The Strategic Logic of Nuclear Proliferation

Nuno P. Monteiro and Alexandre Debs

What causes nuclear proliferation?[1] What role do security threats play in driving states to acquire nuclear weapons? Intuitively, security is the most important factor driving nuclear acquisition.[2] Yet existing security theories of proliferation, while accounting for why some states with grave security concerns have developed nuclear weapons, are unable to explain why others have not.[3] Today only nine states have the bomb, a number much lower than the pessimistic predictions made by

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1. We define "nuclear proliferation" as the acquisition of nuclear weapons by a nonnuclear state, and "nuclear forbearance" as the decision by a state to abandon its nuclear ambitions prior to nuclear acquisition. We call a state's decision to discard its existing nuclear arsenal—as South Africa did in the early 1990s—"nuclear reversal."
2. We define "security" broadly to encompass any aims that may require the use of force against other states. On security explanations of proliferation, see William Epstein, "Why States Go—and Don't Go—Nuclear," *Annals of the American Academy of Political and Social Science*, Vol. 430, No. 1 (March 1977), pp. 18–28; Richard K. Betts, "Paranoids, Pygmies, Pariahs, and Nonproliferation," *Foreign Policy*, Spring 1977, pp. 157–183; Stephen M. Meyer, *The Dynamics of Nuclear Proliferation* (Chicago: University of Chicago Press, 1986); John J. Mearsheimer, "Back to the Future: Instability in Europe after the Cold War," *International Security*, Vol. 15, No. 4 (Summer 1990), pp. 5–56; Benjamin Frankel, "The Brooding Shadow: Systemic Incentives and Nuclear Weapons Proliferation," *Security Studies*, Vol. 2, Nos. 3–4 (Spring/Summer 1993), pp. 37–78; and Bradley A. Thayer, "The Causes of Nuclear Proliferation and the Utility of the Nuclear Non-Proliferation Regime," *Security Studies*, Vol. 4, No. 3 (Spring 1995), pp. 463–519. For an early literature review, see Scott D. Sagan, "Why Do States Build Nuclear Weapons? Three Models in Search of a Bomb," *International Security*, Vol. 21, No. 3 (Winter 1996/97), pp. 54–86, at p. 85.
3. See T.V. Paul, *Power versus Prudence: Why Nations Forgo Nuclear Weapons* (Montreal: McGill-Queen's University Press, 2000). Paul's view is unable to account for variation in the nuclear status of states facing serious security threats.

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early security-based arguments on the causes of proliferation.[4] Clearly, the view that "security is the only necessary and sufficient cause of nuclear proliferation" is not borne out by the history of the nuclear age.[5] This limitation of existing security theories has exposed them to criticism on several fronts. Initially, a burgeoning scholarship emerged focusing on the nonsecurity "sources of the political *demand* for nuclear weapons."[6] More recently, "supply-side" arguments on proliferation view states' demand for nuclear weapons (for security or other reasons) as largely irrelevant, claiming instead that the odds of nuclear acquisition depend on the availability of international nuclear assistance.[7]

This lack of consensus on the causes of nuclear acquisition—and forbearance—has serious consequences for U.S. nonproliferation policy. Without an adequate theory of proliferation, U.S. decisionmakers are limited in their ability to identify the policies most likely to deter other states from

4. See Moeed Yusuf, "Predicting Proliferation: The History of the Future of Nuclear Weapons," Foreign Policy Paper Series No. 11 (Washington, D.C.: Brookings Institution, 2009), p. 4.
5. Thayer, "The Causes of Nuclear Proliferation and the Utility of the Nuclear Non-Proliferation Regime," p. 486.
6. Sagan, "Why Do States Build Nuclear Weapons?" p. 56 (emphasis in original). The most important works discussing nonsecurity causes of nuclear proliferation include Etel Solingen, "The Political Economy of Nuclear Restraint," *International Security*, Vol. 19, No. 2 (Fall 1994), pp. 126–169; T.V. Paul, "Nuclear Taboo and War Initiation in Regional Conflicts," *Journal of Conflict Resolution*, Vol. 39, No. 4 (December 1995), pp. 696–717; Nina Tannenwald, "The Nuclear Taboo: The United States and the Normative Basis of Nuclear Non-Use," *International Organization*, Vol. 53, No. 3 (Summer 1999), pp. 433–468; Jacques E.C. Hymans, *The Psychology of Nuclear Proliferation: Identity, Emotions, and Foreign Policy* (Cambridge: Cambridge University Press, 2006); Etel Solingen, *Nuclear Logics: Contrasting Paths in East Asia and the Middle East* (Princeton, N.J.: Princeton University Press, 2007); Maria Rost Rublee, *Nonproliferation Norms: Why States Choose Nuclear Restraint* (Athens: University of Georgia Press, 2009); and Jacques E.C. Hymans, *Achieving Nuclear Ambitions: Scientists, Politicians, and Proliferation* (Cambridge: Cambridge University Press, 2012).
7. See Matthew Fuhrmann, "Spreading Temptation: Proliferation and Peaceful Nuclear Cooperation Agreements," *International Security*, Vol. 34, No. 1 (Summer 2009), pp. 7–41; Matthew Fuhrmann, "Taking a Walk on the Supply Side: The Determinants of Civilian Nuclear Cooperation," *Journal of Conflict Resolution*, Vol. 53, No. 2 (April 2009), pp. 181–208; Erik Gartzke and Matthew Kroenig, "A Strategic Approach to Nuclear Proliferation," *Journal of Conflict Resolution*, Vol. 53, No. 2 (April 2009), pp. 151–160; Matthew Kroenig, "Exporting the Bomb: Why States Provide Sensitive Nuclear Assistance," *American Political Science Review*, Vol. 103, No. 1 (February 2009), pp. 113–133; Matthew Kroenig, "Importing the Bomb: Sensitive Nuclear Assistance and Proliferation," *Journal of Conflict Resolution*, Vol. 53, No. 2 (April 2009), pp. 161–180; Matthew Kroenig, *Exporting the Bomb: Technology Transfer and the Spread of Nuclear Weapons* (Ithaca, N.Y.: Cornell University Press, 2010); and Matthew Fuhrmann, *Atomic Assistance: How "Atoms for Peace" Programs Cause Nuclear Insecurity* (Ithaca, N.Y.: Cornell University Press, 2012). Critical perspectives on supply-side arguments include Alexander H. Montgomery and Scott D. Sagan, "The Perils of Predicting Proliferation," *Journal of Conflict Resolution*, Vol. 53, No. 2 (April 2009), pp. 302–328; and R. Scott Kemp, "The Nonproliferation Emperor Has No Clothes: The Gas Centrifuge, Supply-Side Controls, and the Future of Nuclear Proliferation," *International Security*, Vol. 38, No. 4 (Spring 2014), pp. 39–78.

acquiring the bomb. When are threats of preventive counterproliferation military action—or, conversely, nonaggression pledges—effective in deterring a U.S. adversary from acquiring the bomb?[8] When will additional security commitments—or, conversely, threats of abandonment—be more likely to stymie a U.S. ally's nuclear ambitions?

This article advances a security-based theory of proliferation that accounts for the limited spread of nuclear weapons. By refining existing security arguments and integrating them into a strategic-interaction approach, we show that a security-based view of proliferation is consistent with the historical record and superior to existing theoretical alternatives in explaining most significant decisions to acquire or forfeit nuclear weapons. We also offer an account of how the security environment shapes the comparative effectiveness of different policy tools aimed at deterring proliferation.

The spread of nuclear weapons is a dynamic process in which the interests of several states interact. Our contribution to the literature on proliferation is to place security arguments in the context of the strategic interaction that takes place between the potential proliferator, its adversaries, and, when present, its allies. In doing so, we provide a necessary corrective to the existing literature, which focuses either on the motivations of the state that attempts to acquire nuclear weapons (demand-side explanations, including security arguments) or on the motivations of other states to prevent it from going nuclear (supply-side explanations). To understand the role played by security concerns in proliferation, we look at both demand and supply, analyzing their net effect.[9]

The likelihood of proliferation, we contend, is largely determined by the strategic interaction between a state deciding whether to acquire nuclear weapons and its adversaries. This interaction is shaped by the potential proliferator's ability to deter a preventive strike on its nuclear program prior to acquiring the bomb. This ability, in turn, hinges on the proliferator's relative power and whether it benefits from the protection of a powerful ally. The higher the potential proliferator's relative power, the greater the likelihood

8. For the purposes of this article, "counterproliferation" refers to the implicit or explicit threat of military action to prevent nuclear acquisition. Counterproliferation is different from "nonproliferation," which refers to any measure designed to curtail proliferation without the threat of military attack. Likewise, "preventive war" includes a whole range of military actions, from surgical strikes against a limited target set to full-scale war.

9. See Scott D. Sagan, "The Causes of Nuclear Weapons Proliferation," *Annual Review of Political Science*, Vol. 14 (February 2011), pp. 225–244, at p. 240.

that it will proliferate unimpeded whenever it deems the security benefit of proliferation to be worth the cost of a nuclear program. Absent sufficient relative power to deter a preventive strike, security guarantees extended by a powerful ally may give a state the opportunity to nuclearize. Not all states with powerful allies proliferate, however. Should a protégé expect its ally to remain a reliable guarantor of its security, it would lack the willingness to acquire the bomb. Conversely, should it expect that pursuing nuclear weapons would result in abandonment by its ally prior to acquiring the bomb, it might be exposed to a preventive strike and not have the opportunity to nuclearize. Therefore, a weak state is likely to acquire nuclear weapons only when it possesses a powerful ally that is neither willing to offer reliable future protection guarantees nor able to issue consequential threats of immediate abandonment.

Our theory highlights five hitherto underappreciated patterns of nuclear proliferation. First, states that do not face a high-level security threat have not acquired the bomb. Second, weak states that did not benefit from the protection of a powerful ally committed to retaliating against an eventual preventive strike—such as contemporary Iran—have not acquired the bomb.[10] Third, states whose security goals are subsumed by their powerful allies' own aims have not acquired the bomb. Among states that possess a powerful ally, only those whose security goals are not entirely covered by this ally have acquired nuclear weapons. Fourth, U.S. threats of abandonment are effective in curtailing proliferation only by protégés that are relatively weak vis-à-vis their adversaries. Such was the case of Taiwan and West Germany, both of which Washington coerced into maintaining their nonnuclear status. Fifth, the spread of nuclear weapons decelerated with the end of the Cold War in 1989. Despite grave concerns that more states would seek a nuclear deterrent to counter U.S. power preponderance, generating "nuclear cascades" and proliferation "tipping points,"[11] only two states—Pakistan and North Korea—have acquired nuclear weapons since the demise of the Soviet Union.

The remainder of this article unfolds as follows. The first section introduces

10. We discuss the case of Pakistan below. North Korea possessed sufficient conventional military capabilities to deter a preventive strike. See Alexandre Debs and Nuno P. Monteiro, "Known Unknowns: Power Shifts, Uncertainty, and War," *International Organization*, Vol. 68, No. 1 (January 2014), pp. 1–31, at pp. 21–22.

11. See Kurt M. Campbell, Robert J. Einhorn, and Mitchell B. Reiss, eds., *The Nuclear Tipping Point: Why States Reconsider Their Nuclear Choices* (Washington, D.C.: Brookings Institution Press, 2004); William C. Potter and Gaukhar Mukhatzhanova, "Divining Nuclear Intentions: A Review Essay," *International Security*, Vol. 33, No. 1 (Summer 2008), pp. 139–169; and Paul Bracken, *The Second Nuclear Age: Strategy, Danger, and the New Power Politics* (New York: Times Books, 2012).

our theory, laying out the strategic logic of nuclear proliferation. The second section shows how our theory is consistent with the overall historical patterns of nuclear proliferation. The third section illustrates our theory through five case studies of nuclear development: the Soviet Union, Iraq, Pakistan, South Korea, and West Germany. The fourth section lays out the implications of our theory. The fifth section summarizes our findings, and the online appendix includes coding rules and short summaries of all other nuclear development cases.[12]

A Strategic Theory of Nuclear Proliferation

We account for the spread of nuclear weapons by determining the overall effect of the security environment on the likelihood of nuclear acquisition. We depart from existing security explanations for the spread of nuclear weapons by shifting and broadening the focus of analysis. Instead of looking at the consequences of nuclear acquisition for the subsequent security of the state, we focus on the security environment a state faces while developing nuclear weapons.[13] Furthermore, instead of looking only at the security incentives of the proliferator, we include those of all of the key strategic actors.

KEY TERMS AND VARIABLES

We define nuclear "development" as the period during which the state is either exploring or pursuing nuclear weapons. Nuclear "exploration" involves the "political authorization to explore the [nuclear] option" or "linking research to defense agencies that would oversee any potential weapons development." Nuclear "pursuit," in turn, involves "[a] political decision by cabinet-level officials, movement toward weaponization, or development of single-use, dedicated technology."[14]

This shift in analytic focus toward the period of nuclear development is justified by the historical observation that no state has ever acquired nuclear weapons without first developing them for a period of time during which it

12. The appendix is available at http://www.mitpressjournals.org/doi/suppl/10.1162/ISEC_a_00177.
13. Supply-side theorists also focus on the period of nuclear development, but with an emphasis on nuclear assistance. We broaden the analysis to encompass the overall strategic setting.
14. See Sonali Singh and Christopher R. Way, "The Correlates of Nuclear Proliferation: A Quantitative Test," *Journal of Conflict Resolution*, Vol. 48, No. 6 (December 2004), pp. 859–885, at pp. 866–867.

made a costly investment of resources in nuclear technology.[15] During this nuclear development period, our theory centers on the strategic interactions among three key actors: the potential proliferator, its adversaries, and, when present, its allies.

A state's security vis-à-vis its adversaries may gain much from nuclear acquisition. At the same time, its adversaries may stand to lose much as a result of its nuclearization. Therefore, if a state wants to nuclearize, its adversaries may want to thwart this effort. To do so, they may launch different counterproliferation measures, including a preventive war. Similarly, the acquisition of nuclear weapons may improve a state's ability to make decisions autonomously from its allies. Yet this may lead its allies to try to stymie its nuclearization for fear of entrapment and regional instability.[16] To do so, an ally may resort to different nonproliferation tools, including boosting its commitments to the security of its protégé or, alternatively, threatening it with abandonment. To understand the overall effect of the security environment on nuclear acquisition—and the relative effectiveness of different policies aimed at deterring proliferation by both adversaries and allies—we synthesize the interaction of these competing forces.

The key to understanding nuclear proliferation is to characterize the attractiveness of nuclear weapons to the potential proliferator, the credibility of an adversary's threats of preventive war, and the effectiveness of an ally's guarantees of protection or threats of abandonment. The remainder of this section examines this logic, uncovering different strategic circumstances that may push a potential proliferator to nuclear acquisition or forbearance.

Our theory draws on four independent variables. The first independent variable, the "level of security threat," is the likelihood of future conflict between a country and its adversaries, as evaluated by a country's decisionmakers. Second, the proliferator's "relative power" reflects the balance of military power vis-à-vis its adversaries. Third, the "cost of a nuclear program" corresponds to the value of the material resources necessary to develop nu-

15. Three former Soviet republics—Belarus, Kazakhstan, and Ukraine—maintained Soviet nuclear weapons on their territory between 1991 and 1996 but never had operational control over them, disqualifying them as nuclear states. See Sagan, "The Causes of Nuclear Weapons Proliferation," p. 227.

16. By "entrapment," we mean, as Glenn H. Snyder puts it, "being dragged into a conflict over an ally's interests that one does not share, or shares only partially." See Snyder, "The Security Dilemma in Alliance Politics," *World Politics*, Vol. 36, No. 4 (July 1984), pp. 461–495, at p. 467. By "regional instability," we mean a scenario where the likelihood of a major conflict involving the new nuclear country increases.

clear weapons. Fourth, the "level of an ally's commitment to the state's defense" first measures whether a powerful state is allied to the potential proliferator (either formally or informally) and, if such an alliance exists, tries to capture the reliability of its commitment to the defense of the proliferator.

Our dependent variable is a country's "nuclear status," which can go from nonnuclear to nuclear with the conduct of a nuclear test.[17] The causal mechanism connecting our independent variables to a state's nuclear status runs through two intervening variables. The first is the "security benefit of proliferation," which refers to the magnitude of the shift in the distribution of capabilities that nuclear acquisition would produce vis-à-vis the state's adversaries.[18] The second, the "cost of preventive war," corresponds to the value of the total resources destroyed by both sides in a preventive war.

For the purposes of our theory, an "adversary" is a state that constitutes an independent and direct security threat to a state's survival. Two states are independent direct security threats if they may decide to engage in war against the would-be proliferator without the support of each other and if they have different security disputes with the potential proliferator. These are the states against which a nuclear deterrent would provide additional security. These are also the states most likely to consider a preventive attack against the potential proliferator during the nuclear development phase. Similarly, an "ally" is a state that, given its past behavior, is expected to support the would-be proliferator in a crisis against its adversaries, regardless of whether the two possess a defense pact. For simplicity, we operationalize our notion of a "powerful" ally by restricting our attention to nuclear allies, which are the most effective deterrers of a preventive counterproliferation attack.[19]

Nuclear acquisition improves the security of a state vis-à-vis its adversaries and therefore its autonomy vis-à-vis its allies. To prevent it, both adversaries and allies may use a variety of tools. We focus on the two most powerful tools at their disposal: credible threats of preventive war launched by an adversary and credible commitments of protection or threats of abandonment

17. Despite not publicly testing a bomb, Israel and South Africa were acknowledged as nuclear powers by the international community. We elide this possibility for simplicity and without limiting the generality of our theory.
18. Our theory is agnostic on whether nuclear weapons yield advantages in the pursuit of revisionist goals. See Matthew Kroenig, "Nuclear Superiority and the Balance of Resolve: Explaining Nuclear Crisis Outcomes," *International Organization*, Vol. 67, No. 1 (January 2013), pp. 141–171; and Todd S. Sechser and Matthew Fuhrmann, "Crisis Bargaining and Nuclear Blackmail," *International Organization*, Vol. 67, No. 1 (January 2013), pp. 173–195.
19. For explicit coding rules for allies in all cases of nuclear development, see the appendix.

made by an ally. In our view, the efficacy of softer counter- and nonproliferation measures—such as inspections of nuclear facilities, supply-side restrictions, and sanctions—depends on the credibility of threats and assurances to use military force against or in support of the potential proliferator.

Adversaries and the strategic logic of proliferation

We start by characterizing the odds of proliferation among states that do not possess a powerful ally facing common security threats. The key strategic dynamics in these cases take place between the proliferator and its adversaries.

To acquire nuclear weapons, a state must first overcome what we label a "willingness" constraint. A potential proliferator's willingness to develop nuclear weapons depends on whether they would yield a security benefit, which in turn hinges on our first two independent variables: the state's ex ante relative power vis-à-vis its adversaries and the level of security threat it faces. The lower a state's relative power prior to proliferation and the higher the level of threat it faces, the more nuclear acquisition will improve the state's strategic outlook by shifting the distribution of capabilities in favor of the proliferator. We call this shift the "security benefit of proliferation," our first intervening variable.

To determine whether a state is willing to proliferate, we must then compare the security benefit of proliferation to our third independent variable, the "cost of a nuclear program." A state is willing to proliferate only when the security benefit of proliferation is greater than this cost. A relatively benign security environment, by lowering the benefit of proliferation, may make this cost smaller than the cost of a nuclear program, undermining a state's willingness to proliferate and helping to account for why most states have not acquired nuclear weapons. Likewise, an improvement in the security environment during the nuclear development phase may undermine the potential proliferator's willingness to nuclearize, leading it to abandon its nuclear ambitions.

Although willingness is a necessary condition for nuclear acquisition, it is not sufficient. An attempt to acquire the bomb could be thwarted by preventive action—either an actual war or a credible threat of attack issued by an adversary. Thus, to nuclearize, a state must also overcome an "opportunity" constraint. Whether it will be able to do so depends on the credibility of its adversaries' threats of preventive attack against its nuclear weapons program. By striking preventively, an adversary can avoid an unfavorable shift in the distribution of capabilities. Yet a preventive war is costly in both blood and treasure. We label the value of the resources destroyed by both sides in a preventive war the "cost of preventive war," our second intervening variable.

When the impact of nuclearization on the security of the new nuclear state's adversaries is smaller than the cost of a preventive war, the potential proliferator's nuclearization would be, from the perspective of its adversaries, less disadvantageous than fighting a war to prevent it. In this case, the threat of preventive war is not credible and the potential proliferator has the opportunity to nuclearize unimpeded. As the effect of proliferation increases relative to the cost of preventive war, however, the threat of preventive military action gains credibility, reducing the likelihood of proliferation. Some states internalize this threat, refraining from pursuing nuclear weapons. Others launch a covert nuclear program, hoping to remain undetected, and may suffer a preventive strike.[20] Either way, when the security benefit of proliferation is higher than the cost of preventive war, a state that is willing to nuclearize is likely to lack the opportunity to get the bomb. Theoretically, the only possibility a weak state has to go nuclear is for its nuclear program to remain undetected.

Herein lies a key difference between our theory and existing security accounts of proliferation. Beyond a certain point, the likelihood of proliferation decreases as the security benefit of proliferation increases. Certainly, the more nuclear weapons would boost a state's ability to achieve its security goals, the greater that state's willingness to nuclearize. This logic led security explanations to predict that a worsened security environment would make a state more likely to proliferate—for example, in response to proliferation by an adversary.[21] Crucially, however, the more nuclear weapons would boost a state's ability to achieve its security goals, the greater its adversaries' incentive to strike preventively. Because the acquisition of nuclear weapons results from a costly investment with delayed returns, any potential proliferator must go through a relatively vulnerable period of nuclear development. The adversary has the advantage: it can launch an attack before the moment of nuclearization. Therefore the adversary's interest trumps that of the potential proliferator, and the likelihood of nuclearization decreases.

The final step in explaining the baseline strategic logic of proliferation is to examine the determinants of the cost of preventive war. Among potential proliferators not protected by an ally, the overall cost of preventive military action is determined by our first independent variable: the ex ante balance of power between the potential proliferator and its adversaries.

When the balance of power favors the potential proliferator, the security

20. See Debs and Monteiro, "Known Unknowns."
21. Epstein, "Why States Go—and Don't Go—Nuclear"; and Sagan, "Why Do States Build Nuclear Weapons?"

benefit of nuclear acquisition to the proliferator is lower relative to the overall cost of preventive war. Because the potential proliferator already enjoys high ex ante relative power vis-à-vis its adversary, nuclearization would produce a relatively smaller security benefit and, conversely, the adversary would see a relatively smaller loss in its own security. Moreover, the higher ex ante relative power of the potential proliferator makes preventive war more costly. This lowers the credibility of threats of preventive war, making strong states more likely to proliferate unimpeded whenever they are willing to do so. Among states not protected by nuclear allies, then, the higher the level of security threat faced by the potential proliferator and the greater its relative power prior to nuclear acquisition, the greater its odds of proliferation.

In contrast, if the ex ante balance of power favors the adversaries of the potential proliferator, the security benefit of proliferation is high. Nuclear weapons would vastly improve the security outlook of the potential proliferator and worsen that of its adversaries. At the same time, the potential proliferator's ex ante relative weakness makes preventive war relatively less costly overall. Consequently, preventive war is more likely to be a rational option against a relatively weak potential proliferator.[22] This, in turn, boosts the credibility of preventive threats, making relatively weak states unprotected by a nuclear ally unlikely to nuclearize. Next, we examine the effect of alliances on the odds of nuclear proliferation.

Allies and the Strategic Logic of Proliferation

We now turn to the effect of our final independent variable—the level of an ally's commitment to its protégé's defense—on proliferation. We say that an ally is "close" if its commitment to the state's defense, as expressed through formal pledges of support and deployments of troops or nuclear weapons, is high. Otherwise, we say it is a "loose" ally. Alliances may affect a state's odds of proliferation in two ways. The first effect of an alliance with a powerful state on proliferation is to mitigate the protégé's security threats. The more reliably a powerful ally commits to defend its protégé's security interests from their common adversaries, the lower the security benefit of proliferation will be for the protégé. When the powerful ally shares all of the protégé's serious security threats and possesses the capability to mitigate them, the protégé is unlikely to see a benefit in nuclear acquisition and will no longer possess the willingness to nuclearize. Taken alone, this effect would make states that possess a power-

22. See Debs and Monteiro, "Known Unknowns."

ful ally less likely to go nuclear. At the same time, however, an alliance has a second effect on proliferation. The presence of a powerful ally raises the costs of preventive war against the protégé, thereby increasing its opportunity to nuclearize. Therefore, whenever an alliance fails to take away the protégé's willingness to go nuclear, it may give it the opportunity to get the bomb.[23]

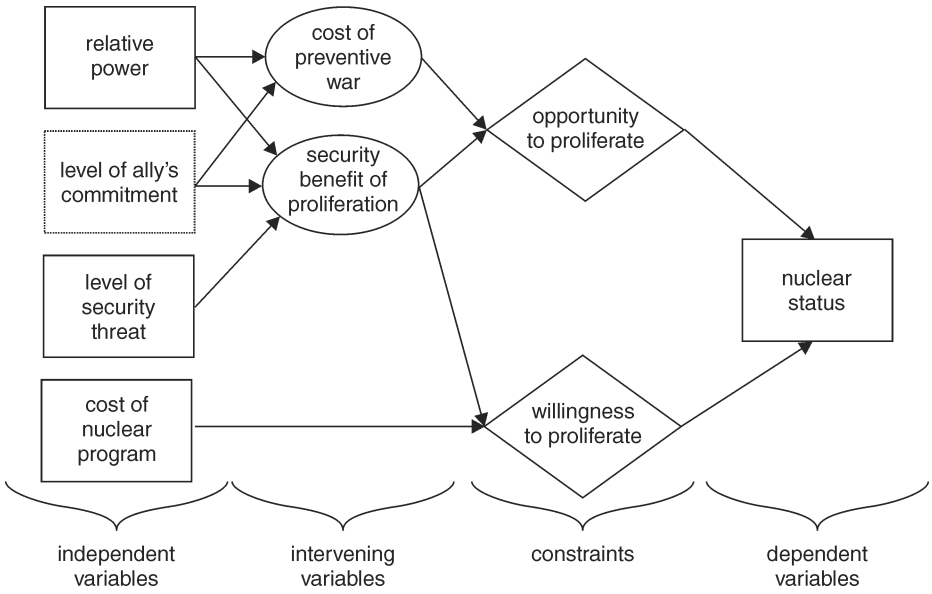
The presence of a powerful ally will therefore have a relevant impact on the odds of a state acquiring the bomb in two situations. First, if when left on its own, the protégé would have the willingness to proliferate but, because of the ally's protection, is no longer willing to build the bomb, the alliance causes nonproliferation. Second, when the protégé would have, in the absence of a powerful ally, no opportunity to nuclearize but, as a consequence of the ally's protection, can now safely proliferate, the alliance causes proliferation. (When the protégé would be unwilling to nuclearize on its own anyway, we cannot say that the alliance prevented proliferation. Likewise, when the protégé would maintain the opportunity to nuclearize without the protection of a powerful ally, the alliance cannot be said to cause proliferation.)

Combining these two potential effects of alliances on nuclear proliferation, states protected by a powerful ally are likely to acquire the bomb only when two conditions exist simultaneously. First, the powerful ally fails to guarantee all of the security goals of its protégé, thereby making it willing to nuclearize. Second, the powerful ally nevertheless protects the protégé's territory during the period of nuclear development, thereby giving it the opportunity to go nuclear. To determine the strategic circumstances in which alliances are likely to cause nuclear proliferation, we need to identify the strategic settings under which these two conditions are likely to be present.

If the powerful ally's commitment to the potential proliferator's security credibly covers all of the protégé's aims, the latter will have no willingness to nuclearize. Therefore, proliferation will not occur. A protégé will possess the willingness to go nuclear only when its powerful ally fails to mitigate all of its security threats reliably. In other words, proliferation by the protégé of a powerful state requires an imperfect overlap between the security interests of the two alliance partners. This imperfect overlap may manifest itself in two ways. First, and most obviously, the potential proliferator may find that its ally is insufficiently committed to its security, either because it provides only a limited amount of protection or because the long-term reliability of its protec-

23. These two countervailing dynamics may nullify the overall statistical effect of alliances on nuclear acquisition. See Dan Reiter, "Security Commitments and Nuclear Proliferation," *Foreign Policy Analysis*, Vol. 10, No. 1 (January 2014), pp. 61–80.

Figure 1. The Strategic Logic of Nuclear Proliferation



NOTE: The dotted lines refer to the effect of alliances on proliferation.

tion is questionable.[24] Second, the potential proliferator may possess broader security interests that would benefit from nuclear possession but that its ally is unwilling to guarantee. According to this logic, the wider the range of security goals of the potential proliferator that an ally does not protect, the higher the likelihood of nuclearization. States that care only about their own survival will be willing to nuclearize only if they do not trust their allies' long-term reliability; states with broader security goals may possess the willingness to nuclearize even when their powerful allies reliably protect their homeland.

Figure 1 summarizes the strategic logic of nuclear proliferation. So far, our argument does not take into consideration the nonproliferation measures that a powerful ally can implement to try to guarantee the continuation of its protégé's nonnuclear status. The following subsection examines this last component of the strategic dimension of proliferation.

24. Our theory is agnostic regarding the existence in extended deterrence of a "multiple audiences" problem, according to which an ally may find it easier to deter an enemy than reassure a protégé. See Timothy W. Crawford, *Pivotal Deterrence: Third-Party Statecraft and the Pursuit of Peace* (Ithaca, N.Y.: Cornell University Press, 2012).

THE EFFECTIVENESS OF DIFFERENT NONPROLIFERATION POLICY TOOLS

Powerful allies have two sets of tools with which they can attempt to ensure their protégé's nonnuclear status: sticks and carrots. The effectiveness of policy "sticks" relies on the consequences of a powerful ally's threat of abandonment. For this threat to be consequential, it must take away the protégé's opportunity to build the bomb. Threats of abandoning a protégé that is relatively weak vis-à-vis its adversaries are more consequential. Left on its own, a weak protégé would lack the opportunity to nuclearize. If, on the contrary, the protégé is sufficiently strong to possess the opportunity to nuclearize even if abandoned by its powerful ally, a sticks approach to nonproliferation is unlikely to guarantee the protégé's nonnuclear status.

In a "carrots" based policy, the powerful ally boosts its security commitment to the protégé, thereby undermining the protégé's willingness to nuclearize. Such policy carrots may include public pledges of protection, troop deployments, nuclear weapons deployments, and sales of conventional weapons. For a carrots-based policy to guarantee the protégé's nonnuclear status, the powerful ally must be willing to mitigate all of the protégé's significant security threats. This will be easier to achieve the narrower the protégé's security interests and the higher its relative power vis-à-vis its adversaries. A protégé with broader security interests would require wider security commitments from a powerful ally before dropping its willingness to build the bomb. Likewise, a weaker protégé would require a powerful ally to make a greater commitment to its security before forgoing its willingness to nuclearize.

Overall, we expect the effectiveness of sticks-based nonproliferation efforts to increase as the relative power of the protégé vis-à-vis its adversaries decreases. Conversely, we expect the likelihood of success of carrots-based nonproliferation policies to increase as the relative power of the protégé vis-à-vis its adversaries increases and its security interests narrow. Broader security interests increase the magnitude of the security commitments that a powerful ally has to extend to remove the protégé's willingness to nuclearize. Higher relative power decreases the magnitude of these security commitments, while also decreasing the ability of the powerful ally to resort to threats of abandonment in an attempt to remove the protégé's opportunity to nuclearize.

Empirical Patterns of Nuclear Proliferation

This section tests our theory against the empirical record on proliferation. We identify the set of significant security threats against which a potential proliferator might perceive the acquisition of nuclear weapons to be beneficial. We

focus on two features of the threats against this state. The first is to determine the existence of independent security threats (i.e., countries likely to engage in a conflict against it).[25] The second is the significance of the threat (i.e., whether the threat is dire enough that the potential proliferator perceives nuclear weapons as yielding a security benefit in mitigating it). To determine whether the potential proliferator believes that the investment in nuclear weapons is productive, we see whether a threat exists and the state reaches at least the stage of nuclear exploration. This is a low threshold, as it does not presuppose a significant investment toward nuclear acquisition.[26]

Having identified the set of states that have exhibited the willingness to acquire nuclear weapons, we then investigate the conditions under which they successfully acquired them. We make four general empirical claims. First, the presence of a significant security threat is a necessary condition for successful nuclearization. Historically, no state has acquired nuclear weapons without perceiving its security environment as highly threatening. Second, among states without a nuclear ally, there is a strong relationship between power and successful nuclearization—that is, no weak unprotected state has so far acquired nuclear weapons. This relationship between power and proliferation is weakened by the presence of an ally, such that some protected states that are weak vis-à-vis their adversaries have acquired nuclear weapons. Third, among states that enjoy the protection of an ally that ensures all of their security interests, none acquired nuclear weapons. Fourth, a powerful ally is more successful in ensuring the nonnuclear status of its protégés by extending additional security assurances (carrots) to strong states and using coercive threats of abandonment (sticks) vis-à-vis weak states.

We can then test the first prediction of our theory, that is, that nuclear acquisition occurs only when the state faces a significant security threat. We find

25. To identify the threats perceived by policymakers, we canvass the secondary and often primary literature on each case. See the appendix for more details. The concept of a "security threat" is distinct from that of an "enduring rival." On the latter, see Singh and Way, "The Correlates of Nuclear Proliferation," p. 873; and Dong-Joon Jo and Erik Gartzke, "Determinants of Nuclear Weapons Proliferation," *Journal of Conflict Resolution*, Vol. 51, No. 1 (February 2007), pp. 167–194, at p. 176. Measures of rivalry are often based on the history of conflict between states. See D. Scott Bennett, "Integrating and Testing Models of Rivalry Duration," *American Journal of Political Science*, Vol. 42, No. 4 (October 1998), pp. 1200–1232; and James P. Klein, Gary Goertz, and Paul F. Diehl, "The New Rivalry Dataset: Procedures and Patterns," *Journal of Peace Research*, Vol. 43, No. 3 (May 2006), pp. 331–348. A state may, however, seek nuclear weapons to placate a threat emanating from a state with which it does not share a history of conflict.

26. Our use of nuclear exploration to identify potential proliferators does not mean that we select on the dependent variable, which is nuclear acquisition.

that this is indeed the case.[27] Each of the ten states that acquired nuclear weapons perceived its environment as highly threatening in the lead-up to nuclear acquisition. More broadly, twenty-eight of the thirty-one recorded cases of nuclear development also involved a significant security threat. The three exceptions are Argentina, Brazil, and Romania.[28] In our view, the lack of a significant threat explains why these nuclear weapons programs progressed slowly and ultimately did not come to fruition. Furthermore, several states have started nuclear programs but eventually dropped their nuclear ambitions because of changes in their strategic environment (caused by international or domestic transformations) that undermined their willingness to build the bomb. These include Algeria, Egypt, Iran in 1978, Libya, Sweden, Switzerland, and Yugoslavia.

We now turn to the effect of relative power and security alliances in conditioning the odds of nuclear acquisition among states that are willing to acquire nuclear weapons. We start by organizing all of the cases of nuclear development according to these two variables. To measure relative power, we follow quantitative studies in using the Correlates of War dataset, more specifically its composite index of national capabilities.[29] To measure the role of alliances, we construct our own coding. The quantitative literature typically favors formal treaties.[30] Such a restrictive definition may miss important alliance dynamics that occur in the context of informal security pledges, however.[31] To capture these dynamics, we create a new index of alliances for all cases of nu-

27. On how security concerns correlate with nuclear proliferation, see Montgomery and Sagan, "The Perils of Predicting Proliferation," p. 306; and Philipp C. Bleek, "Why Do States Proliferate? Quantitative Analysis of the Exploration, Pursuit, and Acquisition of Nuclear Weapons," in William C. Potter and Gaukhar Mukhatzhanova, eds., *Forecasting Nuclear Proliferation in the 21st Century*, Vol. 1 (Redwood City, Calif.: Stanford University Press, 2010), pp. 178–179.

28. We know of no security motivation behind Romania's nuclear exploration. Analysts often portray Argentina and Brazil as each being the security threat that propelled the other's nuclear program. The two cooperated extensively in their quest to master nuclear technology, however, and neither perceived the other, or any other state, as a significant security threat. See case synopses in the appendix.

29. See J. David Singer, "Reconstructing the Correlates of War Dataset on Material Capabilities of States, 1816–1985," *International Interactions*, Vol. 14, No. 2 (April 1987), pp. 115–132; and Jo and Gartzke, "Determinants of Nuclear Weapons Proliferation."

30. See Singh and Way, "The Correlates of Nuclear Proliferation"; and Jo and Gartzke, "Determinants of Nuclear Weapons Proliferation."

31. For example, in 1957 Israel received private assurances from the United States, which refused to formalize them. Implicit U.S. support, as well as Israel's doubts about its reliability, were important dimensions of the strategic environment in the lead-up to Israel's nuclearization. See Douglas Little, "The Making of a Special Relationship: The United States and Israel, 1957–68," *International Journal of Middle East Studies*, Vol. 25, No. 4 (November 1993), pp. 563–585, at p. 565.

clear development. We focus on alliances with nuclear powers, which would be the most likely to possess the ability to mitigate security threats that the potential proliferator deems worthy of nuclear acquisition. We determine whether an existing nuclear power would side with the potential proliferator or with its adversaries in a possible conflict. Beyond relying on the formal defensive commitments of nuclear powers, we also draw on their behavior in past crises between the potential proliferator and its adversaries as well as on the expectations and preparations for assistance between a country and a nuclear power.[32] We present our results in figure 2.

In accordance with our second claim, there is a strong correlation between power and proliferation among states that do not possess a nuclear ally (left column of figure 2). Strong states such as the United States and the Soviet Union were able to proliferate. Furthermore, all of the preventive counterproliferation strikes in history have been carried out against weak states without a nuclear ally: Iran during the Iran-Iraq War, Iraq, and Syria.[33] No weak unprotected state has acquired nuclear weapons so far.

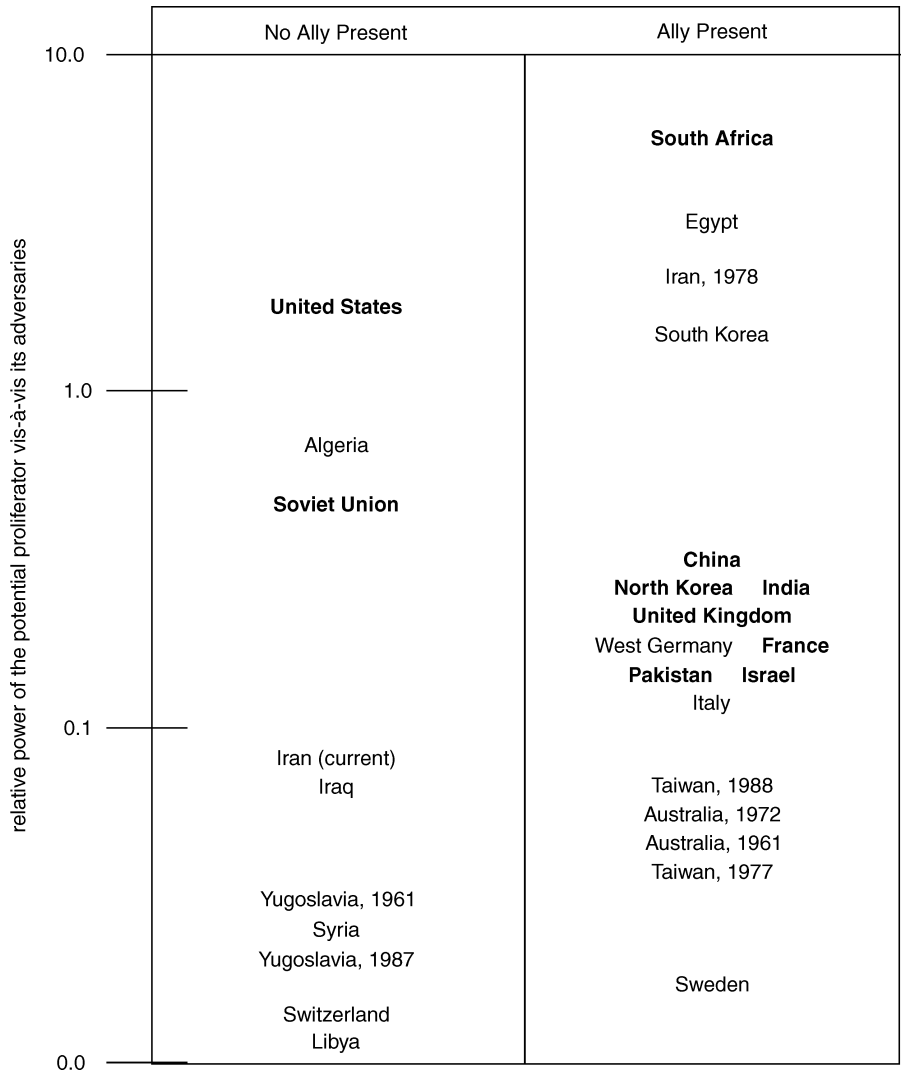
Next, comparing the left and right columns of figure 2, we assess the effect of security alliances on nuclear acquisition. We first notice that the relationship between relative power and proliferation is weakened by the presence of an ally, which can give a weaker state the opportunity to nuclearize. China, India, Israel, and Pakistan were all relatively weak vis-à-vis their adversaries and deemed their nuclear allies unreliable guarantors of their long-term survival.[34] This strategic setting led them to acquire nuclear weapons. France and the

32. We code formal defensive alliances based on the Alliance Treaty Obligations and Provisions v3.0 alliance dataset. See Brett Ashley Leeds et al., "Alliance Treaty Obligations and Provisions, 1815–1944," *International Interactions*, Vol. 28, No. 3 (July 2002), pp. 237–260. The International Crisis Behavior dataset is introduced in Michael Brecher and Jonathan Wilkenfeld, *A Study of Crisis* (Ann Arbor: University of Michigan Press, 2000).

33. See Matthew Furhmann and Sarah E. Kreps, "Targeting Nuclear Programs in War and Peace: A Quantitative Analysis, 1941–2000," *Journal of Conflict Resolution*, Vol. 54, No. 6 (December 2010), pp. 831–859.

34. Their enemies did as well. Egypt was about to target Israel's nuclear facilities when Israel discovered and preempted this, starting the Six-Day War. In at least one and possibly two other instances, a state hostile to a potential proliferator inquired whether the proliferator's nuclear ally would oppose a preventive strike against it. In 1964 National Security Adviser McGeorge Bundy asked Soviet Ambassador Anatoly Dobrynin whether Moscow would countenance U.S. preventive action against China. See Avery Goldstein, *Deterrence and Security in the 21st Century: China, Britain, France, and the Enduring Legacy of the Nuclear Revolution* (Redwood City, Calif.: Stanford University Press, 2000), p. 106. In the 1970s, Moscow may have asked for U.S. assistance in a preventive attack against South Africa's nuclear program. See David Albright, "South Africa and the Affordable Bomb," *Bulletin of the Atomic Scientists*, Vol. 50, No. 4 (July/August 1994), p. 42. Neither request was granted.

Figure 2. Power, Alliances, and Nuclear Proliferation



NOTES: Bolded cases note nuclear acquisition; others are cases of nuclear forbearance. Case list and program dates from Scott D. Sagan, "The Causes of Nuclear Weapons Proliferation," *Annual Review of Political Science*, Vol. 14 (February 2011), pp. 225–244. We omit Brazil and Romania for lack of clear security threats during their nuclear programs. (Argentina is not part of Sagan's case list.) For coding rules on enemies and allies, short vignettes describing how we implemented these rules in each case, and computations of relative power, see the appendix.

United Kingdom nuclearized, despite their relative weakness, because they enjoyed the protection of the United States, but deemed it an unreliable guarantor of their overall "vital interests," which they defined broadly.[35] South Africa acquired the bomb to mitigate unrest in its region, enjoying great relative power vis-à-vis its adversary, Angola. Overall, we conclude that, per our third prediction above, no state that enjoys the protection of a powerful ally that guarantees all of its security interests has ever acquired nuclear weapons.

We further observe that, consistent with our fourth empirical claim, the optimal tool that an ally may deploy to ensure its protégé's nonnuclear status depends on the protégé's relative power vis-à-vis its adversaries. Strong states that possess the willingness to nuclearize have the opportunity to do so in the absence of a powerful ally. Therefore, the optimal nonproliferation tool vis-à-vis a strong protégé is to undermine its willingness to build the bomb by extending additional security assurances—that is, by implementing a carrots-based approach. Because the security benefit of proliferation is relatively lower for strong states, the magnitude of these additional security commitments is relatively smaller. In some cases, the ally is willing to provide such guarantees, and proliferation is averted.

In contrast, weak states are unlikely to acquire nuclear weapons in the absence of a nuclear ally even if they have the willingness to do so. The ally can thus contribute to a weak state's nuclearization by providing it with an opportunity to proliferate. To avoid this outcome, the optimal nonproliferation tool an ally should use vis-à-vis a weak protégé is coercion, including threats of abandonment—that is, a sticks-based approach. When the ally is concerned that its protégé's nuclearization will threaten the security of their common adversary and that this has the potential to result in a serious crisis, it will work hard to ensure that the alliance does not provide an opportunity to proliferate by coercing its protégé into maintaining its nonnuclear status. When the ally is not concerned with the escalation potential of its protégé's nuclearization, or when other goals trump nonproliferation concerns in the ally's relationship with the protégé, the ally may fail to implement the necessary threats of abandonment, providing the protégé with the opportunity to proliferate. Such was the case with France, whose willingness to nuclearize stemmed from the United States' unwillingness to cover its broader security goals, and whose nuclearization prompted little concern in the Soviet Union, thereby failing to lead Washington to threaten Paris with abandonment to avoid a major crisis.

35. Goldstein, *Deterrence and Security in the 21st Century*.

Our theory can also shed light on a hitherto underappreciated historical pattern of proliferation: the decline in the rate of proliferation since the end of the Cold War. Whereas during the Cold War one new state entered the nuclear ranks every five years on average, since its end two-and-a-half decades ago only two states have gone nuclear: Pakistan in 1990 and North Korea in 2006. Moreover, the number of active nuclear programs has decreased significantly in the post–Cold War era, such that today only one state is suspected of pursuing nuclear weapons: Iran.[36]

The end of the Cold War had two effects on proliferation. First, it ameliorated the security environment for U.S. friends and allies, thereby lowering the expected security benefit of nuclearization on their part and undermining their willingness to nuclearize. In fact, South Africa, which had developed nuclear weapons to counter regional threats of communism, terminated its program shortly after the end of the Cold War, producing the only case of nuclear reversal to date.[37] Second, the end of the Cold War limited the potential costs of U.S.-launched preventive wars, boosting the credibility of U.S. threats of military action and thereby decreasing the opportunity to nuclearize among non-U.S. allies. As we show below, the United States was able to impose crippling sanctions against Iraq that effectively terminated its nuclear weapons program. There is some evidence that Libyan leader Muammar al-Qaddafi ended his nuclear program in part in reaction to the U.S.-led invasion of Iraq in 2003, reportedly confiding: "I will do whatever the Americans want, because I saw what happened in Iraq, and I was afraid."[38] Syria had its nuclear reactor re-

36. It is unlikely that Syria has continued its nuclear exploration since the onset of civil war in 2011. Given contemporary surveillance technologies and the fact that most states are members of the Nonproliferation Treaty, which provides early warnings about nuclear activities, we find it highly implausible that a state might acquire nuclear weapons undetected.

37. South African President F.W. De Klerk noted that the fall of the Soviet Union and the subsequent resolution of the conflicts in Angola and Namibia meant that "a nuclear deterrent had become, not only superfluous, but in fact an obstacle to the development of South Africa's international relations." See Frank V. Pabian, "South Africa's Nuclear Weapon Program: Lessons for U.S. Nonproliferation Policy," *Nonproliferation Review*, Vol. 3, No. 1 (Fall 1995), p. 10. There is some controversy about the importance of domestic politics in South Africa's nuclear reversal. See, for example, David Albright and Mark Hibbs, "South Africa: The ANC and the Atom Bomb," *Bulletin of the Atomic Scientists*, Vol. 49, No. 3 (April 1993), pp. 32–37; Peter Liberman, "The Rise and Fall of the South African Bomb," *International Security*, Vol. 26, No. 2 (Fall 2001), pp. 45–86; and Martha Van Wyk, "Sunset over Atomic Apartheid: United States–South African Nuclear Relations, 1981–93," *Cold War History*, Vol. 10, No. 1 (February 2010), pp. 51–79. Van Wyk concludes, "There is no evidence to back the suggestion that the de Klerk government did not wish to risk seeing a potentially radical Black Nationalist government in South Africa armed with nuclear weapons." See Van Wyk, "Sunset over Atomic Apartheid," p. 69.

38. David D. Palkki and Shane Smith, "Contrasting Causal Mechanisms: Iraq and Libya," in Etel

portedly struck preventively by a U.S. ally, Israel, in 2007.[39] Combined, these two effects account for why, despite claims to the contrary,[40] proliferation has slowed with the emergence of U.S. power preponderance.

Historical Cases

We examine five historical case studies to trace the strategic dimension of the proliferation process. We claim that in the absence of a nuclear ally, a strong relationship exists between power and proliferation. Nuclear weapons are the weapons of the weak, but the weak cannot get them. To illustrate this claim, we compare the acquisition of the bomb by the Soviet Union to the unsuccessful nuclearization attempt by Iraq. These two cases provide us with a benchmark to study the effect of alliances on proliferation. In the presence of a loose ally, the relationship between power and proliferation is weakened. A loose ally does not cover the security needs of the potential proliferator but may provide it with an opportunity to nuclearize. To illustrate this possibility, we show how U.S. support of Pakistan increased its opportunity to proliferate. In the presence of a close ally, a state may not want nuclear weapons. But when it does, the most effective nonproliferation tool at the ally's disposal is linked to the relative power of the protégé vis-à-vis its adversary. When its protégé is strong, a powerful ally is more likely to deter proliferation by boosting security assurances to the protégé. When the protégé is weak, the powerful ally is more likely to succeed by using coercive tools and threatening to abandon the potential proliferator. To illustrate this dynamic, we compare the cases of South Korea and West Germany. Nonproliferation was achieved, in great part, through assurances in the first case and threats of abandonment in the latter case.

SOVIET UNION

On August 29, 1949, the Soviet Union tested a nuclear device, ending the U.S. nuclear monopoly. As a strong state facing a high-level security threat because of its security competition with the United States during the early Cold War, the Soviet Union had both the opportunity and the willingness necessary for nuclear acquisition.

Solingen, ed., *Sanctions, Statecraft, and Nuclear Proliferation* (Cambridge: Cambridge University Press, 2012), pp. 272–273.

39. See David Makowsky, "The Silent Strike: How Israel Bombed a Syrian Nuclear Installation and Kept It Secret," *New Yorker*, September 17, 2012, pp. 34–40.

40. Jo and Gartzke, "Determinants of Nuclear Weapons Proliferation," p. 187.

The United States had known about the Soviet program since at least 1945 when, in reaction to the atomic bombing of Hiroshima, Joseph Stalin mentioned it to the U.S. ambassador in Moscow.[41] Stalin could afford his openness because of the tremendous costs a U.S. preventive strike would have, making it unlikely. In May 1949, analyzing the possibility of a covert U.S. attack on China—a much weaker target—Stalin wrote: "The material conditions for an attack, for unleashing war, do not exist. . . . America is less ready to attack than the U.S.S.R. to repulse an attack."[42] This assessment also accounts for U.S. acquiescence to Soviet proliferation. U.S. officials understood that, compared to the effect of Soviet nuclearization, a preventive strike was too costly to make sense.

A U.S. strike would have been costly because, among other things, U.S. intelligence on Soviet nuclear facilities was poor, a problem compounded by Soviet secrecy about their location of the facilities.[43] This lack of intelligence prevented the construction of a target set that would have enabled a surgical strike.[44] As a result, any preventive attack would have had to target the entirety of the Soviet state.

Such a wide-ranging operation, however, was beyond U.S. reach. During the

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41. See Campbell Craig and Sergey Radchenko, *The Atomic Bomb and the Origins of the Cold War* (New Haven, Conn.: Yale University Press, 2008), p. 115.
42. David Holloway, *Stalin and the Bomb: The Soviet Union and Atomic Energy, 1939–1956* (New Haven, Conn.: Yale University Press, 1994), p. 264.
43. See Michael D. Gordin, *Red Cloud at Dawn: Truman, Stalin, and the End of the Atomic Monopoly* (New York: Farrar, Straus and Giroux, 2009), pp. 80–85; and Richard Rhodes, *Dark Sun: The Making of the Hydrogen Bomb* (New York: Simon and Schuster, 1995), p. 287.
44. Moreover, some observers consider the lack of accurate intelligence about Soviet progress as the reason why the United States never launched an attack. See Muhammet A. Bas and Andrew J. Coe, "Arms Diffusion and War," *Journal of Conflict Resolution*, Vol. 56, No. 4 (August 2012), pp. 651–674. Even as late as 1949, U.S. decisionmakers thought that a Soviet nuclear test was at least five years away. See Central Intelligence Agency, "Intelligence Memorandum 225," in Michael Warner, ed., *CIA Cold War Records: The CIA under Harry Truman* (Langley, Va.: Central Intelligence Agency, 1994), pp. 319–320; and Holloway, *Stalin and the Bomb*, p. 220. This line of reasoning suffers from two shortcomings, however. First, U.S. decisionmakers knew that estimates of Soviet progress were "five percent information and ninety-five percent construction." See David Lilienthal (chairman of the Atomic Energy Commission in control of U.S. nuclear weapons), quoted in Michael S. Goodman, *Spying on the Nuclear Bear: Anglo-American Intelligence and the Soviet Bomb* (Redwood City, Calif.: Stanford University Press, 2007), p. 28. This knowledge led the military to prepare war plans as early as October 1945 and important voices in Washington to argue for a strike as early as January 1946. See Russell D. Buhite and Wm. Christopher Hamel, "War for Peace: The Question of an American Preventive War against the Soviet Union, 1945–1955," *Diplomatic History*, Vol. 14, No. 3 (July 1990), pp. 367–384, at p. 374. Thus poor intelligence did not necessarily lead to arguments in favor of attacking at a later moment. Second, and more important, the contention that it did assumes that, had the United States correctly anticipated Soviet nuclearization, an attack would have occurred. We believe that given its high costs, an attack would have been unlikely even if U.S. decisionmakers had been unanimously convinced of the imminence of Soviet nuclearization. In sum, a lack of accurate intelligence cannot explain the absence of a strike.

early nuclear era, writes David Rosenberg, "the nation's stockpile [of nuclear weapons] and delivery capability were extremely limited. There were only two weapons . . . at the end of 1945, nine in July 1946, thirteen in July 1947, and fifty in July 1948. None of these weapons was assembled."[45] By the time the Soviets tested their nuclear device, the United States arsenal had fewer than 200 bombs.[46] Combined with a shortage of nuclear-able bombers and crews trained to operate them,[47] this left the United States unable to destroy the Soviet Union.[48] As Russell Buhite and Christopher Campbell note, U.S. "war plans consistently demanded more bombs than existed in the U.S. arsenals well into the 1950s."[49] U.S. nuclear capabilities were insufficient to prevent Soviet nuclearization.

Any preventive strike would have therefore entailed a conventional invasion of the Soviet Union, which would have led to an extremely costly and potentially protracted fight.[50] Additionally, without a quick victory in sight, such an attack would have invited massive Soviet retaliation. And in the wake of the rapid demobilization of the United States following the end of World War II, the balance of conventional forces in Eurasia heavily favored the Soviets.[51] In December 1947, Secretary of Defense James Forrestal considered the "predominance of Russian land power in Europe and Asia" one of the "outstanding military factors in the world."[52] As John Lewis Gaddis notes, "[O]ne Pentagon estimate credited [the Soviet Union] with sufficient strength to overrun most of continental Europe, Turkey, Iran, Afghanistan, Manchuria,

45. David Alan Rosenberg, "The Origins of Overkill: Nuclear Weapons and American Strategy," *International Security*, Vol. 7, No. 4 (Spring 1983), pp. 3–71, at p. 14.
46. See Robert S. Norris and William M. Arkin, "Nuclear Notebook: Estimated U.S. and Soviet/Russian Nuclear Stockpiles, 1945–94," *Bulletin of the Atomic Scientists*, Vol. 50, No. 6 (November/December 1994), pp. 58–59.
47. See David Alan Rosenberg, "U.S. Nuclear Stockpile, 1945 to 1950," *Bulletin of the Atomic Scientists*, Vol. 38, No. 5 (May 1982), p. 29.
48. See Rhodes, *Dark Sun*, p. 226.
49. Buhite and Hamel, "War for Peace," p. 383.
50. The cost of preventing Soviet nuclearization by force was such that it raised moral concerns. After the Soviet test, President Harry S. Truman justified not having launched a preventive strike by saying: "Such war is the weapon of dictators, not of free democratic countries like the United States." See Truman, "Radio and Television Report to the American People on the Situation in Korea, Sept. 1, 1950," *Public Papers of the Presidents, Harry S. Truman, 1945–1953* (College Park, Md.: Office of the Federal Register, 1966), http://trumanlibrary.org/publicpapers/index.php?pid=861&st=&st1=. Moral arguments, however, do not explain the absence of an attack, because they were also used by those who supported it. In fact, "preventive war thinking was surprisingly widespread in the early nuclear age." See Marc Trachtenberg, "Preventive War and U.S. Foreign Policy," *Security Studies*, Vol. 16, No. 1 (January/March 2007), pp. 1–31, at pp. 4–5.
51. See Holloway, *Stalin and the Bomb*, p. 231.
52. Rhodes, *Dark Sun*, p. 313.

Korea, and North China."[53] The Harmon Committee report, a study of the consequences of eventual preventive action against the Soviet Union published in May 1949—a mere four months before the first Soviet nuclear test—concluded that even if a U.S. attack went as planned, destroying seventy Soviet cities, it would not "bring about capitulation, destroy the roots of Communism, or critically weaken the power of the Soviet leadership to dominate the people."[54] In a characteristic understatement, the report continued, such an attack would "produce certain psychological and retaliatory reactions detrimental to the achievement of Allied war objectives and its destructive effects will complicate post-hostilities problems."[55] Among these developments "detrimental to the achievement of Allied war objectives," the report highlighted the fact that "the capability of Soviet armed forces to advance rapidly into selected areas of Western Europe, the Middle East, and the Far East would not be seriously impaired."[56]

Our argument can account for both the Soviet public decision to develop nuclear weapons and the U.S. decision not to attack the Soviet Union preventively. Seen through the lens of our strategic theory, the threat to Soviet survival posed by competition with a nuclear-armed United States induced Moscow's willingness to nuclearize. The Soviet Union's opportunity to acquire nuclear weapons derived from the extremely high cost of a U.S. preventive attack, which led Washington to countenance Moscow's nuclear ambition.

IRAQ

Iraq's nuclear weapons program started in the 1970s but never achieved completion. A weak state facing a high-level security threat, Iraq had the willingness to acquire nuclear weapons but lacked the opportunity to do so.

Since shortly after the overthrow of the monarchy and creation of a republic in 1958, Iraq was a weak state without a nuclear ally. In March 1959, Iraq withdrew from the defensive Baghdad Pact of 1955, which included the United Kingdom as one of its signatories. It signed an entente with the Soviet Union in April 1972, but the agreement fell short of a defensive pact (including only consultation and nonaggression clauses). Regardless, the agreement was re-

53. John Lewis Gaddis, *The Long Peace: Inquiries into the History of the Cold War* (New York: Oxford University Press, 1987), p. 109.
54. David Alan Rosenberg, "American Atomic Strategy and the Hydrogen Bomb Decision," *Journal of American History*, Vol. 66, No. 1 (June 1979), pp. 62–87, at p. 72.
55. Ibid., p. 73.
56. Ibid., p. 72.

scinded in September 1990 after the Iraqi invasion of Kuwait but before the end of the Iraqi nuclear program.

Facing two strong threats in Iran and Israel, Iraq believed that nuclear acquisition could have a large positive impact on its security. At the same time, Iraq's weakness made it vulnerable to the threat of preventive strikes. Iran attempted to destroy the Iraqi research reactor in Osiraq in September 1980, and in June 1981 Israel succeeded. In response, Iraq moved its nuclear weapons program underground and, following its invasion of Kuwait in August 1990, sped up efforts to acquire the bomb. This crash program was short lived, however. In January 1991, the United States led a coalition to liberate Kuwait and launched an air campaign that destroyed key facilities of Iraq's nuclear weapons program. In the ensuing decade, the Iraqi program was halted by intrusive United Nations inspections and severe sanctions, backed by the threat of war and actual strikes in 1998, which led to the evacuation of inspectors. Uncertain about the state of the Iraqi nuclear weapons program, the United States invaded Iraq in March 2003.[57]

The Iraqi nuclear program started with civilian purposes in 1956, when the country took advantage of the U.S. Atoms for Peace initiative to create the Iraqi Atomic Energy Commission. The program acquired a military dimension in the early 1970s.[58] By then, Iraq faced two major independent threats: Iran and Israel. Iraq had declared war against Israel upon its creation in 1947 and participated in the Six-Day War of 1967. Both ended in Iraq's defeat. Iran had confronted Iraq in two border disputes, in 1959–60 and 1969, and would later fight Iraq in a long and bloody war from 1980 to 1988. In 1981 Saddam Hussein explained the motivation for the Iraqi nuclear weapons program: "We have to have this protection for the Iraqi citizen so that he will not be disappointed and held hostage by the scientific advancement taking place in Iran or in the Zionist entity. . . . Without such deterrence, . . . Iraq will remain threatened by the Zionist entity."[59]

Saddam quickly developed an interest in nuclear weapons. As vice president of Iraq in 1973, Saddam became president of the Iraqi Atomic Energy

57. For a discussion of the role of uncertainty about WMD programs in the Bush administration's decision to invade Iraq, see Debs and Monteiro, "Known Unknowns."
58. See Jeremy Tamsett, "The Israeli Bombing of Osiraq Reconsidered: Successful Counterproliferation?" *Nonproliferation Review*, Vol. 11, No. 3 (Fall/Winter 2004), p. 74; and Solingen, *Nuclear Logics*, pp. 105, 143.
59. Hal Brands and David D. Palkki, "Saddam, Israel, and the Bomb: Nuclear Alarmism Justified?" *International Security*, Vol. 36, No. 1 (Summer 2011), pp. 133–166, at p. 148.

Commission.[60] To obtain a nuclear capability, Iraq sought foreign assistance, slowly accumulating nuclear technology so as to not arouse suspicion from the International Atomic Energy Agency (IAEA). In 1976 Iraq secured a deal with France for the construction of two reactors, including Osiraq (Tammuz I). In 1979 the French nuclear firm in charge of the reactor cores was attacked, delaying their delivery. Suspicion for the attack fell on Israel.[61] Then, in September 1980, two Iranian F-4s bombed Osiraq.[62] The following June, an Israeli air strike destroyed the facility.[63]

The Osiraq raid did nothing to diminish Saddam's desire to acquire nuclear weapons. It did, however, underline the importance of ensuring the secrecy of the nuclear weapons program. The dual nature of nuclear technology, in and of itself, cannot guarantee an opportunity to proliferate. After the attack, Saddam underscored the importance of obtaining nuclear weapons. For him, Arabs "can have no security as long as Israel alone commands the nuclear threat."[64] Saddam took the nuclear program underground and increased its budget from $400 million to $10 billion.[65] From 1983 to 1991, its staff grew by 60 percent annually.[66]

The nuclear program went largely undetected by the IAEA. Crippled by debts accumulated during the 1980–88 Iran-Iraq War, Iraq invaded Kuwait in August 1990 and, two weeks later, launched a crash weaponization program.[67] Washington forcefully denounced the invasion and, on January 16, 1991, a

60. See Målfrid Braut-Hegghammer, "Revisiting Osirak: Preventive Attacks and Nuclear Proliferation Risks," *International Security*, Vol. 36, No. 1 (Summer 2011), p. 106.
61. See Jed C. Snyder, "The Road to Osirak: Baghdad's Quest for the Bomb," *Middle East Journal*, Vol. 37, No. 4 (Autumn 1983), pp. 565–594, at p. 579.
62. See Kevin M. Woods, David D. Palkki, and Mark E. Stout, *The Saddam Tapes: The Inner Workings of a Tyrant's Regime, 1978–2001* (New York: Cambridge University Press, 2011), p. 77.
63. See Shyam Bhatia and Daniel McGrory, *Brighter Than the Baghdad Sun: Saddam Hussein's Nuclear Threat to the United States* (Washington, D.C.: Regnery, 1999), p. 107; Imad Khadduri, *Iraq's Nuclear Mirage: Memoirs and Delusions* (Toronto: Hushion House, 2011); Mahdi Obeidi and Kurt Pitzer, *The Bomb in My Garden: The Secrets of Saddam's Nuclear Mastermind* (Hoboken, N.J.: John Wiley, 2004); and Woods, Palkki, and Stout, *The Saddam Tapes*, p. 77.
64. Central Intelligence Agency Office of Political Analysis, "Implications of Israeli Attack on Iraq" (Langley, Va.: Central Intelligence Agency, 1981), p. 31; and Tamsett, "The Israeli Bombing of Osiraq Reconsidered," p. 76.
65. See Dan Reiter, "Preventive Attacks against Nuclear Programs and the 'Success' at Osiraq," *Nonproliferation Review*, Vol. 12, No. 2 (July 2005), p. 362.
66. See Braut-Hegghammer, "Revisiting Osirak," p. 117.
67. See Christine Wing and Fiona Simpson, *Detect, Dismantle, and Disarm: IAEA Verification, 1992–2005* (Washington, D.C.: United States Institute of Peace Press, 2013), p. 13; Braut-Hegghammer, "Revisiting Osirak," p. 126; and David Albright and Robert Kelley, "Has Iraq Come Clean at Last?" *Bulletin of the Atomic Scientists*, Vol. 51, No. 6 (November/December 1995), p. 53.

U.S.-led coalition launched Operation Desert Storm, defeating Iraqi forces by the end of February.

When calling for a response to the Iraqi attack on Kuwait, President George H.W. Bush cited proliferation concerns.[68] During the war, the United States destroyed two research reactors and nuclear fuel facilities.[69] Yet the extent of Iraqi efforts to acquire the bomb—revealed after the 1990–91 Persian Gulf War—surprised the intelligence community. After the war, the United States worked hard to maintain the nonnuclear status of Iraq.[70] UN Security Council Resolution 687 required Iraq to dismantle its nuclear weapons program and implemented severe sanctions until it did so. The United Nations deployed inspectors to verify Iraq's compliance. According to Scott Ritter, chief UN weapons inspector in Iraq from 1991 to 1998, the severity of the sanctions convinced Saddam to unilaterally destroy his program.[71]

Clearly, sanctions hurt the Iraqi economy. For example, they lowered Iraqi imports by 86 percent between 1990 and 1991 (from $7.6 to $1 billion), keeping them at this level for the next five years.[72] Saddam resented the severity of the UN sanctions and hoped to revive his nuclear weapons program if given the opportunity. In June 1995, he admitted to Baath Party members, "I mean we do not have biological weapons . . . but this is the truth. We do not have chemical weapons; this is true. We do not have the capability to produce nuclear [weapons]."[73] In early 1996, Saddam told the General Command of the Armed Forces: "But what can we do; thank God, anyway! There is nothing, do you think we would talk like this if we had any, and suffer from sanctions for six years if we had chemical, nuclear, and biological missiles?"[74]

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68. See George H.W. Bush, "Address before a Joint Session of Congress," Washington, D.C., September 11, 1990 (Charlottesville: Miller Center, University of Virginia, Scripps Library and Multimedia Archive, 1990), http://millercenter.org/scripps/archive/speeches/detail/3425.
69. See Rebecca Grant, "Osirak and Beyond," *Air Force Magazine*, August 2002, p. 76; and Wing and Simpson, *Detect, Dismantle, and Disarm*, pp. 13–14.
70. There is some debate about whether Iraq was close to obtaining nuclear weapons in 1990. According to Jacques Hymans, the Iraqi program was far from completion, given its inefficiency and poor management. See Hymans, *Achieving Nuclear Ambitions*. In our view, Iraq's status as a weak state without a nuclear ally made it vulnerable to outside pressures—in the form of sanctions, preventive strikes, and invasion—which in turn made successful proliferation unlikely.
71. See Solingen, *Nuclear Logics*, p. 151; and Scott Ritter, *Endgame: Solving the Iraq Crisis* (New York: Simon and Schuster, 1999), p. 34.
72. See Hans Blix, *Disarming Iraq* (New York: Pantheon, 2004), pp. 56–57.
73. "Saddam Hussein Meeting with Ba'ath Party Members to Discuss the Results of the UN Inspectors' Mission to Look for WMDs," June 19, 1995, History and Public Policy Program Digital Archive, Woodrow Wilson International Center for Scholars, Washington, D.C.
74. "Saddam Hussein Meeting with the General Command of the Armed Forces Regarding Iraqi

Since the early 1990s, Saddam had tried to circumvent UN sanctions. In January 1993, the UN Security Council found Iraq in "material breach" of its obligations, leading to bombing raids of radar sites and suspected nuclear facilities by the United States, the United Kingdom, and France.[75] In October 1994, Saddam sought to pressure the international community for an end to the sanctions by sending troops to the Kuwaiti border. The Security Council responded by calling for Iraq to cooperate with the United Nations Special Commission and to withdraw its troops from the border. Iraq soon complied.[76] In July 1995, Saddam threatened to terminate his cooperation with the Special Commission absent progress toward ending the sanctions.[77] Three years later, in August 1998, he expelled the inspectors, only to reverse himself in mid-November under the threat of U.S. air strikes. After reentering Iraq, the inspectors again found their efforts being impeded. On December 16, they were evacuated, with U.S. strikes soon to follow. The strikes involved 400 cruise missile strikes and 650 aircraft sorties over five days. Inspectors would not return to Iraq until November 2002. By that time, President George W. Bush had deemed the inspection efforts insufficient, and in March 2003, the United States invaded Iraq.[78] After defeating Iraqi forces and deposing Saddam, U.S. forces were unable to find any functioning weapons of mass destruction (WMD) programs or stockpiles. Ritter had been correct: Iraq had dismantled its nuclear program during the 1990s under international pressure.

In sum, as a weak state facing dire security threats without a nuclear ally, Iraq wanted to acquire nuclear weapons, a position that raised concerns among its enemies—Iran, Israel, and, eventually, the United States. In seeking to develop a nuclear weapons program, Iraq made itself vulnerable to outside threats and eventual preventive strikes, ultimately dooming its nuclear ambitions.

PAKISTAN

Pakistan initiated a nuclear weapons program in the early 1970s, acquired the capability to build nuclear weapons in the late 1980s, and tested its first devices in 1998. Facing a conventionally superior enemy in India, and enjoying only loose support from the United States, Pakistan had the willingness to ac-

Development and Defense Theory," January 1996, History and Public Policy Program Digital Archive, Woodrow Wilson International Center for Scholars, Washington, D.C.

75. See Alexander Thompson, *Channels of Power: The U.N. Security Council and U.S. Statecraft in Iraq* (Ithaca, N.Y.: Cornell University Press, 2010), p. 100.

76. Ibid.

77. Ibid.

78. See Debs and Monteiro, "Known Unknowns."

quire nuclear weapons. When geostrategic developments convinced the United States of the importance of its alliance with Pakistan, Islamabad gained the opportunity to proliferate.

Pakistan's foreign policy since its independence in 1947 has been aimed mainly at deterring India, its stronger neighbor and adversary. To this end, Pakistan obtained security guarantees and conventional weapons from the United States, which in 1959 "undertook to preserve the 'independence and integrity of Pakistan.'"[79] At the time, Pakistani leaders were convinced that the West "would provide Pakistan the security it needed against perceived Indian threats."[80]

To the United States, Pakistan was seen as a bulwark against the spread of communism while providing a convenient base for intelligence operations on the Soviet Union and China.[81] U.S. support for Pakistan, however, seemed contingent on broader geostrategic developments. When China invaded India in October 1962, Washington quickly offered aid to Delhi, generating a "growing sense of uneasiness" in Islamabad.[82] Moreover, the advent of reconnaissance satellites and intercontinental ballistic missiles reduced the importance of access to Pakistani territory for the United States.[83]

Apprehensions over the possible unreliability of U.S. support materialized in the 1965 and 1971 Indo-Pakistani wars. The war of 1965 was fought over the control of Kashmir, which did not represent a core security interest for the United States. Shortly after the conflict erupted in a full-scale war, the administration of Lyndon Johnson announced a suspension of economic and military aid to India and Pakistan on September 8. Meeting with the U.S. envoy, Pakistani Foreign Minister Zulfikar Ali Bhutto declared that the U.S. decision "would mean that Pak[istani]-U.S. relations could not be the same again. . . . [T]he decision [was] not an act of an ally and not even that of a neutral."[84] In practice, the embargo was a more serious blow to Pakistan, which was more

79. Zulfikar Ali Bhutto, *The Myth of Independence* (London: Oxford University Press, 1969), p. 46.
80. Samina Ahmed, "Pakistan's Nuclear Weapons Program: Turning Points and Nuclear Choices," *International Security*, Vol. 23, No. 4 (Spring 1999), pp. 178–204, at p. 181; and Samina Ahmed and David Cortright, eds., *Pakistan and the Bomb: Public Opinion and Nuclear Options* (Notre Dame, Ind.: University of Notre Dame Press, 1998), p. 90.
81. See Zafar Iqbal Cheema, "American Policy in South Asia: Interests and Objectives," in Stephen P. Cohen, ed., *The Security of South Asia: American and Asian Perspectives* (Chicago: University of Illinois Press, 1987), pp. 120, 122; Selig S. Harrison, "U.S. Policy in South Asia," in Cohen, *The Security of South Asia*, p. 136; and Bhutto, *The Myth of Independence*, p. 1.
82. Ibid., p. 74.
83. See Cheema, "American Policy in South Asia," p. 123.
84. Dennis Kux, *The United States and Pakistan, 1947–2000: Disenchanted Allies* (Washington, D.C.: Woodrow Wilson Center Press, 2001), p. 162.

reliant than India on U.S. military aid.[85] Subsequently, in 1971 India defeated Pakistan, which would lose control of East Pakistan (Bangladesh). Washington responded by sending an aircraft carrier task force to the Bay of Bengal, a move seen in Islamabad as largely symbolic.[86]

Practically abandoned by its ally, Pakistan decided to press ahead with an independent nuclear weapons program. On December 20, 1971, three days after the end of the war, Bhutto was named president. Bhutto's interest in nuclear weapons was well known. In 1966 he had famously stated that "[i]f India makes the atomic bomb, the people of Pakistan will eat grass but will also have the bomb."[87] A month after coming to power, Bhutto met with top officials and ordered his scientists to produce a bomb within the next three years.[88] In May 1974, India successfully detonated a nuclear device, and Bhutto pledged that he would "never let Pakistan be a victim of nuclear blackmail."[89]

Pakistan's increased efforts to acquire the bomb were likely to be detected by the United States, which would oppose them out of concern that Pakistani nuclearization would augment the risks of conflict with India. In fact, U.S. pressure would soon be noticeable. When, in 1976, Islamabad concluded an accord with France aimed at purchasing a nuclear reprocessing plant, Washington convinced Paris to include safeguards designed to ensure that the plutonium would not be diverted to military purposes.[90] By 1978 the United States had succeeded in pressuring France to cancel the agreement.[91] At the same time, the U.S. Congress approved legislation aimed at limiting the spread of nuclear weapons. Passed in June 1976, the Glenn-Symington amendment prohibited military and economic aid to any country importing unsafeguarded nuclear materials, equipment, or technology.[92] In 1978 Congress passed the

85. See Ahmed, "Pakistan's Nuclear Weapons Program," p. 182; and Cheema, "American Policy in South Asia," p. 123.
86. See Ahmed, "Pakistan's Nuclear Weapons Program," p. 181; and Feroz Khan, *Eating Grass: The Making of the Pakistani Bomb* (Redwood City, Calif.: Stanford University Press, 2012), p. 70. In India the deployment was seen as deeply troubling. See, for example, Paul, *Power versus Prudence*, p. 127.
87. Ibid., p. 189. See also Ahmed, "Pakistan's Nuclear Weapons Program," p. 183.
88. See Khan, *Eating Grass*, p. 91; David Armstrong and Joseph Trento, *America and the Islamic Bomb: The Deadly Compromise* (Hanover, N.H.: Steerforth, 2007), p. 32; Zahid Hussain, "Deliberate Nuclear Ambiguity," in Ahmed and Cortright, *Pakistan and the Bomb*, p. 31; Paul, *Power versus Prudence*, p. 133; and Ahmed, "Pakistan's Nuclear Weapons Program," p. 178.
89. Khan, *Eating Grass*, p. 118.
90. See Ahmed, "Pakistan's Nuclear Weapons Program," p. 184; Onkar Marwah, "India and Pakistan: Nuclear Rivals in South Asia," *International Organization*, Vol. 35, No. 1 (Winter 1981), p. 170; Hussain, "Deliberate Nuclear Ambiguity," p. 34; and Khan, *Eating Grass*, p. 105.
91. See Armstrong and Trento, *America and the Islamic Bomb*, pp. 60, 77.
92. See Ahmed, "Pakistan's Nuclear Weapons Program," p. 184; Armstrong and Trento, *America and the Islamic Bomb*, p. 63; and Hussain, "Deliberate Nuclear Ambiguity," p. 34.

Nuclear Nonproliferation Act, further limiting the transfer of peaceful nuclear technology even to allies. More directly, the United States suspended all military and economic aid to Pakistan after the 1977 coup that brought Gen. Muhammad Zia-ul-Haq to power. At the same time, the administration of Jimmy Carter overrode the Nuclear Nonproliferation Act to allow for the shipment of nuclear fuel to India.[93] U.S. support for Pakistani security goals seemed to be all but vanishing.[94]

Pakistan's fortunes improved significantly with the December 1979 Soviet invasion of neighboring Afghanistan. In Washington, Pakistan was now seen as a "frontline state" that could help turn Afghanistan into a "Soviet Vietnam."[95] The United States quickly lifted economic sanctions aimed at Islamabad and resumed military aid.[96] In April 1981, Pakistan and the United States reached a bilateral agreement whereby they would cooperate in fighting the Soviets in Afghanistan, while Washington would turn a blind eye toward the Pakistani nuclear weapons program.[97]

Concerned about the progress of Pakistan's nuclear weapons program, India considered launching preventive strikes on a few occasions in the early 1980s.[98] A major problem for India was that it would have to strike without superpower guarantees.[99] No strikes were ever launched, arguably because of the role played by the United States. U.S. military aid packages in 1981 and 1986 boosted Pakistani conventional defenses, raising the cost of a preventive war.[100] The United States also helped Pakistan by warning it of an impending

93. See Cheema, "American Policy in South Asia," p. 126.
94. In 1979 Pakistan even feared a possible U.S. attack on its uranium enrichment plant at Kahuta. See Feroz Hassan Khan and Peter R. Lavoy, "Pakistan: The Dilemma of Nuclear Deterrence," in Muthiah Alagappa, ed., *The Long Shadow: Nuclear Weapons and Security in 21st Century Asia* (Redwood City, Calif.: Stanford University Press, 2008), p. 220.
95. Armstrong and Trento, *America and the Islamic Bomb*, pp. 89, 90. See also Ahmed, "Pakistan's Nuclear Weapons Program," p. 186; R.R. Subramaniam, "U.S. Policy and South Asia: The Decision-Making Dimension," in Cohen, *The Security of South Asia*, p. 143; Cheema, "American Policy in South Asia," p. 127; and Paul, *Power versus Prudence*, p. 134.
96. See Khan, *Eating Grass*, p. 214.
97. See Kux, *The United States and Pakistan, 1947–2000*, pp. 256–261; and Or Rabinowitz, *Bargaining on Nuclear Tests: Washington and Its Cold War Deals* (Oxford: Oxford University Press: 2014), pp. 145–154.
98. See Fuhrmann and Kreps, "Targeting Nuclear Programs," p. 837.
99. See P.R. Kumaraswamy, *India's Israel Policy* (New York: Columbia University Press, 2010), p. 230. According to some sources, Washington threatened to come to the defense of Pakistan in a conflict with India. See Bharat Kharnad, *Nuclear Weapons and Indian Security: The Realist Foundations of Strategy* (New Delhi: Macmillan, 2002), pp. 349–350.
100. See Mitchell Reiss, "The Illusion of Influence: The United States and Pakistan's Nuclear Programme," *RUSI Journal*, Vol. 136, No. 2 (Summer 1991), p. 48.

Indian attack on the uranium enrichment plant at Kahuta in early 1984.[101] In response, the Pakistani air force stepped up its defenses and prepared to strike back at the Indian nuclear facilities at Trombay. Eventually, Indian Prime Minister Indira Gandhi backed down.

Although Pakistan appreciated U.S. support, it entertained doubts about its long-term reliability, and therefore had a strong incentive to advance rapidly with its nuclear weapons program during the 1980s.[102] In 1981 Robert McFarlane, counselor at the State Department, met with Zia concerning "Pakistan's security concerns vis-à-vis India and its nuclear programme."[103] McFarlane's instructions were to "try and make the most compelling case about how we would not tolerate a Pakistani defeat at the hand of India without spelling out what we were not prepared to do. We were not prepared to deploy forces and so our leverage, apart from willingness to maintain a modest armed force in Pakistan, was not persuasive."[104] In response to McFarlane's vague assurances, Zia replied: "[W]e have little choice but to match their [the Indians'] capabilities."[105] To be sure, Zia added, "[W]e understand your country's sensitivities and we will not embarrass you."[106] The United States wished to prevent Pakistan from testing a nuclear weapon, but otherwise would tolerate a Pakistani nuclear weapons program.[107]

Pakistani progress toward a nuclear capability worried the U.S. Congress, but not the executive branch, which was more interested in protecting a key ally. In 1985 the Pressler amendment came into effect. The amendment required the president to certify that a state did not have nuclear weapons before it could receive U.S. aid. Both Presidents Ronald Reagan and George H.W. Bush complied and certified Pakistan's supposed nonnuclear status. Yet, as early as November 1986, U.S. intelligence officials suspected that Pakistan had a nuclear capability.[108] General Zia himself boasted in March 1987 that

101. See Kharnad, *Nuclear Weapons and Indian Security*, p. 348; and Adrian Levy and Catherine Scott-Clark, *Deception: Pakistan, the United States, and the Secret Trade in Nuclear Weapons* (London: Atlantic, 2007), pp. 103–105.
102. See Khan, *Eating Grass*, pp. 174–233.
103. Ibid., pp. 147–148.
104. Robert McFarlane interview by Or Rabinowitz, June 2013, Washington, D.C., transcript, Or Rabinowitz private collection.
105. Rabinowitz, *Bargaining on Nuclear Tests*, p. 148.
106. Ibid.
107. See ibid.; and Kux, *The United States and Pakistan, 1947–2000*, p. 257.
108. See Bob Woodward, "Pakistan Reported near Atom Arms Production; Acquisition of Weapon Could Halt U.S. Aid," *Washington Post*, November 4, 1986.

"Pakistan has the capability of building the Bomb."[109] In testimony in 1989, President Reagan stayed close to the letter of the law while warning about future developments: "The statutory standard as legislated by Congress is whether Pakistan possesses a nuclear explosive device, not whether Pakistan is attempting to develop or has developed various relevant capabilities. . . . Congress should be aware that as Pakistan's nuclear capabilities grow, and if evidence about its activities continues to accumulate, this process of annual certification . . . may be difficult or impossible to make with any degree of certainty."[110]

Then, in late 1989, Soviet forces withdrew from Afghanistan as the Cold War came to a close with the fall of the Berlin Wall. As a result of these geostrategic developments, in 1990 President Bush refused to certify that Pakistan was nonnuclear, cutting all economic and military aid to Islamabad. For Pakistan, this was just the latest proof of the unreliability of U.S. security assurances.

In sum, Islamabad's willingness to acquire nuclear weapons is easily understood. Pakistan faced a conventionally superior enemy in India and enjoyed only loose support from the United States. The Soviet invasion of Afghanistan led to increased U.S. support and ultimately helped Islamabad to acquire nuclear weapons.

SOUTH KOREA

Since the mid-twentieth century, South Korea has faced a significant security threat from North Korea, with its capital, Seoul, being highly vulnerable to attack. South Korea initially developed a willingness to acquire nuclear weapons in the late 1960s, in response to the announcement of President Richard Nixon's Guam Doctrine, aimed at limiting U.S. military entanglements in Asia. Its interest in nuclear weapons has since waxed and waned as a function of the perceived reliability of the U.S. guarantees and aggressiveness of North Korea.

With its involvement in the Korean War of 1950–53, the United States displayed an interest in defending South Korea and has since played an important role in meeting South Korea's security needs.[111] As the war ended, the two

109. William R. Doerner and Ross H. Munro, "Pakistan Knocking at the Nuclear Door: A Key Ally Confirms That His Scientists Can Build the Bomb," *Time*, March 30, 1987, http://www.time.com/time/magazine/article/0,9171,963894,00.html.
110. Ronald Reagan, certification of Pakistan's nonnuclear status and accompanying letter to Speaker of the U.S. House of Representatives Jim Wright (D-Texas), quoted in David B. Ottaway, "Pakistan May Lose U.S. Aid: 'No Atom Bomb' Certification Is Unlikely," *Washington Post*, January 28, 1989.
111. See Kang Choi and Joon-Sung Park, "South Korea: Fears of Abandonment and Entrapment," in Alagappa, *The Long Shadow*, p. 375.

countries signed a mutual defense treaty.[112] In 1957 the United States further boosted its commitment to South Korea by deploying tactical nuclear weapons on the Korean Peninsula.[113] The United States also assisted South Korea in its efforts to produce nuclear energy, starting with a bilateral treaty in 1955 for the transfer of nuclear technology for peaceful purposes.[114] In 1959 the Korea Atomic Energy Research Institute was founded to oversee all nuclear activities in South Korea, officially starting the country's nuclear program.[115]

Two developments in the 1960s worsened South Korea's security outlook. The first was North Korea's military buildup and frequent provocations.[116] The second stemmed from changes in U.S. foreign policy. In 1969 President Nixon announced the Guam Doctrine.[117] Shortly thereafter, the United States pulled one-third of its troops (around 20,000) out of South Korea, including all U.S. troops stationed along the demilitarized zone that divided the two Korean states.[118] This shift in policy was meant to encourage U.S. allies to take greater control of their own security. In Seoul, however, it raised fears of abandonment, especially given U.S. attempts to engineer a rapprochement with the People's Republic of China.[119] Shocked by the Guam Doctrine, and until then reliant on the United States for its defense, South Korea asked for time. In June 1970, a senior aide to President Chung-hee Park stated that it could do more for its defense, "[b]ut we need time. By 1975 we will be superior to North Korea in every respect and will be able to take care of ourselves."[120]

South Korea thus developed a greater interest in a military component to the nuclear program. President Park called for a "self-reliant national defense,"[121] to include the development of a "super weapon."[122] In 1970 a mili-

112. See Jonathan D. Pollack and Mitchell B. Reiss, "South Korea: The Tyranny of Geography and the Vexations of History," in Campbell, Einhorn, and Reiss, *The Nuclear Tipping Point*, p. 266.
113. See Choi and Park, "South Korea," p. 375.
114. See Scott D. Snyder, "South Korean Nuclear Decision Making," in Potter and Mukhatzhanova, *Forecasting Nuclear Proliferation in the 21st Century*, Vol. 2, p. 160.
115. See ibid.
116. See Choi and Park, "South Korea," p. 375.
117. See Richard M. Nixon, "Informal Remarks in Guam with Newsmen," July 25, 1969, *Presidential Papers of the United States: Richard M. Nixon, 1969* (Washington, D.C.: Government Printing Office [GPO], 1971), p. 549, quoted in Pollack and Reiss, "South Korea," p. 261.
118. See Choi and Park, "South Korea," p. 384.
119. See Seung-young Kim, "Security, Nationalism, and the Pursuit of Nuclear Weapons and Missiles: The South Korean Case, 1970–1982," *Diplomacy and Statecraft*, Vol. 12, No. 4 (December 2001), pp. 54–55.
120. Philip Shabecoff, "Seoul Protests U.S. Plan for Withdrawal," *New York Times*, June 17, 1970.
121. Choi and Park, "South Korea," p. 384.
122. Sung Gul Hung, "The Search for Deterrence: Park's Nuclear Option," in Byung-Kook Kim and Ezra F. Vogel, eds., *The Park Chung-hee Era: The Transformation of South Korea* (Cambridge, Mass.: Harvard University Press, 2011), p. 483.

tary nuclear program controlled by the Agency for Defense Development was set in motion.[123] President Park tasked the Korea Atomic Energy Research Institute with acquiring reprocessing capabilities,[124] and he created the covert Weapons Exploitation Committee, responsible for the procurement and production of nuclear weapons.[125] In 1973 South Korea sought to acquire a reprocessing facility and a research and heavy water reactor from France and Canada.[126] In February of the same year, Park signed the "Basic Plan for Developing Ballistic Missiles."[127]

Eventually, the United States became aware that its retrenchment doctrine had exacerbated fears of abandonment and heightened the risk of proliferation in Asia. In March 1975, U.S. Secretary of State Henry Kissinger explicitly threatened to cut off all security ties with, and withdraw all U.S. forces from, South Korea if Seoul insisted on pursuing a nuclear weapon.[128] This pressure led South Korea to ratify the Nonproliferation Treaty (NPT) a month later, on April 23. Having done so, President Park proceeded to publicly tie the abandonment of his nuclear aspirations with the maintenance of a U.S. security guarantee. Speaking to *Washington Post* reporters on June 26, he said: "If South Korea were not provided with a U.S. nuclear umbrella, South Korea would do anything to protect its security, including the development of nuclear weapons."[129]

Yet Washington had not alleviated South Korea's fears of abandonment. President Park was determined to develop the capability to build nuclear weapons. In November 1976, he told Won-chul Oh, his senior economic adviser, to pursue the development of a nuclear industry: "Acquire the capability, but in a manner not inviting foreign pressure."[130] Developments in Washington would soon reignite South Korean fears of abandonment. In early 1977, President Jimmy Carter appeared "determined to remove U.S. troops from South Korea and was highly critical of Park's repressive domestic policies."[131] To this effect, Carter proposed to cut military aid to South Korea, with-

123. See House Committee on International Relations, *Investigations of Korean-American Relations: Report of the Subcommittee on International Organizations*, 95th Cong., 2nd sess. (Washington D.C.: GPO, 1978), p. 79.
124. See Snyder, "South Korean Nuclear Decision Making," p. 161.
125. Ibid.
126. Daniel A. Pinkston, "South Korea's Nuclear Experiments" (Monterey, Calif.: James Martin Center for Nonproliferation Studies, Monterey Institute of International Studies, 2004), http://cns.miis.edu/stories/041109.htm.
127. See Hung, "The Search for Deterrence," p. 494.
128. See Paul, *Power versus Prudence*, p. 123.
129. Park Chung-hee to the *Washington Post*, quoted in Choi and Park, "South Korea," p. 377.
130. Kim, "Security, Nationalism, and the Pursuit of Nuclear Weapons and Missiles," p. 67.
131. Snyder, "South Korean Nuclear Decision Making," p. 161.

draw U.S. ground troops from the peninsula, and remove 1,000 tactical nuclear weapons from the country.[132] As a result, Park once again considered the nuclear option,[133] as well as development of South Korea's missile capability.[134] Carter's announcement, made on March 9, 1977, to delay withdrawal plans until 1982, did not assuage Park's concerns.[135]

Park's assassination in October 1979 and the arrival of President Ronald Reagan in early 1981 paved the way for a possible change in South Korea's nuclear policy. The Reagan administration promised to restore and reaffirm the United States' long-standing security commitment to South Korea if the country would terminate its nuclear ambitions in the military realm. President Doo-hwan Chun was persuaded by U.S. actions to cancel the nuclear program altogether.[136]

During the 1980s and 1990s, South Korea remained firmly under the U.S. security umbrella while diplomatic activity with North Korea increased, leading to improved relations between Seoul and Pyongyang. In December 1991, the two countries adopted the "Basic Agreement," which included provisions for controlling military movements and exercises, the peaceful use of the demilitarized zone, exchange of military information, and the phased reduction and eventual elimination of WMDs on the Korean Peninsula.[137] The following year, the "Joint Declaration of Denuclearization of the Korean Peninsula" committed both countries not to "manufacture or produce, deploy, store, or use nuclear weapons or to possess reprocessing and enrichment facilities."[138] Finally, the Agreed Framework of 1994 promised eased relations between North Korea and the United States.[139]

Subsequently, increased tensions with North Korea have raised concerns about the possibility that Seoul could resume its nuclear program. The Agreed Framework was abandoned in 2002, and North Korea performed three nuclear

132. See Paul, *Power versus Prudence*, p. 121.
133. See Kim, "Security, Nationalism, and the Pursuit of Nuclear Weapons and Missiles," p. 67; and Paul, *Power versus Prudence*, p. 123.
134. See Hung, "The Search for Deterrence," pp. 494–495.
135. See Kim, "Security, Nationalism, and the Pursuit of Nuclear Weapons and Missiles," p. 67.
136. See Snyder, "South Korean Nuclear Decision Making," p. 168. The continuation into the Reagan administration of negotiations on the South Korean nuclear weapons program underscored Seoul's continuing fears of abandonment. In 1981, U.S. officials tried to persuade South Korea to close down its nuclear weapons program with a combination of contingent threats and assurances. See, for example, Michael J. Siler, "U.S. Nuclear Nonproliferation Policy in the Northeast Asian Region during the Cold War: The South Korean Case," *East Asia*, Vol. 16, Nos. 3–4 (Autumn/Winter 1998), pp. 75–76; and Pollack and Reiss, "South Korea," p. 263.
137. See Choi and Park, "South Korea," p. 379.
138. See ibid.; and Paul, *Power versus Prudence*, p. 123.
139. See Choi and Park, "South Korea," p. 378.

tests, in October 2006, May 2009, and February 2013. In response, the United States has reiterated its pledges to defend South Korea. Eleven days after the first of Pyongyang's tests, the term "extended nuclear deterrence" was, at the South's request, for the first time added to the joint communiqué issued by South Korea and the United States at the end of Security Consultative Meetings.[140] Given the limited aims of South Korea's foreign policy and the firm commitment of the United States to defend South Korea, it is unlikely that South Korea will develop its own nuclear weapons.

In sum, South Korea's close alliance with the United States has been a key factor in keeping in check its willingness to acquire nuclear weapons. When this commitment appeared to weaken, Seoul considered the nuclear option, which it could certainly afford given its significant economic and technological capacities. Yet renewed and sustained commitments from Washington have contained Seoul's willingness to acquire nuclear weapons.

WEST GERMANY

West Germany considered the nuclear option in the 1950s and 1960s. On the front line of conflict in Europe and facing a stronger enemy in the Soviet Union, West Germany had the willingness to acquire nuclear weapons. Yet it lacked the opportunity to proliferate, because it was vulnerable to coercive pressure from its U.S. ally.

Following its creation in 1949 and recognition as a sovereign state six years later, West Germany sought to reunify with East Germany. The East, however, remained within the orbit of the Soviet Union, a much stronger enemy that enjoyed a preponderance of conventional power in Central Europe. To ensure its survival, Bonn relied on Washington, pledging in the initial aftermath of acquiring full sovereignty in 1955 to remain nonnuclear.[141]

The United States saw the protection of West Germany—and of Western Europe more generally—as a key global interest, given their geographical proximity to Soviet territory and economic potential. Consequently, the United States committed significant resources to the European theater in the form of the Marshall Plan and the creation of the North Atlantic Treaty Organization.

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140. See Snyder, "South Korean Nuclear Decision Making," p. 158.
141. See Memorandum of Conversation, June 22, 1962, *Foreign Relations of the United States* [FRUS], *1961–1963*, Vol. 13: *Western Europe and Canada* (Washington, D.C.: GPO, 1994), p. 422; Hans-Peter Schwarz, *Konrad Adenauer: A German Politician and Statesman in a Period of War, Revolution, and Reconstruction* (Providence: Berghahn, 1997), p. 123; and Ronald J. Granieri, *The Ambivalent Alliance: Konrad Adenauer, the CDU/CSU, and the West, 1949–1966* (New York: Berghahn, 2004), p. 83.

Yet doubts soon emerged about the reliability of U.S. commitments. In 1955 the Carte Blanche war games estimated the number of German citizens killed or injured in a superpower conflict at 5 million.[142] In July 1956, the Radford plan, which laid out U.S. intentions to withdraw 800,000 troops from the continent and rely more heavily on nuclear weapons, was leaked to the press.[143]

These developments caused great alarm in Bonn. Chancellor Konrad Adenauer declared to the press that he opposed a policy where "America is a fortress for itself, because that would mean that we would be outside that fortress."[144] He wrote to U.S. Secretary of State John Foster Dulles on July 22, 1956, that as a result of the Radford plan, "Europe, including Germany, has lost its confidence in the United States' reliability."[145] In September 1956, Adenauer declared that "Germany cannot remain a nuclear protectorate."[146] Consequently, he vowed to acquire "the most modern weapons" for West Germany.[147] The following month, Franz Josef Strauss was named minister of defense. Both Adenauer and Strauss were committed to acquiring nuclear weapons.

The Soviet Union's successful launch of *Sputnik* in October 1957 further exacerbated Bonn's security concerns. West Germany held bilateral talks with France and, in April 1958, signed an agreement with both the Paris and Rome governments for the development of a secret nuclear program.[148] Eventually, the program was discovered and heavily criticized by Washington and London. French President Charles de Gaulle canceled the program in the fall of 1958.

Despite the official end to the West German nuclear weapons program, Bonn's willingness to acquire nuclear weapons held steady. In December 1962, President John F. Kennedy proposed the creation of a multilateral force (MLF), an idea initially conceived during the administration of Dwight Eisenhower, to integrate national nuclear arsenals under a single command within NATO.[149]

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142. See Jeffrey Boutwell, *The German Nuclear Dilemma* (Ithaca, N.Y.: Cornell University Press, 1990), p. 18.
143. See Schwarz, *Konrad Adenauer*, p. 235; and Granieri, *The Ambivalent Alliance*, p. 88.
144. Ibid.
145. Schwarz, *Konrad Adenauer*, p. 235.
146. Ibid., pp. 239–240; and Granieri, *The Ambivalent Alliance*, p. 99.
147. Boutwell, *The German Nuclear Dilemma*, p. 19.
148. See Catherine M. Kelleher, *Germany and the Politics of Nuclear Weapons* (New York: Columbia University Press, 1975), p. 149; Pertti Ahonen, "Franz-Josef Strauss and the German Nuclear Question, 1956–1962," *Journal of Strategic Studies*, Vol. 18, No. 1 (June 1995), pp. 32–33; and Harald Müller, "Germany and WMD Proliferation," *Nonproliferation Review*, Vol. 10, No. 2 (Summer 2003), p. 2.
149. See Granieri, *The Ambivalent Alliance*, p. 164.

For the United States, the centralization of decisionmaking was an important tenet of Kennedy's foreign policy. Additionally, the MLF could satiate West Germany's appetite for nuclear weapons. In June 1964, Adrian Fisher, the deputy director of the U.S. Arms Control and Disarmament Agency, wrote in a memo to Secretary of State Dean Rusk that the MLF "was intended to support our nonproliferation policy in the light of the growing nuclear ambitions of the Federal Republic."[150]

West Germany quickly saw the MLF as the best way to obtain control over nuclear weapons. After endorsing the MLF proposal in January 1963, Adenauer stated: "We must arrange within NATO so that a decision can be taken to use atomic weapons even before the [U.S.] President is heard from."[151]

Meanwhile the Soviet Union harbored concerns about the proliferation risks presented by the MLF. Safeguards for a U.S. veto over the use of MLF nuclear weapons might fail, and West Germany might also acquire useful information from its participation in the MLF to develop its own nuclear weapons.[152] When Kennedy described the MLF to the Soviets in April 1963, Premier Nikita Khrushchev expressed amazement at his "attempt to convince me that neither the multinational nor multilateral nuclear forces being planned for NATO will increase the danger of the spreading of nuclear weapons." For Khrushchev, the MLF was "a crack" in nonproliferation efforts, and "once such a crack exists there will be found fingers which in this fashion will find their way to the control panels of these weapons."[153]

West German nuclearization was a frightening prospect for the Soviet Union. There is strong evidence to suggest that Khrushchev engineered the Berlin crisis of 1958–62 to pressure the United States to keep West Germany nonnuclear.[154] In July 1962, at a meeting of the UN's Eighteen-

150. Glenn T. Seaborg, *Stemming the Tide: Arms Control in the Johnson Years* (Lexington, Mass.: Lexington, 1987), p. 131.
151. Jenifer Mackby and Walter B. Slocombe, "Germany: The Model Case, a Historical Imperative," in Campbell, Einhorn, and Reiss, *The Nuclear Tipping Point*, p. 191.
152. U.S. allies were also concerned. In October 1964, recently elected British Prime Minister Harold Wilson famously objected to the MLF in the following terms: "If you have a boy and wish to sublimate his sex appetite, it is unwise to take him to a strip-tease show." See Kelleher, *Germany and the Politics of Nuclear Weapons*, p. 252.
153. Message from Chairman Khrushchev to President Kennedy, undated, *FRUS, 1961–1963*, Vol. 6: *Kennedy-Khrushchev Exchanges* (Washington, D.C.: GPO, 1996), p. 274.
154. According to Joseph S. Nye Jr., Khrushchev believed that "Berlin was a 'blister' that he could step on to make the Americans feel pain. He could trade stability in the status of Berlin for Western assurances that the Federal Republic of Germany would not get nuclear weapons." See Nye, "The Superpowers and the Non-Proliferation Treaty," in Albert Carnesale and Richard N. Haass, eds., *Superpower Arms Control: Setting the Record Straight* (Cambridge, Mass.: Ballinger, 1987), p. 169. Ac-

Nation Committee on Disarmament, the Soviet representative stated that nonproliferation "cannot be discussed in an abstract fashion. It is primarily the question of the spread of nuclear weapons to West Germany."[155] During the negotiations for the NPT, a Soviet representative declared: "We primarily designed the whole treaty to close all doors and windows on the possibility of the Federal Republic of Germany having nuclear weapons."[156]

The Soviets were willing to consider a range of actions to ensure that West Germany would sign the treaty. In January 1966, Soviet Chairman Alexei Kosygin complained that NATO members seemed to be debating "how and to what extent to satisfy the growing nuclear demands of West Germany."[157] He stated that the Soviet Union would be "forced to take all measures which it, along with its allies and friends, would consider necessary for securing peace in Europe" in the event that West Germany "got access to nuclear weapons" in any form.[158]

Given Soviet concerns about West German nuclearization, and the risks of entrapment in a conflict with the Soviet Union, the United States gradually turned away from the MLF between 1964 and 1966.[159] Instead of trying to prevent West German nuclearization by eliminating Bonn's willingness to proliferate, Washington would try to eliminate its opportunity to proliferate. U.S. Ambassador to West Germany George McGhee told Secretary of State Rusk

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cording to Marc Trachtenberg, "The German nuclear question thus lay at the heart of Soviet policy during the Berlin Crisis." See Trachtenberg, *Constructed Peace: The Making of the European Settlement, 1945–1963* (Princeton, N.J.: Princeton University Press, 1999), p. 253.

155. Nye, "The Superpowers and the Non-Proliferation Treaty," p. 169.

156. Matthias Küntzel, *Bonn and the Bomb: German Politics and the Nuclear Option* (London: Pluto, 1995), p. 20.

157. Message from Chairman Kosygin to President Johnson, Moscow, February 1, 1965, *FRUS, 1964–1968*, Vol. 11: *Arms Control and Disarmament* (Washington, D.C.: GPO, 1997), pp. 186–188; and Translation of Message Handed Acting Secretary of State by Soviet Ambassador Dobrynin,. January 11, 1966, *FRUS, 1964–1968*, Vol. 11: *Arms Control and Disarmament* (Washington, D.C.: GPO, 1997), p. 279.

158. Ibid., p. 280. See also Kosygin's press conference in London in February 1967, quoted in Seaborg, *Stemming the Tide*, p. 359.

159. Kelleher argues that the MLF was effectively killed in December 1964, when President Johnson put it on hold. See Kelleher, *Germany and the Politics of Nuclear Weapons*, p. 254. Negotiations about the NPT continued for more than a year afterward. McGeorge Bundy argues that the MLF was dropped at end of 1965. See Bundy, *Danger and Survival: Choices about the Bomb in the First Fifty Years* (New York: Random House, 1988), p. 494. Frank Costigliola argues that it "faded away" in 1966. See Costigliola, "Lyndon B. Johnson, Germany, and 'the End of the Cold War,'" in Warren I. Cohen and Nancy Bernkopf Tucker, eds., *Lyndon Johnson Confronts the World: American Foreign Policy, 1963–1968* (New York: Cambridge University Press, 1994), p. 180. Mathias Küntzel says that it ended in November 1966, with the resignation of Ludwig Erhard's government. See Küntzel, *Bonn and the Bomb*, p. 54.

that Bonn should try to reassure East European countries of its foreign ambitions, renouncing nuclear weapons and at least accepting the Oder-Neisse line. If the Federal Republic of Germany attempted to acquire a nuclear capability, the United States "would withdraw our forces and support for Germany first"; the other NATO allies "would dissociate themselves from Germany"; and the Soviets would "make such efforts the subject of a preemptive attack." By mid-1966, McGhee became convinced that West Germany could not acquire a national nuclear capability, not because of technical requirements "but because neither the Soviets—or her allies including us, would permit her to do it."[160]

By late 1966, the United States and the Soviet Union completed negotiations on the NPT, whereby nuclear powers would renounce nuclear sharing, and nonnuclear weapons states would not acquire their own nuclear arsenals, subject to inspections. The two superpowers signed the treaty on July 1, 1968, along with sixty-two other countries.

West German leaders objected to U.S. coercion. In February 1967, West German Chancellor Kurt Kiesinger denounced the NPT as an act of superpower "atomic complicity."[161] He later went on to declare that the treaty was "part of a superpower conspiracy to split and denuclearize Germany forever."[162] Former West German Defense Minister Strauss called the NPT "a new Versailles, and one of cosmic dimensions." Adenauer called it a "Morgenthau Plan raised to the power of two" and a "death warrant" for West Germany.[163] Yet West German leaders had little choice. Facing a strong enemy in the Soviet Union, West Germany gave up its nuclear ambitions because it lacked the opportunity to proliferate. Under Chancellor Willy Brandt, West Germany signed the NPT on November 28, 1969, and worked to improve relations with the Soviet Union, including signing the Treaty of Moscow in 1970.[164]

In sum, West Germany was a close ally of the United States facing a powerful threat in the Soviet Union. Fearful of the risks of escalation associated with German nuclearization, Washington colluded with Moscow to create the non-

160. Letter from the Ambassador to Germany (McGhee) to Secretary of State Rusk, August 25, 1966, *FRUS, 1964–1968*, Vol. 15: *Germany and Berlin* (Washington, D.C.: GPO, 1999), p. 395.
161. Küntzel, *Bonn and the Bomb*, p. 96.
162. Shane J. Maddock, *Nuclear Apartheid: The Quest for American Atomic Supremacy from World War II to the Present* (Chapel Hill: University of North Carolina Press, 2010), p. 276.
163. Küntzel, *Bonn and the Bomb*, p. 90. See also Mackby and Slocombe, "Germany," pp. 180, 196–197.
164. West Germany ratified the NPT in 1975. After reunification, Germany reiterated its renunciation of nuclear weapons and in 1994 voted to extend the NPT indefinitely.

proliferation regime and ensure West Germany's nonnuclear status. Ultimately, West Germany remained nonnuclear.

Implications for the Study of Nuclear Proliferation

Although we posit that security dynamics are at the core of most proliferation decisions, several extant contributions to the study of proliferation can be incorporated into our framework in a symbiotic relationship. On the one hand, a strategic theory such as ours can be enriched by bringing into its framework additional variables that have been explored in the literature. On the other hand, existing theories of proliferation could be refined by taking into account the strategic dynamics highlighted by our theory.

For example, Etel Solingen's pathbreaking work on the role that the economic orientation of ruling elites plays in the proliferation process can easily be incorporated into our framework. Solingen's argument is that elites who want to integrate their country into the global economy are more likely to forbear nuclear weapons and those who do not ("inward-looking" elites) are more likely to pursue the bomb.[165] While we focus on the expected security costs and benefits of nuclear acquisition—and we contend that these security factors are sufficient to explain a country's nuclear path—a more complete analysis of the proliferation process would benefit from incorporating the economic costs on which Solingen's work centers, which could add to the overall cost of a nuclear program, undermining a state's willingness to nuclearize. Reciprocally, further work on the role of economic preferences in conditioning the spread of nuclear weapons should incorporate security concerns in its logic: as Solingen acknowledges, states in a region populated by other inward-looking states become more likely to acquire the bomb.[166]

Likewise, Jacques Hymans's important work on the role played by leader psychology in shaping the proliferation process could provide greater richness to our strategic framework of analysis.[167] As Hymans points out, leaders' psychological makeup will color their perceptions of threat. As a result, particular types of leaders, such as those who adhere to what Hymans labels a "national

165. See Solingen, "The Political Economy of Nuclear Restraint"; and Solingen, *Nuclear Logics*. For an alternative perspective on the effect of domestic politics on proliferation, see Christopher Way and Jessica L.P. Weeks, "Making It Personal: Regime Type and Nuclear Proliferation," *American Journal of Political Science*, Vol. 58, No. 3 (July 2014), pp. 705–719.
166. See Solingen, *Nuclear Logics*, pp. 40–47.
167. See Hymans, *The Psychology of Nuclear Proliferation*.

identity conception" of "oppositional nationalism," will be prone to inflate threats and therefore become more likely to, according to our theory, possess the willingness to build the bomb.[168] At the same time, additional work on the psychology of nuclear proliferation should take into account the strategic setting in which leaders operate. It is implausible that the psychological makeup of a country's leadership be immune to strategic pressures.

Our strategic framework can also accommodate Hymans's work on how technological and managerial incompetence may lead to nuclear forbearance.[169] According to our theory, a state's incompetence in the nuclear realm may affect proliferation in two ways. First, it may increase the cost of a nuclear program, making it less likely that the state is willing to acquire the bomb. Second, by delaying nuclear acquisition, it may facilitate nuclear forbearance if the security environment improves during the nuclear development period. Only in the first case can we talk of incompetence causing nuclear forbearance, however. In the second case, forbearance occurs only if the strategic environment improves during the longer nuclear development phase. Regardless of how much longer this phase becomes, our theory explains why proliferation might nonetheless occur if the security environment continues to provide the state with both the willingness and the opportunity to nuclearize. This logic also highlights the benefits of incorporating strategic dynamics into future work on the role that technological and managerial competence plays in the proliferation process.

A similar logic applies to work on how norms against nuclear proliferation and institutions such as the NPT affect the spread of nuclear weapons.[170] Our theory speaks to normative concerns and institutional effects by incorporating them into the strategic environment. At a minimum, institutions may reduce the likelihood that member states would be able to build the bomb undetected. According to our theory, the NPT may take away the ability of weak unprotected states—those that, if threatened, would enjoy a higher benefit of proliferation—to acquire the bomb by exposing their development efforts, making them vulnerable to preventive attack. In addition, institutions can help to lower states' perception of the level of security threat in a coordinated manner, by generating lower expectations of future proliferation and conflict.

Finally, arguments about the effectiveness of restrictions to the supply of nu-

168. Ibid.
169. See Hymans, *Achieving Nuclear Ambitions*.
170. See Tannenwald, "The Nuclear Taboo"; and Rublee, *Nonproliferation Norms*.

clear materials and technology as a means of deterring proliferation, which have recently enjoyed significant popularity, would have much to gain from accounting for the strategic dynamics at the core of our theory.[171] To begin with, without placing supply-side efforts in their strategic context, it is not clear what effect they will have on the rate of proliferation. Existing supply-side theories such as Matthew Fuhrmann's and Matthew Kroenig's tell us which states are more or less likely to provide others with nuclear assistance: more powerful states, which have more to lose from proliferation, are most likely to withhold it. But often alternative suppliers are available and, in any case, the benefit of nuclear proliferation may be so great that a state is willing to pursue the bomb even if it must develop its program indigenously. As Scott Kemp has recently argued, "Alongside a few highly visible programs that relied on technology transfers, the historical record contains many more lesser-known examples of states developing nuclear weapon capabilities without foreign assistance."[172]

Furthermore, supply-side theories cannot account for the slower pace of proliferation of the past two decades. By their own logic, as the Soviet Union lost much of its power projection capability, it "became more willing to provide sensitive nuclear assistance."[173] Additionally, states such as Pakistan are suspected of supplying would-be nuclear powers with nuclear technology and materials.[174] To connect supply-side arguments to the odds of proliferation, then, we need to place supply constraints in the context of our broader strategic framework. When we do so, it becomes clear that supply-side efforts may deter proliferation in two ways. First, they may condition the cost of a nuclear program. If the cost of developing a nuclear weapon without international supply is sufficiently high to overcome the security benefit of proliferation, the state will no longer possess the willingness to nuclearize. Although this is a theoretical possibility, we found no historical case in which this calculation occurred. Second, supply-side restrictions have often been employed by a powerful country such as the United States in an attempt to coerce one of its allies to remain nonnuclear. Such efforts—as with any other sticks-based ap-

171. See Fuhrmann, "Spreading Temptation"; Fuhrmann, "Taking a Walk on the Supply Side"; Kroenig, "Exporting the Bomb"; Kroenig, "Importing the Bomb"; Kroenig, *Exporting the Bomb*; and Fuhrmann, *Atomic Assistance*.

172. Kemp, "The Nonproliferation Emperor Has No Clothes," p. 40.

173. Kroenig, "Exporting the Bomb," p. 128. Kroenig notes that China's rise may counter the effect of Russian decline, but this is theoretically indeterminate.

174. See Gordon Corera, *Shopping for Bombs: Nuclear Proliferation, Global Insecurity, and the Rise and Fall of the A.Q. Khan Network* (Oxford: Oxford University Press, 2006).

proach to nonproliferation—are likely to succeed only if the protégé is relatively weak vis-à-vis its adversaries. A strong protégé would maintain the opportunity to nuclearize even if Washington abandoned it, and would thus likely attempt to circumvent such restrictions. What causes nonproliferation in the case of a weak protégé is therefore the strategic logic of proliferation, not the supply-side effort per se, whose success is merely a symptom of the strategic environment of the potential proliferator. In other words, the effectiveness of restrictions to the supply of nuclear materials and technology is largely underpinned by the consequences of threats of abandonment. The efficacy of such sticks-based policies must thus be evaluated *in toto*.

Conclusion

This article has introduced a security-based theory of nuclear proliferation focusing on the strategic interaction between a state, its enemies, and, where present, allies. We conclude that only two types of states acquire the bomb: powerful but highly threatened states; and weaker states whose territory is protected by an ally they deem unlikely to remain present in the long-term or unwilling to ensure its other core security goals. The empirical rarity of these strategic situations is responsible for the relatively low number of states—fewer than 5 percent—that have acquired the bomb during the first seven decades of the nuclear age. This finding questions frequent claims that nuclear weapons are the "weapon of the weak," the "great equalizer" in international relations.[175] No doubt, nuclear weapons would enable an otherwise weak nation to stand up to more powerful adversaries. So far, however, no weak unprotected nation has ever managed to obtain them.

Today Iran is at the center of U.S. proliferation concerns. As a relatively weak state involved in an adversarial relationship with the United States, Israel, and Sunni Arab states, and in the absence of a powerful ally, Iran is likely to possess the willingness to build nuclear weapons. A nuclear deterrent would make the Iranian regime virtually immune to foreign threats to its survival and might boost its bargaining position on other security issues. Yet, at the same time, our theory makes clear why Iran is unlikely to have the oppor-

175. T.V. Paul, "Great Equalizers or Agents of Chaos? Weapons of Mass Destruction and the Emerging International Order," in Paul and John A. Hall, *International Order and the Future of World Politics* (Cambridge: Cambridge University Press, 1999), pp. 373–392; and T.V. Paul, "Disarmament Revisited: Is Nuclear Abolition Possible?" *Journal of Strategic Studies*, Vol. 35, No. 1 (February 2012), pp. 149–169.

tunity to nuclearize. For Tehran to acquire nuclear weapons, its adversaries must estimate the security benefit of Iranian proliferation to be lower than the cost of a preventive strike. Otherwise, a preventive strike is a rational option, and either Iran internalizes this threat and abandons its nuclear investment or its program is likely to be targeted. It should therefore come as no surprise that both U.S. and Israeli leaders have refused to take the military option off the table during negotiations with Iran over its nuclear program. Our theory predicts that, either through a comprehensive nuclear deal or as the result of a preventive strike, Iran will remain a nonnuclear weapons state.

Furthermore, our theory provides reasons to doubt the widespread fear that eventual Iranian nuclearization would trigger a proliferation cascade in the Middle East involving Egypt, Saudi Arabia, or Turkey. As the South Korean case demonstrates, none of these states is likely to pursue nuclear weapons as long as they continue to possess reliable U.S. security guarantees. At the same time, as the Pakistani case demonstrates, to persuade its allies to drop their nuclear ambitions, Washington must place nonproliferation at the top of its agenda. In the past, the United States has consistently succeeded in preventing clients from nuclearizing whenever it shared their security goals and privileged nonproliferation efforts over other strategic goals. This success is, to a great extent, responsible for the historical absence of "reactive proliferation."[176] We have no doubt that U.S. administrations will continue to place great importance on these states' security vis-à-vis a putative Iranian nuclear threat. Given the evolving nature of the Egyptian, Saudi, and Turkish regimes, however, it is less clear that Washington will be able to continue to prioritize the goal of nonproliferation above all of its other policy goals vis-à-vis these states. In any case, our theory highlights an important cost that the United States often pays to ensure the nonnuclear status of its allies: offering security guarantees to a burgeoning number of states. Whether the United States will be able to continue to do so will have a great impact on the odds of future nuclear proliferation.

176. Bleek, "Why Do States Proliferate?" p. 179.