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## Introduction

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As the first decade of the twenty-first century comes to a close, a feeling of optimism and renewal animates the scholars and practitioners who deal with nuclear nonproliferation. President Barak Obama has embraced nuclear disarmament as a long-term U.S. policy goal, an objective endorsed by other eminent U.S. statesmen.<sup>1</sup> This renewed interest in nuclear disarmament also is reflected in recent scholarly work that seeks to identify practical ways to make total nuclear disarmament a reality.<sup>2</sup> Scholars have suggested that arms control verification, combined with confidence building measures, can reassure the global community that fissile materials, manufacturing facilities, and scientific expertise are not being diverted into clandestine nuclear weapons programs. For many observers, nuclear disarmament is no longer a millenarian dream. Instead, it is a practical objective that should be embraced by national leaders.

Disarmament advocates are quick to identify today's proliferation threats as justification for their position and policies. Topping this list of threats is the possibility that a nuclear weapon could fall into the possession of a violent extremist group or some other nonstate actor. The fear is that a nuclear weapon might be stolen from a stockpile maintained by a state, or that a primitive fission bomb might be crafted from nuclear material obtained on the black market, or that a "dirty bomb" might be built by wrapping high explosive in a blanket of radioactive material.<sup>3</sup> A. Q. Khan's ability to siphon off significant nuclear materials and technology from Pakistan's nuclear program to create a commercial market for nuclear materials, bomb-making equipment, and weapons design information is considered a harbinger of a world in which nuclear trafficking is commonplace.<sup>4</sup> Analysts worry that it is only a matter of time before a terrorist

organization detonates a nuclear device or a dirty bomb in an urban area, possibly killing thousands and irradiating large portions of a major city. For those who embrace “the logic of zero,” disarmament is the only sure way to head off the threat posed by nonstate actors by eliminating nuclear weapons before they fall into the hands of terrorists and by securing fissile materials and technologies associated with building a nuclear device before they find their way onto black markets.<sup>5</sup>

Iran’s ongoing effort to develop nuclear weapons and the emergence of a North Korean nuclear arsenal also are identified as major threats to regional security and the nonproliferation regime. North Korea or Iran might start a “proliferation cascade” as neighboring states initiate their own nuclear programs to counter emerging threats, creating dynamics that can fuel nuclear arms races and crises.<sup>6</sup> There are even signs that this cascade is already occurring. In 2006, thirteen countries in the Middle East initiated or revived plans to pursue civilian nuclear programs, plans that are in part a political response to Iran’s nuclear ambitions.<sup>7</sup> Nascent bomb programs also could create a discernible path to open hostilities as regional states contemplate preventive war to block Tehran or Pyongyang from fully deploying a nuclear arsenal. Global disarmament efforts are identified as a response to this threat by helping to create sustained international pressure against these nuclear holdouts. As the nuclear threat recedes elsewhere in the world, disarmament champions believe the existing hard cases will come under increasing international scrutiny and public condemnation. The political and economic price of maintaining an active nuclear weapons program will increase so much in the years ahead that disarmament advocates believe North Korea and Iran will eventually be forced to accept the logic of zero.

By focusing on the international threat environment, however, champions of global nuclear disarmament fail to recognize the underlying political, scientific, and military trends that actually have created the strategic setting whereby the issue of nuclear disarmament can rise to the top of international policy agendas. This is not an unusual situation in diplomatic history or the social sciences. As Geoffrey Blainey reminds us, “For every thousand pages published on the causes of wars there is less than one page directly on the causes of peace.”<sup>8</sup> Nevertheless, understanding the nature, duration, and strength of the trends that favor disarmament and other cooperative security measures is important because it can inform policymakers about the impact of their policies on positive international developments. For example, will arms reductions or the atro-

phy of great power nuclear programs reduce the credibility of extended deterrence, leading smaller states to seek nuclear arms in the face of regional threats? What are the prospects of maintaining a stable nuclear balance and system of strong regional security arrangements as forces are drawn down? Most important, policymakers must have some appreciation of what might reverse positive trends and the steps they can take to prevent deterioration in the international political and military climate that would increase the importance they give to maintaining robust nuclear arsenals or reinvigorating nuclear modernization programs.

When it comes to vertical and horizontal nuclear proliferation over the last thirty years, two generalizations can be offered about these positive trends. In terms of vertical proliferation, the nuclear arms race among the great powers is becoming a distant memory. Their nuclear programs have been scaled back with the end of the Cold War. For the United States, the demise of the Soviet Union quickly eliminated the political and strategic motivation to maintain a robust nuclear modernization and procurement program. Research and development efforts were terminated and aging strategic systems were retired. For Russia, the economic dislocation caused by the end of the Soviet empire led to large reductions in its nuclear arsenal. A *de facto* nuclear test moratorium also has curtailed nuclear weapons modernization programs, limiting efforts to marry global precision-strike delivery systems with “boutique” weapons designed to maximize electromagnetic pulse and other nuclear effects. The nuclear programs of the United Kingdom, France, the People’s Republic of China, the United States, and Russia are either in stasis or decline.<sup>9</sup> In reality, the New START treaty signed by the United States and Russia in April 2010,<sup>10</sup> potential U.S. ratification of the Comprehensive Test Ban Treaty, and growing international support of the Fissile Material Cutoff Treaty will simply formalize the decline of the great powers’ nuclear programs. States will still make references to their nuclear deterrent, but in reality nuclear weapons are likely to play a less central role in their defense policies.

In terms of horizontal proliferation, the positive trend can be summarized by the phrase “the situation could be worse.” Only a few countries have acquired nuclear arsenals. In fact, in each of the six decades of the nuclear era, only one or two states have obtained nuclear weapons capabilities: the United States and the Soviet Union in the 1940s, the United Kingdom and France in the 1950s, China and Israel in the 1960s, India and South Africa in the 1970s, Pakistan in the 1980s, and North Korea in the 1990s. Iran also seems intent on

acquiring a nuclear device despite considerable international pressure and domestic turmoil following its June 2009 presidential elections. Nevertheless, this is a relatively small number of states, especially compared with the number of countries that possess the scientific and industrial capability needed to make nuclear weapons. Additionally, several states that inherited nuclear weapons (such as Ukraine) or developed them (for example, South Africa) have abandoned their arsenals; and Libya has terminated its rudimentary efforts to acquire a nuclear capability. Moreover, with the exception of India and Pakistan, no nuclear powers appear to be locked into an arms race that is producing either a qualitative or quantitative increase in nuclear arsenals.<sup>11</sup>

If these positive trends set the stage for more ambitious disarmament agendas, it would make sense for disarmament advocates to take steps to preserve this strategic setting. An important initiative, related to the issue of horizontal proliferation, would be to identify the reasons why certain governments have decided to forgo developing a nuclear capability and the type of events that might lead to a change in that policy. Lewis Dunn, for instance, notes that “once a country’s leadership [has] committed itself to acquire nuclear weapons, little [can] be done to reverse that decision. Attempts to make it technically harder, diplomatic and political jawboning, threats and imposition of sanctions, rougher inspections, legal constraints and/or conventional arms placebos often proved too little, too late.” By understanding what strategic developments might prompt a reassessment of policy, the international community could act to allay concerns and emerging threats before they prompt policymakers to embark on a more ominous path. By doing so, according to Dunn, “it then would become possible to pursue a multifaceted approach to influence their calculations while time remains to do so.”<sup>12</sup>

If policymakers actually possessed this type of proliferation early warning system, what steps could they take to alter the strategic setting before it forced governments to reassess their nuclear options? In terms of vertical proliferation, policymakers might explore the unilateral and multilateral initiatives that can be undertaken to reduce incentives for states to acquire nuclear weapons. Unbridled regional nuclear arms races or the use of nuclear weapons on some distant battlefield would likely reverse the trend toward de-emphasizing the role of nuclear weapons in great power defense strategies. The United States, Great Britain, or France, for instance, might face political pressure to restart their nuclear weapons programs following Iranian acquisition of a nuclear weapon. By contrast, confidence building measures, positive and negative secu-

rity guarantees, and multilateral efforts to stop trafficking in illicit material that were sponsored by the great powers might not only strengthen the nonproliferation regime but also build mutual confidence in their commitment to stop the spread of nuclear weapons. Unilateral and multilateral confidence building measures and security guarantees can work to stem proliferation “on the periphery,” while providing evidence of the great power commitment to nonproliferation, strengthening the trends toward nuclear disarmament in great power relations. As they work to eliminate potential incentives for other states to develop nuclear weapons, the great powers can also work to coordinate their own policies and build confidence concerning their own ambitions.

### DOES NUCLEAR PROLIFERATION HAVE A FUTURE?

This book sets aside the traditional proliferation “hard cases” that gain the lion’s share of scholarly attention to explore the reasons why several states have turned away—at least for now—from the opportunity to acquire a nuclear arsenal. We offer no general theory to explain why states might choose to acquire a nuclear capability. Most of our authors are guided by the realist assumption that governments will acquire a nuclear arsenal when they believe that it will improve their security.<sup>13</sup> Etel Solingen in Chapter 8 of this book uses a political-economic model to explain various countries’ nuclear trajectories.<sup>14</sup> According to this approach, leaders or ruling coalitions advocating economic growth through integration in the global economy (“internationalizers”) have incentives to avoid the costs of nuclearization because a nuclear weapons program impairs domestic economic and political reforms favoring internationalization, including macroeconomic and political stability, economic reforms, and efforts to enhance exports, economic competitiveness, and global access.

A few other of our authors deliberately utilize a “nuclear mythmaking” approach that highlights the beliefs that link the acquisition of nuclear weapons or other types of weapons of mass destruction to the state’s enhanced security or influence. According to this perspective, a state is likely to seek nuclear weapons when national elites (*nuclear mythmakers*) who support this strategy: (1) emphasize their country’s insecurity or its poor international standing; (2) portray this strategy as the best corrective for these problems; (3) argue for the political, economic, and technical feasibility of acquiring nuclear weapons; (4) successfully associate these beliefs and arguments (*nuclear myths*) with existing cultural norms and political priorities; and, finally, (5) convince senior decision-makers to accept and act on these views.<sup>15</sup> As several authors of this book

illustrate, competing myths also may exist and are spread by similar mechanisms. Thus if enterprising and well-connected strategic elites manage to cultivate a national—or at least a governmental—consensus that acquiring nuclear weapons would make the state *less* secure or *less* influential, then the government is not likely to initiate or continue to invest in a nuclear bomb program. At any given time and in any given country, multiple strategic myths may coexist and compete with one another.

In fact, most of the authors of this volume take an empirical approach by identifying the reasons national leaders and governments abandon their nuclear ambitions. The contributors identify the strategic, political, and economic factors that shift national calculations away from the decision to go nuclear. These factors constitute the underlying trends that produce positive developments in the realm of nuclear nonproliferation. If these strategic and political factors evaporate, one might expect that the governments in question could reassess their decision to forgo nuclear weapons, a situation that could spark a fresh round of proliferation. In each of the cases we consider, there are active debates (some relatively open but most quite secret) about developing or redeveloping a nuclear arsenal.

Identifying the factors that shape positive outcomes can improve the ability to estimate the likelihood of future proliferation threats. Early warning that a government might reassess its non-nuclear posture could help the international community take the steps necessary to reverse a deteriorating local or regional strategic setting. The book also alerts policymakers and scholars alike to the fact that people in and around the governments considered here are thinking about their nuclear options, despite the fact that they are not actively pursuing a nuclear capability.

Our first group of contributors—Katsuhisa Furukawa, Arthur Ding, James Russell, Michael Malley, Tanya Ogilvie-White, Etel Solingen, Isabelle Facon, Noel Stott, and Andrew Selth—examine several states that have little in common other than the fact that they possess at least a rudimentary nuclear infrastructure and have at some point made the decision to abandon or not to acquire a nuclear weapons capability. Two of these states—Taiwan and Japan—have significant nuclear capabilities. Japan is often described as a state that could even acquire a modern, lightweight fusion weapon and long-range ballistic missile delivery system within months of a political decision to go nuclear. South Africa and Ukraine actually possessed nuclear weapons, deciding to abandon their arsenals when their leaders found themselves in fundamentally

different strategic and political settings. Libya had launched a program to develop a nuclear weapon, but its leaders apparently decided to drop the project when international efforts at dissuasion ramped up following the Second Gulf War. All of these states have attracted some scholarly attention because they once posed or continue to pose a potential for nuclear proliferation.

Those concerned with nuclear proliferation often overlook other states for the very reason that they seem unlikely to exploit their commercial nuclear industries or appear uninterested in developing a nuclear weapon. The governments of Saudi Arabia, Burma, Vietnam, Indonesia, Argentina, Brazil, and Venezuela all possess nuclear infrastructures, and all have at times expressed some degree of interest in further developing their nuclear industries. What keeps these states from more vigorously pursuing their nuclear option? Is it wrong for scholars to take this nuclear restraint for granted? Our contributors describe the nuclear debate in these countries and how governments weigh incentives and disincentives when it comes to developing a capability to build nuclear weapons.

Our second set of contributors describe policies and events that can shape perceptions of the utility of a nuclear arsenal. One emerging issue is an ongoing revolution in the biological and life sciences that is creating the potential for new kinds of biological weapons. As Michael Moodie observes, the widespread availability of these new technologies, especially to nonstate actors, could create an incentive to acquire nuclear weapons to bolster deterrent or even war fighting capabilities. Perceptions of the desirability of acquiring nuclear weapons also can be altered by so-called proliferation shocks, setbacks to the international nonproliferation agenda. Given the continued presence of proliferation "hard cases," Lewis Dunn suggests that it might be prudent to develop plans to exploit these setbacks to strengthen the nonproliferation regime. Chris Ford also explores the way the existing nonproliferation regime can be used to help alter perception of the utility of developing a nuclear arsenal, while Bruno Tertrais explores the role of positive and negative security guarantees in deterring the proliferation of weapons of mass destruction. With an eye toward drawing lessons for the future, Wyn Bowen also describes the diplomatic and intelligence resources brought to bear by the British and U.S. governments to persuade Libyan officials to abandon their chemical, biological, and nuclear weapons programs.

Viewed as a whole, our volume seeks to identify the types of considerations that have led various governments and policymakers to forgo the nuclear option, while suggesting several kinds of policies that can reinforce these percep-

tions, even in the face of inevitable setbacks to the nonproliferation regime. Our volume thus highlights a key issue in world politics by not treating the decision against acquisition of nuclear weapons as irreversible. Our authors agree that this is not a valid assumption because the strategic and political setting that fostered a specific decision can change, and because scientific and industrial capabilities are constantly advancing. A weapon that was once at the cutting edge of science and technology now appears increasingly within reach of relatively limited programs. And, when held up to close scrutiny, it becomes apparent that in several cases, the decision to abandon a nuclear weapons program was highly contested and controversial. Nuclear advocates still constitute a vocal minority in many “disarmed” polities. And with shifting security circumstances or domestic political fortunes, these minority positions and proponents might yet come out on top.

## NOTES

1. Remarks by President Barak Obama, Hradcany Square, Prague, Czech Republic, April 5, 2009, [http://www.whitehouse.gov/the\\_press\\_office/Remarks-By-President-Barack-Obama-In-Prague-As-Delivered/](http://www.whitehouse.gov/the_press_office/Remarks-By-President-Barack-Obama-In-Prague-As-Delivered/); and George P. Shultz, William J. Perry, Henry Kissinger, and Sam Nunn, “A World Free of Nuclear Weapons,” *Wall Street Journal*, January 4, 2007, A15.
2. Ivo Daalder and Jan Lodol, “The Logic of Zero: Toward a World without Nuclear Weapons,” *Foreign Affairs*, 87, No. 6 (November–December 2008): 80–95.
3. Lewis A. Dunn, “Can al Qaeda Be Deterred from Using Nuclear Weapons?” Center for the Study of Weapons of Mass Destruction, National Defense University, Occasional Paper 3, July 2005, available at [http://www.ndu.edu/WMDCenter/docUploaded/206-186\\_CSWMD\\_OCP3WEB.pdf](http://www.ndu.edu/WMDCenter/docUploaded/206-186_CSWMD_OCP3WEB.pdf).
4. Jeremy Bernstein, *Nuclear Weapons: What You Need To Know* (Cambridge: Cambridge University Press, 2008), 255–81.
5. William C. Potter, “Nuclear Terrorism and the Global Politics of Civilian HEU Elimination,” *Nonproliferation Review*, 15, No. 2 (July 2008): 135–58.
6. James Clay Moltz, “Future Nuclear Proliferation Scenarios in North East Asia,” *Nonproliferation Review*, 13, No. 3 (November 2006): 591–604.
7. Shlomo Brom, “Israeli Perspectives on the Global Elimination of Nuclear Weapons,” in *Unblocking the Road to Zero: Perspectives of Advanced Nuclear Nations*, ed. Barry Blechman (Washington, DC: Henry L. Stimson Center, 2009), 47.
8. Geoffrey Blainey, *The Causes of War* (New York: Free Press, 1973), 1.
9. James J. Wirtz, “United States: Nuclear Policy at a Crossroads,” in *The Long Shadow: Nuclear Weapons and Security in 21st Century Asia*, ed. Muthiah Alagappa (Stanford: Stanford University Press, 2008), 111–33.



10. U.S. Department of State, “New START,” <http://www.state.gov/t/avc/newstart/index.htm>.

11. Although the term “arms race” is often used as a pejorative term for virtually any expenditure on defense, it implies a self-sustaining, “action-reaction” phenomenon. In reality, this type of event is relatively rare in world politics. See Grant T. Hammond, *Plowshares into Swords* (Columbia: University of South Carolina Press, 1993).

12. Lewis A. Dunn, “Countering Proliferation: Insights from Past Wins, Losses, and Draws,” *Nonproliferation Review*, 13, No. 3 (November 2006): 483.

13. Realism—or, more accurately, neorealism—expects states to balance against the most serious military threats to their security; rarely do they *bandwagon*, or appease their adversaries. States can try to balance “internally” by relying on their own military capabilities or “externally” by relying on the military capabilities of allies. Defense planners generally prefer internal balancing because it leaves less to chance and less to the will of others; however, this strategy, especially when it comes to developing nuclear weapons, requires levels of national will and resources beyond the reach of most countries. See Kenneth N. Waltz, *Theory of International Politics* (New York: Random House, 1979), 128, 168; and John J. Mearsheimer, *The Tragedy of Great Power Politics* (New York: W. W. Norton, 2001), 156–57.

14. This argument is developed fully in Etel Solingen, *Nuclear Logics: Contrasting Paths in East Asia and the Middle East* (Princeton, NJ: Princeton University Press, 2007).

15. This approach is developed more fully in Peter R. Lavoy, “Nuclear Proliferation over the Next Decade: Causes, Warning Signs, and Policy Responses,” *Nonproliferation Review*, 13, No. 3 (November 2006): 433–54.