of 2004. Foremost, North Korean negotiators started to signal a profound unwillingness to give up the nuclear program. By February 2005, North Korea's lead negotiator for the Six-Party Talks made a dramatic statement: "The time for discussing give and take type issues, such as freeze and reward, at the Six-Party Talks has passed. Now that we have become a dignified nuclear weapons possessing state, the Six-Party Talks must naturally become arms reduction talks."[84] By trying to shift the focus from nonproliferation to bilateral US–DPRK arms control negotiations, Pyongyang may have been signaling that the nuclear production complex was now too valuable to trade away. Nonetheless, the United States laid out a roadmap in 2007 for North Korea to denuclearize in exchange for concessions. The leadership in Pyongyang took some initial steps, most notably disabling aspects of the plutonium program at Yongbyon, but eventually refused to verifiably dismantle key parts of the nuclear complex. By the fall of 2008, the DPRK seemed to decide that previously sufficient concessions were no longer good enough to outweigh giving up its nuclear program.

Summary

The historical case studies traced out the effect of bringing too little, too much, and just the right amount of nuclear technology to the bargaining table with the United States. As tabulated in Table 3, the boundaries of the sweet spot consistently lined up with challenger's ability to produce fissile missile at ENR facilities.

Most of the causal mechanisms stipulated by the Goldilocks hypotheses also appeared to be empirically validated. In a clear confirmation of H1, the proliferation threats from South Korea in 1975 and Japan in 1957 were not deemed to be credible by the United States, and ended Seoul's quest to import ENR technology. The H3 sweet-spot hypothesis was also supported by Japan's ability to compel concessions a decade later once its nuclear program was on an inexorable trajectory to reprocess plutonium and the similar bargaining leverage bestowed on North Korea when it gained an operational plutonium capacity in the early 1990s. To be sure, the single case study of North Korean behavior during the Six-Party Talks is not sufficient to definitively test the three causal mechanisms stipulated by H2, but there is evidence of path dependency at work. Further research should examine the bargaining behavior of other countries at advanced stages of nuclear latency, notably France, Pakistan, and Iran, to test the mechanisms against one another.

A brief overview of Iran's nuclear odyssey, for instance, lends qualified support for the theory. Iranian negotiators managed to bargain out of a dangerous situation in 2003 when the enrichment program was gliding into the sweet spot. US officials later put a deal on the table in 2009 to induce Iran to give up most of its enriched uranium, but the sudden volte-face indicated that the government was already

[84]Statements of the DPRK Ministry of Foreign Affairs, 10 February and 31 March 2005. Quoted in Jonathan D. Pollack, *No Exit: North Korea, Nuclear Weapons and International Security* (Abingdon, UK: Routledge, 2011), 148.

Table 3. The sweet spot zone in practice.

	Nuclear Program's Trajectory		
	Too Little	Just Right (Sweet Spot)	Too Much
Technical Signposts	Emerging ambition for ENR capability but limited ability to import and/or indigenously develop the technology	Capability and speed of progress put the nuclear program on the cusp of being able to produce fissile material with either a uranium enrichment facility or nuclear reactor and plutonium separation facility	Operational fissile material production capability for either military weapon or civilian energy program
Compellence Episodes	Japan 1957 South Korea 1975 Iran before 2003	Japan 1965–70 North Korea 1991–94 Iran 2003–9	North Korea after 2006 Iran 2009–15

locked in to the nuclear program. The successful negotiation of the comprehensive nuclear accord in 2015 is critical test of the theory. As mentioned earlier, one assessment in support of H2 is that the Iranians achieved a Pyrrhic victory because they paid excessive enforcement costs and weathered strong US resistance to retain a scaled back enrichment infrastructure with little benefit in the short term. Another interpretation is that Iran cut an expensive yet optimal bargain because the nuclear accord provided a long-term pathway for the regime to normalize its uranium enrichment program. Unfortunately, there is not enough information on the regime's cost–benefit calculus to make a high-confidence assessment about whether the concessions gained from the JCPOA outweighed the costs. But the theory should be subjected to this test if the data become available in the years ahead.

The Goldilocks Principle of Compellence with Nuclear Latency: Implications for Scholarship and Policy

The identification of a sweet spot for compellence with nuclear technology contributes to a broader research agenda that is questioning tenants of the nuclear revolution.[85] By focusing on how variation in nuclear latency affects a country's bargaining posture, this article pushed against the tendency to treat proliferation as having a binary outcome with homogenous consequences. Instead, a continuum of nuclear latency exists with clear thresholds of technical development below the initial acquisition of nuclear weapons. To be sure, countries do not pass through these stages "simply to accumulate negotiating chips," and some are undoubtedly driven to acquire nuclear weapons.[86] But governments pursue multiple objectives over the lifespan of a nuclear program.[87] In line with recent work on the strategic

[85]The best overview remains Robert Jervis, *The Meaning of the Nuclear Revolution: Statecraft and the Prospect of Armageddon* (Ithaca, NY: Cornell University Press, 1989), 14–45. For a direct challenge to the core pillar of mutual vulnerability, see Austin Long and Brendan Rittenhouse Green, "Stalking the Secure Second Strike: Intelligence, Counterforce, and Nuclear Strategy," *Journal of Strategic Studies* 38, no. 1–2 (2015): 37–73.
[86]Victor Cha, *Impossible State: North Korea, Past and Future* (New York: Ecco, 2012), 300.
[87]Sagan, "Why Do States Build Nuclear Weapons?"

posture choices that regional powers make to achieve foreign policy goals beyond deterrence, governments as different as Japan and North Korea leveraged nuclear latency to extract concessions from the United States.[88] The theory uncovered an optimal middle range of nuclear latency for compelling the most benefits at the lowest cost possible.[89] Contrary to the dualistic view of proliferation, nuclear technology can be integrated into a compellence posture to generate powerful and nonlinear political effects well before a country deploys its first weapon system.

The theory also highlighted a wrinkle in the traditional view of power dynamics between strong and weak nations. Compellence is supposed to be difficult, and should favor the most powerful actors.[90] But a recent comprehensive study found that although weaker nations are reluctant to challenge the strong, they tend to be quite successful at compelling changes to the status quo.[91] This article offers one partial explanation. Nuclear latency could be a unique weapon of the weak.[92] Proliferation is one of the only ways a conventionally inferior challenger can threaten to undercut the power projection capabilities of a stronger target. But further research should build on the work of Todd S. Sechser and Phil Haun to determine whether the ability and willingness of the United States to uphold its end of the nuclear deal affects a country's decision to play the latency card in the first place.[93] Weaker adversaries such as North Korea may develop and refuse to give up nuclear weapons out of a fear of suffering the same fate as Libya's Muammar Gadhafi.[94] If an adversary takes irreversible steps away from the bomb, then the strength of this commitment may create disincentives for the United States to continue paying concessions or live up to the terms down the road. While the sweet spot remains the same for adversaries and allies, the perceived credibility of US assurances certainly differs when viewed from Tokyo or Pyongyang.

What do these findings about the bargaining utility of nuclear latency mean for US nonproliferation policy? Recent scholarship shows how US officials have consistently employed a mix of technology denial, coercion, inducements, and even

[88] Mark S. Bell, "Beyond Emboldenment: How Acquiring Nuclear Weapons Can Change Foreign Policy," *International Security* 40, no. 1 (Summer 2015): 87–119; Michael C. Horowitz and Neil Narang, "Poor Man's Atomic Bomb? Exploring the Relationship between 'Weapons of Mass Destruction,'" *Journal of Conflict Resolution* 58, no. 3 (2014): 509–535; Vipin Narang, "What Does It Take to Deter? Regional Power Nuclear Postures and International Conflict," *Journal of Conflict Resolution* 57, no. 3 (2012): 478–508; Brad Roberts, *The Case for U.S. Nuclear Weapons in the 21st Century* (Stanford, CA: Stanford University Press, 2016).

[89] For a complementary set of formal model findings, see Andrew J. Coe and Muhammet Bas, "Give Peace a (Second) Chance: The Viability of Bilateral Nonproliferation Deals," (paper presented at the 2015 International Studies Association Annual Meeting, New Orleans, LA, 18–21 February 2015).

[90] Schelling, *Arms and Influence*, 70–73.

[91] Sechser, "Militarized Compellent Threats."

[92] Despite an enduring debate about compellence with nuclear weapons, there has been little consideration of how variation in nuclear latency enhances or degrades a country's ability to compel changes in the status quo. See, for example, Matthew Kroenig, "Nuclear Superiority and the Balance of Resolve: Explaining Nuclear Crisis Outcomes," *International Organization* 67, no. 1 (Winter 2013): 141–71; Todd S. Sechser and Matthew Fuhrmann, "Crisis Bargaining and Nuclear Blackmail," *International Organization* 67, no. 1 (Winter 2013): 173–95.

[93] Todd S. Sechser, "Goliath's Curse: Coercive Threats and Asymmetric Power," *International Organization* 64, no. 4 (October 2010): 627–60; Phil Haun, *Coercion, Survival and War: Why Weak States Resist the United States* (Stanford, CA: Stanford University Press, 2015).

[94] Mira Rapp-Hooper and Kenneth Waltz, "What Kim Jong-Il Learned from Qaddafi's Fall: Never Disarm," *Atlantic*, 24 October 2011.

collusion with rivals to limit the spread of sensitive nuclear technology among both adversaries and allies.[95] The steady and effective application of these options established the acquisition of ENR technology as a clear redline in US nonproliferation policy.[96] Given the bargaining advantages bestowed by sensitive nuclear technology, the Goldilocks principle lends strong analytic support to the US objective of keeping countries out of the fissile material sweet spot but recommends a possible shift in means to achieve this long-standing goal.

Beyond Iran, there are no other adversaries of the United States seeking nuclear latency in lieu of nuclear weapons. Yet a handful of US allies in Northeast Asia and the Middle East have refused to foreclose the option to develop ENR facilities for civilian nuclear energy programs. The challenge is how to respond. While technology denial and coercive threats worked well four decades ago in the South Korea case, these options are less effective and prudent today. As the global role of the US nuclear industry continues to shrink, allies can turn to an alternative field of nuclear suppliers—notably France, Russia, and China—that are eager to offer a full range of nuclear fuel cycle services without the stringent nonproliferation requirements demanded by the US government. The cost of coercive sanctions against an ally that pursues a nuclear program in full compliance with international monitoring and safeguards is quite high. In 2004, for example, Washington was reluctant to allow South Korea to be even censured for undeclared enrichment and reprocessing experiments.[97]

The United States may want to consider shifting towards a strategy of buying out an ally's sensitive nuclear program with tailored packages of military, economic, and energy assistance. The US government has long rewarded some countries for upholding nonproliferation commitments, so inducements are not a new policy instrument. Instead, the novel twist identified in this article is that incentives are most likely to influence the trajectory of a nuclear program if offered at an early stage of development. The United States can use its leverage at this phase to induce countries without ENR capabilities from ever pursuing these sensitive technologies in the first place. Once an ally glides into the sweet spot, however, US officials will have to put more lucrative rewards on the table.

While the United States is in the strongest position when an ally is at a low level of nuclear latency, the Goldilocks principle also points toward three challenges. The first is how to divine a country's future nuclear intentions. Without clear capabilities to measure, it can be hard to know if an ally is serious about ENR or just bluffing for leverage. Indeed, this uncertainty is the exact reason why US officials remain skeptical today about Saudi Arabia's purported ambitions to match the

[95] Andrew J. Coe and Jane Vaynman, "Collusion and the Nuclear Nonproliferation Regime," *Journal of Politics* 77, no. 4 (October 2015): 983–997; Francis J. Gavin, "Politics, History and the Ivory Tower-Policy Gap in the Nuclear Proliferation Debate," *Journal of Strategic Studies* 35, no. 4 (2012): 573–600; Nicholas L. Miller, "Nuclear Dominoes: A Self-Defeating Prophecy," *Security Studies* 23, no. 1 (January–March 2014): 33–73.

[96] Daniel Altman and Nicholas Miller, "Red Lines in Nuclear Nonproliferation," (working paper, March 2016).

[97] James M. Acton, "The Problem with Nuclear Mind Reading," *Survival*, 51, no. 1(February–March 2009): 136–37.

Iranian nuclear program. Second, uncertainty over intent points toward a moral hazard. An ally with no desire for uranium enrichment could inaugurate a fuel enrichment plant, and then trade away this bargaining chip. The costs of buying out nonexistent ENR ambitions must be weighed alongside the risk of calling the ally's bluff. Third, inducements may create a marketplace for governments to sell the United States a bad nuclear deal, especially if some are unwilling to accept iron-clad ENR constraints.

These are nontrivial issues to consider before adopting an inducement policy. The upshot is that the United States does have more leverage and bargaining room at an early stage of latency to convince nuclear newcomers to make at least a political commitment to forego ENR technology. But to do so, US negotiators should have the flexibility to bargain over the modalities of how exactly an ally will credibly commit itself to restraint, and the backing to put lucrative offers and credible long-term promises on the table if the moral hazard risks are deemed to be acceptable.

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