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1

Introduction

Just after midnight on September 6, 2007, four Israeli F-15s and four F-16s screamed low over the desert and leveled a nondescript structure in the Syrian hinterland on the banks of the Euphrates River.[1] For years, American and Israeli intelligence satellites had noted the building but were not overly concerned—the "cube," as it was known, was undefended. There were no suspicious traffic patterns or activity, and the facility was littered with debris, making it appear like one of the many abandoned structures in the area. There was nothing to suggest that the Syrian government even cared about the building. Not until an Israeli intelligence operation in March 2007 copied the contents of a laptop belonging to the head of Syria's Atomic Energy Agency did the Israelis learn that the "cube"—officially called al Kibar—was in fact a replica of North Korea's Yongbyon nuclear reactor. The eponymous cube was a superstructure to conceal what lay underneath from satellites passing overhead: a nearly complete graphite-moderated nuclear reactor. With no visible evidence that it was designed to ever plug into Syria's electrical grid, American and Israeli intelligence concluded that the building had only one purpose: to produce plutonium for a Syrian nuclear weapons program.

As a junior varsity member of the Axis of Evil, Syria's president Bashar al-Assad had reasonable grounds to fear that, without nuclear weapons, he might be an easy target for mid-2000s America on a regime-change binge.

1. See Amos Harel and Aluf Benn, "No Longer a Secret: How Israel Destroyed Syria's Nuclear Reactor," *Haaretz*, March 23, 2018, https://www.haaretz.com/world-news/MAGAZINE-no-longer-a-secret-how-israel-destroyed-syria-s-nuclear-reactor-1.5914407.

Nevertheless, the United States was stunned at Assad's sheer audacity: attempting to hide an *aboveground nuclear reactor* built with North Korean assistance, in the year 2007, knowing that America and Israel were continuously watching overhead. The Israelis took no chances and decided to destroy the building on September 6, risking a war with Syria to flatten the reactor. The strike likely occurred weeks before fuel elements were to be added to the reactor core making it "hot," after which it would have been nearly impossible to destroy without significant environmental damage. Syria, a member of the Nuclear Nonproliferation Treaty (NPT) in otherwise good standing, was attempting to pursue a clandestine nuclear weapons program in the most creative and brazen way possible. Syria's nuclear program, though it was ultimately thwarted, illustrates that the way states pursue nuclear weapons rarely resembles the American Manhattan Project or China's determined state-mobilized effort to build the bomb. This is a book about these different strategies of nuclear proliferation and why they matter.

There are two core questions motivating the book. First, how do states pursue nuclear weapons and why do they select a particular strategy of proliferation over the alternatives? Second, how do their choices of strategy affect nuclear proliferation and conflict dynamics? This is the first book to systematically analyze how states seek nuclear weapons, identifying the strategies available to them, and why they choose a particular strategy to do so. It shows that nuclear aspirants' strategic choices follow a clear logic and have important consequences for nuclear proliferation and conflict. Different strategies of proliferation have different likelihoods of success and provide different vulnerabilities that can be leveraged by nonproliferation policies to try to stop states from attaining nuclear weapons. As the world finds itself in a new nuclear era now thirty years after the end of the Cold War, understanding the dynamics and consequences of the proliferation process—which strategies of proliferation are available to states, which strategy a nuclear aspirant might select and why, and what the international community can do to thwart nuclear proliferation depending on the aspirant's strategy—is critical to global security.

The proliferation literature to date has almost exclusively focused on the question of why states pursue nuclear weapons. The question of how states pursue nuclear weapons, once choosing to do so, has received less attention. To the extent that scholars considered it, they have focused on the technical choices states made rather than on political choices and strategies of proliferation. Most scholarship on nuclear proliferation further assumes that states pursuing nuclear weapons prioritize speed of development and attainment over all else—a strategy I call *sprinting*. When nuclear pursuers

stop short of a functional arsenal, scholars often assume that technological barriers or external pressure impeded them.

I correct these misconceptions. I show that states choose from four discrete strategies of proliferation and that the logic that leads them to one of these strategies has little to do with resource constraints. States that seek the bomb—or develop an option to seek it in the future—approach the problem with ruthless pragmatism, weighing their domestic and international constraints and opportunities. Security considerations motivate a state to consider developing a nuclear weapons option, but I highlight the crucial role of domestic political consensus in driving a state toward an active nuclear weaponization strategy. My theory emphasizes the degree to which proliferators anticipate attempts by outsiders to frustrate their efforts. Fear of preventive action drives many of their calculations. The danger of prevention leads proliferators to seek creative alternative strategies to develop nuclear weapons: some cultivate or exploit the protection of great powers who can deter or dissuade adversaries from mounting preventive attacks on the proliferator, while others attempt to hide their proliferation from the outside world with a clandestine nuclear weapons program.

What are these different strategies of nuclear proliferation available to states? The first part of the book offers a novel typology of nuclear proliferation strategies, which I call *hedging*, *sprinting*, *sheltered pursuit*, and *hiding*. Some states, such as Japan and Sweden, choose to *hedge* on their potential path to attaining nuclear weapons, seeking not the rapid development of a nuclear weapons capability but rather to put the pieces in place to weaponize at a later date if necessary. I show that hedgers do not hedge in uniform ways or for uniform reasons. My theory offers insights into what might trigger a particular type of hedger—I differentiate between technical hedging, insurance hedging, and hard hedging—to choose to exercise its nuclear weapons option. Hedgers do not fail to develop nuclear weapons; they intentionally choose to not try, yet. Identifying hedging as a proliferation *strategy*—unpacking it into its various forms, locating it on the continuum of the proliferation process, and identifying the circumstances that will make hedgers resume their pursuit of the bomb or make a U-turn—rather than treating it as a disconnected phenomenon is an important contribution of the book.

For states seeking nuclear weapons, rather than just a future option, there are three active strategies of proliferation. The early nuclear proliferators such as the Soviet Union, France, and China were *sprinters* that sought to build nuclear weapons as quickly as possible, trying to match the first-mover, the United States. Others, like Israel and Pakistan and North

Korea, leveraged the complicity of a superpower patron to adopt a *sheltered pursuit* strategy, which exploits forbearance from a more powerful state as a shield against nonproliferation efforts. Other states, such as Iraq and Syria who cannot avail themselves of a major power shelterer, have no choice but to pursue a *hiding* strategy, prioritizing secrecy over speed and aiming to present their completed nuclear weapons as a fait accompli to the world. This book is the first effort to systematically identify the various strategies of proliferation available to nuclear aspirants, showing that states pursue nuclear weapons in distinct ways.

Why do states choose a particular proliferation strategy over the available alternatives? I develop a decision-theoretic framework, Proliferation Strategy Theory, identifying a sequence of security and domestic political variables to explain why a state selects a specific nuclear proliferation strategy. I apply this framework to explore empirical cases of each proliferation strategy, often leveraging primary documents and data to highlight novel features of states' proliferation journeys. I use the framework to generate a proliferation strategy prediction for each of the 29 states that have pursued nuclear weapons (46 total strategies including over-time shifts) and find that the framework accurately predicts over 85 percent of all nuclear proliferation strategies since 1945. Subsequent chapters provide detailed case studies on almost twenty of these nuclear aspirants, those that provide crucial variation in the independent and dependent variables showing why states select the strategies they do, and why they may shift strategies.

The chapter on varieties of hedging includes what I call *technical hedgers* such as Brazil and Argentina that most closely resemble the concept of "nuclear latency," *insurance hedgers* such as Japan and West Germany who hedged against the possibility of American abandonment, and *hard hedgers* such as India, Sweden, and Switzerland who stopped short of weaponizing due to ambivalence or a lack of domestic political consensus in favor of nuclear weapons. States typically make the decision to hedge for strategic reasons. I demonstrate, however, that domestic political consensus in favor of nuclear weapons is the crucial regulator for shifting from hedging to an active proliferation strategy, as in the case of India's stilted march to nuclear weapons. This is an important revision to recent scholarship that veers toward one extreme or the other, with some scholars arguing that it is almost exclusively regime type that drives nuclear proliferation,[2] while others argue that security

2. See Jacques E. C. Hymans, *Achieving Nuclear Ambitions: Scientists, Politicians, and Proliferation* (Cambridge: Cambridge University Press, 2012).

considerations alone explain proliferation.[3] I argue that both are important, but in a particular sequence, with security threats providing the stimulus and domestic political consensus providing the momentum for nuclear weapons.

External protection or prevention at this stage can prove critical to whether the state ultimately attains nuclear weapons. For powerful states with the luxury to openly march for nuclear weapons without fear of prevention, *sprinting* for a bomb is the optimal proliferation strategy. Most states that are powerful enough to sprint, though, already possess nuclear weapons—the Soviet Union, China, and France, for example—although some potential sprinters such as Australia, Japan, and potentially Germany remain should they ever decide to pursue nuclear weapons. The remaining nuclear weapons aspirants are forced to be more creative. A preferable option, if it is available or if it can be cultivated, is building nuclear weapons under the *shelter* of a major power that shields the pursuer from outside pressure and refrains from applying any pressure itself. The major power essentially tolerates nuclear proliferation in pursuit of higher-priority geopolitical goals, while the proliferator attempts to weaponize before the shelter disappears. This is how Israel, Pakistan, and North Korea all successfully developed the bomb. The rest of the states who seek nuclear weapons—those that fear external coercion because they are likely the states the world least wants to possess nuclear weapons—have no choice but to hide and pursue nuclear weapons clandestinely. The very threats that motivate nuclear pursuit drive the program underground. *Hiding* is a high-risk, high-reward strategy that attempts to present the world with a nuclear fait accompli before the program is detected—as South Africa succeeded in doing—but risks military strikes if it is caught before it gets there, as Syria discovered.

Why are these strategies of proliferation important? First, states adopting different strategies experience differing rates of success in attaining nuclear weapons. Hedgers do not fail to attain nuclear weapons, for example. They simply have not actively tried, yet. Among active proliferation strategies, almost *half* of those states that have attempted to develop actual nuclear weapons have succeeded in doing so, with sprinters and sheltered pursuers reaching the finish line at very high rates. Hiders may fail at high rates, but the seduction of potentially succeeding as South Africa did motivates many to keep trying. The typology offers a valuable first cut at assessing the danger that a proliferation threat might come to fruition. Second, and

3. See Alexandre Debs and Nuno P. Monteiro, *Nuclear Politics: The Strategic Causes of Proliferation* (Cambridge: Cambridge University Press, 2017).

related, the typology and my explanation of what drives nuclear aspirants' choices offer hints as to how to stop different kinds of proliferators. Notably, in states that have not generated the domestic consensus for explicit weaponization, keeping domestic political consensus fractured is key to forestalling proliferation and keeping a hedger hedging. Third, the typology offers predictions about the likely consequences for international politics as a function of proliferation strategies. Hiders, for example, are especially dangerous and disruptive to the international system since they either successfully attain a nuclear weapons capability, irrevocably altering the global power structure, or they are discovered, potentially triggering military crises as external powers try to destroy a previously unknown clandestine nuclear weapons program. Indeed, pushing active hiders, such as Iran, back to hedging is in itself an important nonproliferation success, as I show in chapter 7. Given that the pool of likely future proliferators is dominated by potential hiders, the focus on hiders is especially important to understand the looming nuclear landscape. This book is therefore the first effort to identify the variety of proliferation strategies and analyze both their sources and their profound consequences for international security.

Existing Proliferation Scholarship: Focusing on Why, Not How

Why is a focus on strategies of proliferation so novel? First, the literature on nuclear proliferation since the end of the Cold War has generally focused on the *motivations* for state pursuit of nuclear weapons. Scott Sagan's landmark article outlined "three models in search of the bomb," three canonical motivations for nuclear weapons: security, prestige, and domestic politics.[4] Subsequent literature offered additional or refined motivations such as a state's political economy, more nuanced and sophisticated security dynamics, supply side temptations, and oppositional nationalism.[5]

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

5. T. V. Paul, *Power versus Prudence: Why Nations Forgo Nuclear Weapons* (Montreal: McGill-Queen's University Press, 2000); Etel Solingen, *Nuclear Logics: Contrasting Paths in East Asia and the Middle East* (Princeton: Princeton University Press, 2007); Matthew Kroenig, *Exporting the Bomb: Technology Transfer and the Spread of Nuclear Weapons* (Ithaca: Cornell University Press, 2010); Matthew Fuhrmann, *Atomic Assistance: How "Atoms for Peace" Programs Cause Nuclear Insecurity* (Ithaca: Cornell University Press, 2012); Stephen M. Meyer, *The Dynamics of Nuclear Proliferation* (Chicago: University of Chicago Press, 1984); Jacques E. C. Hymans, *The Psychology of Nuclear Proliferation: Identity, Emotions, and Foreign Policy* (Cambridge: Cambridge University Press, 2006); Nicholas

If we know why states might pursue nuclear weapons, however, do we automatically know how they might do so? No. This is the case for several reasons. First, as Sagan shows in an evaluation of the broader literature, and Mark Bell demonstrates with respect to the quantitative literature, the scholarship on why states initiate nuclear weapons pursuit has produced inconsistent and sometimes contradictory answers, yielding no generalizable theory as to which states might do so, and when or why.[6] Thus any inferences about how states might pursue nuclear weapons based on their underlying motivations may be dubious. Indeed, shifting the focus to strategies of proliferation—which endogenizes a state's level of desire for nuclear weapons (demand) and its ability to develop them (supply)—is not only important in its own right but may help integrate the presently disconnected literatures on the supply and demand for nuclear weapons.[7] Second, a review of the almost thirty cases of nuclear aspirants suggests that that there is little relationship between the motivations for nuclear pursuit and a state's ultimate choice of proliferation strategy. States that pursued nuclear weapons for security reasons might select the same strategy of proliferation as those that pursued them for status and prestige reasons. Likewise, states that have had security motivations for pursuing nuclear weapons have chosen every available strategy of proliferation. Therefore, although varying *intensity* of demand—how much a state wants nuclear weapons—is certainly important to the strategy of proliferation a state selects, with lower-intensity demand more likely to correlate with hedging strategies, the *source* of that demand—security, prestige, or domestic—matters less. That is, *why* states pursue nuclear weapons is largely independent of *how* they do so. The literature on why states want nuclear weapons—the overwhelming majority of the proliferation scholarship in the past quarter century—has little to say about how they may attempt to do so.[8]

Miller, *Stopping the Bomb: The Sources and Effectiveness of U.S. Nonproliferation Policy* (Ithaca: Cornell University Press, 2018); Alexandre Debs and Nuno Monteiro, "The Strategic Logic of Nuclear Proliferation," *International Security* 39, no. 2 (Fall 2014): 7–51. For overviews and evaluations of the literature on the causes of proliferation, see Scott D. Sagan, "The Causes of Nuclear Weapons Proliferation," *Annual Review of Political Science* 14, no. 1 (June 2011): 225–44; Jacques E. C. Hymans, "The Study of Nuclear Proliferation and Nonproliferation: Toward a New Consensus?" in *Forecasting Nuclear Proliferation in the 21st Century, Volume 1: The Role of Theory*, ed. William C. Potter and Gaukhar Mukhatzhanova (Stanford: Stanford University Press, 2010); and Mark S. Bell, "Examining Explanations for Nuclear Proliferation," *International Studies Quarterly* 60, no. 3 (September 2016): 520–29.

6. Bell, "Examining Explanations for Nuclear Proliferation"; Sagan, "The Causes of Nuclear Weapons Proliferation."

7. Sagan, "The Causes of Nuclear Weapons Proliferation," 227–36.

8. One exception is Hymans, *Achieving Nuclear Ambitions*.

Moreover, analyzing strategies of proliferation is novel because the extant literature on nuclear proliferation tends to treat nuclear pursuit as a binary, a-strategic process: states are either pursuing nuclear weapons or they are not, and those that are uniformly aim to weaponize a nuclear capability as quickly as possible. This literature assumes that all states with nuclear weapons programs invariably seek to create a functional arsenal as fast as technically possible. For example, Jacques Hymans's work on how efficiently states achieve their nuclear ambitions assumes that nuclear aspirants all try to develop a nuclear weapons capability as quickly as possible and vary only in their ability to manage the project and the process.[9]

These assumptions are not always true. For example, states including Japan, Sweden, and India at times have sought to put the pieces in place to weaponize at a later date if necessary but have consciously and strategically stopped well short of attaining nuclear weapons with a form of hedging strategy.[10] Their goal was not nuclear weapons but erecting a nuclear weapons program that could be activated and consummated at a time of their choosing if necessary. Hedgers can stall at this point for years, or indefinitely. Certainly, the early nuclear proliferators such as the United States, the Soviet Union, and China sought to weaponize as quickly as possible in a sprinting strategy. These are the stereotypical proliferators in the extant literature. But under 20 percent of the states that pursued nuclear weapons have followed their strategy. Some states may not prioritize speed but secrecy, pursuing a hiding strategy that aims to present a fait accompli before the program is discovered. Still others can leverage the complicity of a major power's knowledge of their program and adopt a sheltered pursuit strategy, which attempts to cultivate major power immunity to shield them from nonproliferation or counterproliferation efforts. Few states after the 1950s fit the archetype of the sprinters, trying to build nuclear weapons as quickly as possible. Many states seeking nuclear weapons may value considerations besides speed and outcomes besides a fully functional nuclear weapons arsenal. The existing literature has little to say about this variation.

Why does variation in strategies of proliferation matter? To begin with, a theory of how a potential nuclear aspirant goes about trying to seek nuclear weapons identifies additional opportunities and policy levers to halt nuclear weapons proliferation. How a state chooses to pursue nuclear weapons

9. Ibid.

10. E.g., Ariel E. Levite, "Never Say Never Again: Nuclear Reversal Revisited," *International Security* 27, no. 3 (Winter 2002/2003): 59–88; Avner Cohen and Benjamin Frankel, "Opaque Nuclear Proliferation," *Journal of Strategic Studies* 13, no. 3 (1990): 14–44.

matters as much as—if not more than—its underlying motivations when it comes to identifying and implementing policies to prevent nuclear proliferation. There are different *types* of nuclear proliferators, and the distinctions between them are important for scholars hoping to understand the proliferation landscape and for policymakers hoping to shape it. Understanding the different strategies of proliferation allows the international community to tailor inducements or punishment to try to dissuade or deter states from developing nuclear weapons. This book outlines these different strategies, develops a theory for why states might select one strategy over another, and demonstrates the power of the theory on a variety of cases. Three decades of scholarship on *why* states want nuclear weapons has neglected that *how* they pursue them has crucial implications for international security. This book thus opens new terrain in the proliferation literature by systematically analyzing how states pursue nuclear weapons and why strategies of proliferation matter to the nuclear landscape and international politics.

Why States Need to Think about Proliferation Strategies: Duress

Why do states have to carefully devise a strategy of proliferation? As the Syrian example demonstrates, states that pursue nuclear weapons often do so under duress. On average, nuclear proliferators, as they approach the point of weaponization, experience systematically more pressure—whether the threat of sanctions or military conflict—than they did prior to and after weaponization.[11] There are three reasons why this might be the case. First, of course, there may be some reverse causality where increased levels of duress further motivate pursuit of nuclear weapons. Second, as states approach the point of weaponization, other states might have motivations to destroy a state's nascent nuclear capabilities.[12] Third, anticipating the attainment of nuclear weapons or in the immediate aftermath of attaining them, proliferators might become emboldened, relying on ambiguous or limited capabilities to deter retaliation.[13] These are often treated as distinct mechanisms,

11. David Sobek, Dennis M. Foster, and Samuel B. Robison, "Conventional Wisdom? The Effect of Nuclear Proliferation on Armed Conflict, 1945–2001," *International Studies Quarterly* 56, no. 1 (March 2012): 149–62.

12. Matthew Fuhrmann and Sarah Kreps, "Targeting Nuclear Programs in War and Peace: A Quantitative Empirical Analysis, 1941–2000," *Journal of Conflict Resolution* 54, no. 6 (December 2010): 831–59.

13. See Mark S. Bell, "Beyond Emboldenment: How Acquiring Nuclear Weapons Can Change Foreign Policy," *International Security* 40, no. 1 (Summer 2015): 87–119.

but they are related to each other. Proliferators that others fear might be emboldened are more likely to be the potential target of greater coercive or preventive efforts. Similarly, these efforts might trigger greater emboldenment or aggression by the proliferator. This is not a new phenomenon. The historical record is dotted with conflicts where targeting nuclear weapons programs was salient: the 1967 Arab-Israeli Six Day War, episodes in 1984 and 1986–87 where India contemplated using a broader conflict to target Pakistan's uranium enrichment facility, Israeli strikes against Iraq and Syria, and the multiple wars with Iraq.[14] For potential nuclear aspirants, such as Libya and Iran, these examples can be powerful demonstrations of what may be awaiting them if they try to pursue nuclear weapons against the will of major powers.

The pursuit of nuclear weapons can therefore result in substantial international turbulence and conflict. There is a "window of volatility" for proliferators that becomes pronounced in the decade prior to weapons attainment and that seems to last until a decade after. To illustrate the extent of this duress on the most extreme indicator—military conflict—I show that a state experiences systematically more military conflict as it approaches the point of weaponization. This analysis understates the true level of duress a proliferator faces on average, because it does not include other forms of pressure a state may experience, such as economic threats or military harassment that falls below the militarized threshold. I align all non-superpower nuclear possessors by their date of nuclear possession (normalizing that date as t_0) and plot the level of conflict that they experience in the two decades prior and subsequent to achieving a nuclear capability, using militarized interstate disputes (MIDs) as a reasonable indicator for conflict.[15] This approach takes the point of nuclearization as the uniform moment to assess conflict levels for proliferators, so it normalizes China in 1964 with, for example, Pakistan in 1987 to observe conflict levels across the proliferation process.[16]

14. Also see Muhammet Bas and Andrew J. Coe, "A Dynamic Theory of Nuclear Proliferation and Preventive War," *International Organization* 70, no. 4 (Fall 2016): 655–85.

15. Dates are from Philipp C. Bleek, "Does Proliferation Beget Proliferation?: Why Nuclear Dominoes Rarely Fall" (PhD diss., Georgetown University, 2010), appendix A, http://hdl.handle.net/10822/558060. I exclude the United States and USSR here because they had wartime proliferation programs, and the number of MIDs around their programs is artificially high.

16. This approach necessarily restricts the sample to nuclear states. In theory, this bias favors the null hypothesis because these are the successful proliferators; those states whose programs were terminated by the counterproliferation efforts of others are not included but would strengthen the results.

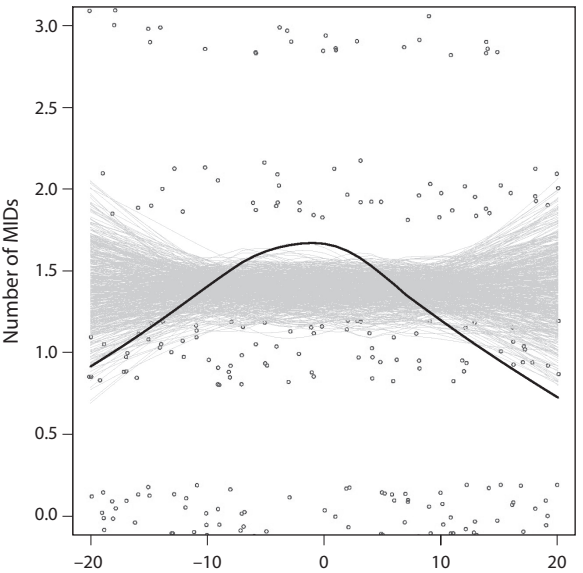

FIGURE 1.1. Window of Volatility. This illustrates the relationship between armed conflict and nuclear proliferation, where t_0 is the point of attainment (bold line). Compared to conflict levels twenty years prior to, and subsequent to, weaponization, states face an average of one additional armed dispute per year. This uses randomization inference and 500 random draws (light lines) from the reference distribution under the null hypothesis ($p < 0.001$).

I use randomization inference, which tests the sharp null hypothesis that there is no relationship between nuclearization and conflict level for any unit through many random draws. Compared to the null hypothesis, figure 1.1 shows a significant and substantively large relationship between the proliferation process and conflict levels.

States pursuing nuclear weapons thus face more average armed conflict through the *process* of nuclear proliferation.[17] Nuclear proliferation can be a rough process for the international system and the proliferator. Potential proliferators must therefore carefully decide *how* to pursue nuclear weapons and succeed in developing them under this duress. That is, they must carefully choose a strategy of proliferation that tries to minimize their exposure to pressure. This book is about how states think about their strategies of nuclear proliferation given their domestic and international constraints and opportunities, as they navigate this potential window of volatility.

17. The results in figure 1.1 are robust to different attainment dates, removing any one regional nuclear power, MIDs 4.0. Contact author for any desired robustness checks.

Plan of the Book

The book is organized as follows. Chapter 2 identifies the various strategies of proliferation available to states and develops a decision-theoretic framework to explain why a given state might select a given strategy at any point in time, based on a clear sequence of systemic and domestic political variables. The theory generates a determinate prediction for whether a state will select a variety of hedging—technical, insurance, or hard hedging—or an active nuclear proliferation strategy: sprinting, hiding, or sheltered pursuit. This chapter makes a substantial theoretical contribution by providing a testable and falsifiable theory for why states might select a particular strategy of nuclear proliferation, giving insights into future potential proliferators and which strategies they may select and which variables might be manipulated to possibly stop them.

After conducting a full analysis in tabular form in chapter 2, the empirical chapters that follow perform a medium-n analysis covering 19 of the 29 nuclear aspirants thus far, testing the theory against several alternative explanations such as technological determinism, a rigorous (realist) security model, and international nonproliferation regime explanations for state behavior. I focus on key cases in each of the empirical chapters to highlight novel mechanisms and illustrate important variation across the independent or dependent variables. The cases are not randomly selected but chosen because they are important cases of proliferation that highlight key theoretical mechanisms or offer novel historical value. These chapters demonstrate the power of the theory by identifying and establishing the crucial variables that pushed states to select a particular strategy of nuclear proliferation. These chapters provide substantial empirical value. I offer the first systematic coding of strategies of proliferation, providing an original framework to analyze the 29 states that have pursued nuclear weapons—and those that may pursue them in the future—and illuminate key and novel features of their proliferation experiences. Where possible, I present new or primary data to best understand the strategic decisions nuclear aspirants and great powers such as the United States made during the proliferation process.

Chapter 3 focuses on the varieties of hedging. As I highlighted at the outset, hedging is an important waypoint in the proliferation process. States often consciously choose variants of it for strategic reasons—seeking not the bomb but a bomb option. I present new and primary data on hard hedgers such as India, Sweden, and Switzerland, insurance hedgers such as Japan and West Germany, and technical hedgers including Brazil and Argentina. These

cases show why hedging is central to the proliferation process as some, like India, opt to resume their quest for nuclear weapons, while others such as Sweden and Switzerland forswear them entirely, and still others like Japan may remain idle at the hedging stop indefinitely. Chapter 4 presents the case of the sprinters, the stylized version of proliferation in the literature: the states who openly and quickly marched to nuclear weapons without fear of prevention or reprisal. Chapter 5 centers on three important sheltered pursuers—Israel, Pakistan, and North Korea—who probably would not have been able to develop nuclear weapons if not for the shelter afforded them by the major powers that valued these countries for more important geopolitical reasons and essentially turned a blind eye to their development of nuclear weapons and shielded them from nonproliferation efforts. Chapter 6 focuses on three crucial hiders: Iraq, Taiwan, and South Africa. These cases illustrate how allied abandonment can generate proliferation pressures and, even though Taiwan was unsuccessful in eventually hiding its nuclear weapons program, it highlights the need to remain vigilant against potential hiders—both adversaries and allies alike. South Africa is a case of a successful hider, showing that it is indeed possible even against immense intelligence capabilities—both the United States and Soviet Union opposed South African nuclearization—to successfully build nuclear weapons through hiding under the right conditions. The case of Iraq shows how disruptive hiders can be to the international system as Iraq's clandestine program in the 1980s set the stage for two decades of tumult and conflict—once he was suspected of being a hider, Saddam Hussein was presumed to always be a hider.

The penultimate chapter focuses on the consequences of these choices. First, which strategies are more likely to successfully lead to nuclear weapons? This chapter highlights the variation in successful nuclear proliferation as a function of strategy, showing that although sprinting rarely fails for those who select it, sheltered pursuit is also a particularly successful strategy, with profound implications for future nuclear proliferation and the major powers that may extend shelter and tolerate additional nuclear states. Second, what are the different nonproliferation consequences of these strategies? What are the key variables that have been, and can be, manipulated to successfully halt states from attaining nuclear weapons depending on which strategy they select? Finally, what are the consequences for international conflict? In particular, hiding is a very disruptive strategy. An effective hider, such as a South Africa, can entirely bypass the so-called window of vulnerability identified earlier and substantially improve its global power position. But a hider that is caught, like Iraq or Syria, can generate very high likelihoods of preventive

conflict and war. Knowing which states might be hiders, then, helps highlight future potential flashpoints for conflict and war. It also highlights why diplomatic initiatives, such as the 2015 Joint Comprehensive Plan of Action (JCPOA) between Iran and the so-called P5+1 that pushed Iran back from hiding to hard hedging by attempting to empower moderates in Tehran who opposed nuclear weapons, are such important nonproliferation successes.

This book is the first systematic attempt to analyze the diversity of strategies of nuclear proliferation, their sources, and their consequences. It shows that states have systematically selected *different* strategies to try to attain nuclear weapons, and that these choices matter deeply to international security. It advances scholarship on nuclear proliferation by opening new terrain, showing that although why states want nuclear weapons is undoubtedly important, how they go about pursuing nuclear weapons is fundamental to the global nuclear landscape. Understanding this dynamic is crucial for the United States as it confronts the increasing possibility that a growing number of states—friends, foes, and frenemies—may pursue nuclear weapons in the future.

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