

Nuclear Proliferation: The Risks of Prediction

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Abstract and Keywords

This chapter reviews existing theoretical tools for predicting proliferation or nonproliferation, spanning a range of agents across levels of analysis. It then distills relevant considerations for exploring future scenarios in East Asia. The region provides a good laboratory for understanding failed past predictions and for identifying conditions for potential transformations of its nuclear order. The final section extracts lessons for relying on cutting edge scholarship to map out proliferation futures. A promising research agenda attentive to complex systemic effects, dynamics of the global economy, regime survival, norms and institutions has replaced older accounts. Yet a unified field theory capable of predicting proliferation may not be in our grasp.

Keywords: nuclear proliferation, weapons of mass destruction, prediction, forecasting, North Korea, East Asia

25.1 Introduction

THIS Handbook's editors invited contributors to think about the future of international security while identifying key agents, processes, and structural drivers of transformation. This is a tall order. This chapter organizes the existing literature on nuclear proliferation accordingly. Section 25.2 briefly reviews existing theoretical tools for predicting proliferation or nonproliferation, spanning a range of agents (states, regimes, dominant coalitions, and individuals), structures, and processes. Section 25.3 distills relevant considerations for exploring future scenarios in East Asia, a good laboratory for understanding failed past predictions and conditions for potential transformations of its nuclear order. Section 25.4 concludes with an assessment of where the field stands in its potential for estimating proliferation trends.

25.2 Theoretical Tools for Predicting Nonproliferation

25.2.1 Neorealism

Neorealism was once the orthodoxy for explaining why some states seek nuclear weapons and others renounce them. Its foremost exponent, Kenneth Waltz, considered it unwise to lump his theory, offering specific predictions on the topic, with other versions of neorealism. Waltz identified an anarchic international structure as the dominant driver of nuclear behavior, and states as the key agents responding to those constraints. (p. 366) While anarchy arguably renders all states insecure—compelling self-help—nuclear weapons provide security, stability, and diminished chances of war. Alluring for its simplicity, this theory provides valuable insights, explains some cases reasonably well, and retains some *prima facie* appeal (Solingen 2007: 26–9). Yet its dominance has been challenged. As the “most likely” explanation, neorealism should effortlessly crowd out other theories yet it competes with them heavily in what should be its best arena for empirical validation. Three major problems stand out.

First is the massive and growing set of empirical anomalies:

- Anarchy, uncertainty, and self-help apply to most if not all states, yet most have not developed nuclear weapons; indeed, an overwhelming majority has renounced them.
- Even more modest predictions by Waltz—18 to 30 nuclear weapons states—have not materialized
- Several acutely vulnerable states have *not* gone nuclear, even when rivals did (e.g. Egypt, Vietnam, but also Japan, South Korea, and others)
- States without *existential* threats *contemplated* nuclear weapons (e.g. Argentina, Brazil)

When scholars attempt to deal with these anomalies, a second problem emerges, explanatory inconsistency:

- Hegemonic protection had disparate effects, with some renouncing nuclear weapons but not others.
- Alliances are insufficient for explaining nuclear abstention, with some allies abstaining but not others (e.g. Britain, France) (Waltz 1979, 1981)
- Many states restrained nuclear ambitions without superpower guarantees (e.g. Egypt, Brazil).
- Comparable structural conditions can (and have) lead to very different choices; multipolarity, for example, predicts increased nuclearization yet has led to different outcomes across time and space (e.g. East Asia, the Middle East).

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- States have shifted toward or away from nuclear weapons over time even absent major structural changes (e.g. Taiwan, South Korea).

These problems of explanation reveal deeper conceptual limitations:

- Unfalsifiability (many options can be made to fit vague notions of security maximization a posteriori).
- Under-determination (inconclusive corollaries lead to multiple possible outcomes); it fails to explain many cases easily, at high levels of confidence and parsimony, and is incomplete in explaining most others.

Other branches of neorealism more amenable to domestic considerations discussed in the next sections may partially alleviate some of these problems but only at the cost of (p. 367) parsimony, a feature that neorealism prizes highly. Over the last two decades some studies began challenging previously unquestioned confidence in this theory as the driving force of all nuclear decisions (Solingen 1994a, 1994b; Ogilvie-White 1996; Sagan 1996). This has led to new efforts to rectify some of the noted deficiencies (Debs and Monteiro 2016).

25.2.2 Neoliberal Institutionalism

Neoliberal institutionalist scholarship is far more sensitive than neorealism to states' ability to "mitigate the effects of anarchy, produce mutual gains, and avoid shared harm" (Jervis 1999: 45), and to their rational incentives to join international institutions that enhance information, enforce compliance, and serve their interests at lower costs than self-help. These institutional agents can arguably moderate brute power, and states' expectations of repeated institutional interactions can alter their strategic calculus (Axelrod and Keohane 1985). The nonproliferation regime (NPR) that emerged around its core Nonproliferation Treaty (NPT) has undoubtedly performed some of the functions attributed to such institutions.¹ As a presumed driver of non/proliferation, however, this institutional approach has important limitations, including:

- The NPR *may* mitigate but not eliminate security dilemmas.
- Several NPT signatories developed clandestine weapons programs (e.g. Iraq, North Korea).
- There are inconsistencies in non-compliance rulings (e.g. South Korea, Egypt).
- Regime imperfections and other considerations have kept states from joining the NPR (e.g. India, Pakistan, Israel).
- We lack systematic evidence that the NPR accounts for *all or most* cases of nuclear abstention, although we also lack systematic evidence to the contrary (Solingen 2007).²
- Potential selection bias warns against imputing excessive causal weight to the NPR; states may have joined for a wide range of reasons that were causally prior to joining the treaty (e.g. South Africa, Japan).

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- Causally prior drivers (in the direction of nuclear abstention) can also explain subsequent compliance better than fears of detection and punishment.
- The NPR is less than a stable bargain but rather one subject to challenges from various quarters (e.g. potential new proliferators, New Agenda Coalition on upholding the NPT's Article VI, the 2017 Treaty on the Prohibition of Nuclear Weapons, and others).

Because nuclear choices are highly sensitive to Prisoner's Dilemma situations and problems of collective action, a neoliberal institutionalist perspective does not constitute a "most likely" theory in this arena. And yet, the fact that the NPT is among the most highly subscribed international treaties compels its serious consideration as a source of nuclear restraint.

(p. 368) 25.2.3 Norms

Constructivist approaches draw attention to how international norms emerge and converge, emphasizing socialization and normative pressure (Finnemore and Sikkink 1998; Barnett and Finnemore 1999; Johnston 2001; Klotz and Lynch 2007). States arguably join institutions not simply as a function of a material cost-benefit analysis but also because they share common purposes and beliefs. The horrors of Hiroshima and Nagasaki led to important work by Schelling (1976, 2000) and Tannenwald (2007) on the emergence of a taboo explaining nuclear non-use. Efforts by others (Ruble 2009) to apply normative insights to explain non-acquisition are less persuasive for several reasons.³

- A large segment of the expert community has been socialized into the framework of canonical deterrence theory, which assumes that nuclear acquisition obviates use. If nuclear weapons are designed to prevent war, according to this worldview (Jervis 1989), then such weapons may conform to a consequentialist "conditional morality" (Nye 1988)
- Many states considered or pursued nuclear options even after Hiroshima and Nagasaki (not just Iran, Iraq, North Korea, Libya, and Syria but also Sweden, Switzerland, and many others).⁴
- Insufficient systematic evidence is available to ascertain that strong norms against acquisition have indeed taken root for all or most states.
- Proposals for universal nuclear disarmament, including some backed by prominent experts (e.g. Global Zero) have failed to yield fruit. The conclusion of the Nuclear Weapon Ban Treaty in 2017 is an important milestone but one facing innumerable challenges.
- There is overwhelming domestic support for nuclear weapons among nuclear weapons' states, and rising levels of support among some presumed to have been restrained by anti-nuclear norms (e.g. South Korea).
- All nuclear arsenals are undergoing modernization.
- Coercion, material dis/incentives and other rational factors are at play in many cases of abstention.

- Failure to specify the domestic politics explaining normative receptivity (Checkel 1997).

25.2.4 Domestic Models of Political Survival

All approaches discussed thus far suffer from a common omission: a proper theory stipulating why and how domestic politics underlie nuclear choices, modifying the impact of international power, institutional, or normative considerations. Internal disagreements over nuclear choices are empirical facts, suggesting that conceptions of threats are not simple derivatives of abstract balances of power. Particular leaders (p. 369) and regimes interpret and define “structural insecurity” differently. Furthermore, the latter should not be conflated with *regime* survival or insecurity. Nor can rational-institutional and normative dis/incentives regarding nuclear weapons be understood without reference to the relative domestic receptivity to either. What might explain such receptivity?

Models of regime survival stemming from competing orientations to the global political economy offer important clues for estimating nuclear choices since the NPT’s inception (Solvingen 1994a, 1994b, 2007). Leaders and supportive coalitions rely on two Weberian ideal-typical models to gain and retain power: internationalizing and inward-looking, respectively. Findings suggest that nuclear aspirants were more likely to emerge in domestic and regional contexts dominated by inward-looking models than in internationalizing ones. The two models entail different grand strategies, each with domestic, regional, and global referents. Inward-looking models stake their political survival on rejecting integration in the global economy and associated institutions inimical to their strategy. Hostile to international markets, foreign investment, and technology, these models favor economic protectionism, self-sufficiency, sprawling state enterprises, ancillary military-industrial complexes, and nationalism, policies that shield their constituencies. Inward-looking models are less keen on cooperative regions that both undermine allocations to those constituencies and deprive them from opportunities to promote hyper-nationalist myths.⁵ Such models thus incur fewer costs from exploiting nuclear weapons as tools in nationalist-protectionist platforms. There are strong synergies across the domestic, regional, and international pillars of their favored strategy. North Korea’s *juche* (autarkic) approach is archetypical but several Middle Eastern states have exhibited similar profiles.

Internationalizing models lowered the likelihood of nuclear weapons’ acquisition through several causal mechanisms. First, their emphasis on economic growth through global integration entailed strong incentives to avoid political, economic, reputational, and opportunity costs of nuclearization that could harm internationalizing objectives. Second, those objectives also required: resources for compensating constituencies adversely affected by economic openness; restrained military expenditures, lest they crowd out the resources needed for internationalizing the economy; expanded private economic activities; and lower barriers to trade and foreign investment. Third, these models also required a cooperative region not prone to nuclearization that would free up resources for domestic reform; reduce uncertainty; encourage foreign investment; and signal a commitment to sta-

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bility and growth. Nuclear weapons programs, by contrast, strengthen bureaucracies and industrial complexes opposed to such reforms; rattle neighbors and endanger their own reforms; and encumber efforts to promote exports, competitiveness, macroeconomic and political stability, and global access. Finally, internationalizing models endorse global rules and institutions that encourage their favored strategies. Nuclear abstention enhances synergies across those strategies' domestic, regional, and global pillars. East Asian states embraced variants of this model since the 1960s. Notably, after China's 1964 nuclear test under Mao's inward-looking model only North Korea acquired nuclear weapons.

(p. 370) Domestic models of political survival were omitted from the theoretical menu until recently despite their utility for weighing and re-ordering the relative importance of other drivers, including structural power, norms, and institutions. Those models explain synchronic variation in nuclear preferences across states and overtime variation within the same state; varying compliance with NPR commitments; varying readings of security dilemmas as more (or less) intractable; variance in ranking alliances higher than self-reliance or vice versa; variance in relative receptivity to external sanctions and inducements;⁶ why and when external coercion and inducements may be effective; and why nuclear designs were renounced where one might have expected them. Since 1968 every decision to renounce nuclear weapons by states that had entertained them was nested in broader shifts toward internationalizing models (e.g. post-Franco Spain, Sadat's Egypt, post-apartheid South Africa, Brazil, Argentina, South Korea, Japan, Taiwan, Libya in 2003, and several European powers). Most defiant nuclear courses unfolded under inward-looking models (Saddam Hussein, Muammar Qaddafi, the Kim dynasty, Ahmadinejad, Assad's Syria, and others). The two patterns find support across different regional security contexts and diverse associations with hegemon, yet important caveats and scope conditions should be noted:

- The association between respective models and nuclear choices is neither deterministic nor inevitable.
- Inward-looking models arguably provide necessary but insufficient conditions for seeking nuclear weapons.
- A region's center of gravity (internationalizing or inward-looking) can modify domestic preferences toward or away from nuclear weapons.
- Temporal sequences in nuclear weapons' acquisition matter: when nuclearization precedes the inception of internationalizing models (e.g. China, Israel), subsequent de-nuclearization may be harder. It is far more costly politically to abandon nuclear weapons than to cancel a program prior to fruition, as one might expect from prospect theory (McDermott 1998). Dis/incentives emanating from a global political economy arguably operate more forcefully at earlier stages both in the inception of internationalizing models and in the consideration of nuclear weapons.

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The expansion of quantitative studies has not ended contestation over the relative weight of the theoretical drivers reviewed thus far (Solingen and Wan 2017). Supply-side studies building on Meyer's (1986) landmark proposition that technological momentum inevitably leads to proliferation have yielded competing findings (Fuhrmann 2009; Kroenig 2009; Kemp 2014). Technological determinism exhibits significant anomalies including a substantial number of "most likely cases" that renounced nuclear weapons and "least likely cases" that pursued them (Solingen 2007). As Lewis (2016) argued, whether or not states decide not to acquire nuclear weapons has often far more to do with restraint than with technological barriers, given a 65-year-old technology. Studies considering neorealist variables differed in their conceptualization of security, the weight of enduring rivalries, the likelihood of "reactive proliferation," and the effect of security guarantees, (p. 371) among others (Singh and Way 2004; Jo and Gartzke 2007). Some studies argued that personalist regimes are more likely to pursue nuclear weapons (Ways and Weeks 2014); others that nonproliferation norms act most strongly on democratic or democratizing states (Mueller and Schmidt 2010). Yet most autocratic leaders have renounced nuclear weapons and abided by their NPT commitments; both democracies and autocracies have acquired nuclear weapons; and the outstanding non-NPT members are either stable democracies (India and Israel) or intermittently democratic (Pakistan).

Bell's (2015) sophisticated statistical study concluded that quantitative studies failed to offer strong explanations or predictions for proliferation patterns because they neglect indirect causal pathways that are difficult to capture; have little to say about those drivers' causal strength; include too many variables relative to the number of cases; rely on proxy variables that gauge underlying concepts poorly; and focus on different dependent variables (nuclear exploration, pursuit, acquisition). Hence, findings regarding weak correlations between many variables and proliferation offer no proof whatsoever that those variables indeed lack causal effects on proliferation and nonproliferation. Furthermore, wide discrepancies regarding the appropriate "universe of cases" exist, along with serious concerns that the typical "universe"—that is, nearly all states in the system—exacerbates heterogeneity and decreases validity (Debs and Monteiro 2016; Solingen and Malnight 2016). Statistical studies also ignore temporal effects, treating states as monolithic entities following continuous, coherent pathways. They often exclude contextual factors that are hard to capture, measure, or operationalize such as the role of the NPR (beyond membership), political-economy models (beyond trade ratios), or perceptions of status (beyond capacity). Endogeneity is rampant and the dominant direction of causality often unclear. Some of these shortcomings can afflict qualitative studies as well. The lack of consensus across theoretical and methodological studies suggests that the task of predicting nuclear futures—as nuclear weapons themselves—is pregnant with risk.

25.3 Japan's Enigma and Proliferation Scenarios in East Asia

East Asia is an especially appropriate focus for this chapter's assignment: the region's trajectory has failed to conform to various theories; offers "crucial cases" for testing them; and has been a focal point as a proliferation-prone region. Suggesting that Japan and South Korea might be better off with their own nuclear weapons, President Donald Trump exacerbated such concerns, but they are not new. Waltz and others predicted decades ago that Japan was highly likely to acquire nuclear weapons,⁷ and that such development does not break alliances apart: "Great powers ... must expect to take care of themselves" and "How long can Japan ... live alongside other nuclear states while denying [itself] similar capabilities?" (Waltz 1993: 66, 2000: 34). Even strong supporters (p. 372) of the alliance in Japan sustained concerns with US commitments. Makoto Momoi, former head of Japan's Defense Research Institute, referred to the alliance as "a Bible. You may know every word in it, and believe it to be true, but can you really be sure of salvation?"⁸ After Nixon's trip to China (without consulting Japan) Momoi added: "you can say that we've put the Bible away. It's something around the home, but the children don't read it any longer." In an anarchic neorealist world, concerns with alliance commitments could never be fully put to rest. As a Japanese vice-admiral once put it, "the nuclear umbrella held by the U.S. must surely be useful, but for complete faith there is the nuclear umbrella opened by oneself."

Such predictions notwithstanding, Japan has not acquired nuclear weapons as of mid-2017, an outcome especially incompatible with the premise that states do best by relying on their own deterrent. What makes this abstention an even more difficult anomaly for neorealism is that Japan has witnessed—over six decades—the nuclearization of no less than three of its neighbors (the Soviet Union, China, and a rabid North Korean regime that conducted six nuclear tests). With so many thresholds crossed, imminent predictions that Japan would go nuclear should have come to pass. Nor was Japan's abstention the product of US coercion; there was no strong Japanese demand for nuclear weapons that required US pressure to halt it. Nixon's 1969 "Guam doctrine" called for greater self-reliance by Asian allies and unleashed a renewed sense of abandonment by the United States. Nixon even suggested to Premier Sato in 1972 that Japan faced an unacceptable choice to either develop "its own deterrent power however unpalatable vis-à-vis its neighbors, who are armed with nuclear weapons, or ... come to an accommodation with them" (Solingen 2007: 61) and the United States exerted no pressure on Japan to ratify the NPT.

Japan's nuclear abstention does not provide strong support for neoliberal institutionalism either. There is little evidence that the nascent NPT played any role in its critical 1970s decisions. Nor did the NPR's institutional failures—notably regarding North Korea—alter those decisions. A norms-based approach tracing abstention to Hiroshima and Nagasaki may explain the rise of some pacifist constituencies. Yet the "nuclear allergy" was far from strong when Japan delayed signing the NPT by 18 months; attached an unusual ad-

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dendum to its signature, taking note of Article X allowing legal withdrawal three months after notification; delayed ratification by nearly *seven* years; and conducted various studies on nuclear options. All these, as well as surveys and archives, provide enough evidence that Japan did not consider nuclear weapons' acquisition an "unthinkable" taboo at the time of its crucial decisions (Samuels 1996; Solingen 2007). Premier Sato was awarded the Nobel Peace Prize for Japan's 1967 Three Non-Nuclear Principles (NNP, not to possess, manufacture, or introduce nuclear weapons into Japan's sea or air). Yet Sato also conveyed to Ambassador Reischauer explicitly—and to Keidanren leaders—his personal preference for a nuclear Japan. Indeed the NNP never became law and contestation regarding Article 9 of the Constitution (renouncing the right of belligerency but not explicitly "defensive" nuclear weapons) persists. Embracing the US nuclear umbrella did not precisely signal nuclear abstinence either. Japan informed the International Court of Justice in 1994 that it did not necessarily view (p. 373) nuclear weapons' use as illegal. Nor did Japan sign the 2014 "Humanitarian Pledge" calling for a new legal framework prohibiting nuclear weapons or the 2017 Nuclear Weapon Ban Treaty. If neither great power status nor the NPT or norms were crucial drivers, what explains nuclear abstention in this case? And what might reverse this trajectory?

The Yoshida doctrine, at the heart of the dominant Liberal Democratic Party's (LDP) model of political survival, was a decisive component of nuclear restraint. This "economy first" strategy hinging on economic growth deflated Communist subversion and rallied LDP factions, bureaucracies, big business and finance, energy and farming interests, smaller and medium-sized business, and even most opposition parties. The model overwhelmed more inward-looking right and left extremes, including those favoring rearmament or nuclear weapons. It also quadrupled Japan's share of global trade and exports; turned it into the third largest economy in the 1960s; and yielded stability and continued LDP dominance. The model thus provided the glue for a nuclear abstention package that logrolled essential constituencies. Nuclear weapons would have heightened uncertainty, threatened the economic miracle, and unraveled Japan's regional "peace diplomacy" and global access. Peak industrial associations strongly endorsed NPT ratification. Japan's nuclear energy program was doomed without international support; its economic miracle was doomed without nuclear energy; and the LDP was doomed without the economic miracle. A secret study ordered by Sato on the desirability of nuclear weapons (1968-70) concluded that the domestic political and international diplomatic costs would be too high and that Japan's security would be far better advanced through the Yoshida model.

The behavior of Sato—and of his post-war precursors and successors—also challenges a view that psychological profiles of leaders predict nuclear choices (Hymans 2006), an approach that neglects the political context. Premiers Kishi, Yoshida, Sato, Nakasone, Koizumi, Fukuda, Abe, and others may have arguably favored a nuclear armed Japan privately but did not (could not) act on those proclivities (Solingen 2010b). Indeed, the confluence of major external threats (North Korea's repeated nuclear and missile tests) and leaders with arguably strong private penchants for nuclear weapons failed to yield different out-

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comes than abstention. That still remains the case for Abe Shinzo, who imbibed a hard-line approach from his grandfather Kishi.

What does all this suggest for future scenarios regarding not just Japan but also South Korea and Taiwan? After all, neorealism's most authoritative proponent (Waltz 1979) argued that a strong theory must be able to predict accurately a priori and that its usefulness is judged not only by its explanatory but also its predictive powers. Given elastic and subjective definitions of balance of power, self-help, insecurity, and power itself, predictions based on such assumptions remain questionable. The nuclearization of three neighbors and China's dramatic rise have not yet altered Japan's nuclear abstention. We must nonetheless consider a scenario where East Asia exhibits more nuclear weapons' states, but how do we get there? Debs and Monteiro (2016) argue that states will proliferate when (a) they enjoy high relative power; (b) can deter a preventive strike; (c) they have a great power ally that can deter a preventive strike but falls short in reliability; (d) the great power ally has expansive foreign policy interests not covered under (p. 374) the alliance; and (e) the ally allows them to proliferate as long as the risk of entrapment is low. Assessing all these conditions is rather difficult, particularly because concepts such as "relative power," "level of security threat," and "great power reliability" among others remain open to subjective estimates and hence, to elusive predictions. The consequential changes in balance of power—beyond the ones we already observed—that should trigger discontinuities in nuclear policy remain unclear. Furthermore, each one of conditions (a) to (e) may lead to different—often contradictory—scenarios.

Indeed, regarding US extended deterrence alone, widespread disagreement remains on whether security guarantees alone account for nuclear abstention, whether US coercion or persuasion were more important, and other enigmas related to alliances (Solingen 1994b, 2007; Knopf, 2012; Debs and Monteiro 2016). Waltz's (1981) precept that "internal balancing is more reliable and precise than external balancing" cannot be discounted. Nor can his prediction that "nuclear weapons make alliances obsolete." Even alliances that qualify as "best practices" do not preclude dilemmas of abandonment and entrapment, and sometimes outright nuclearization (e.g. Britain and France). The fundamental logic of survival trumps the idea that states can substitute self-help for external protection. Anarchic international structures preclude a division of labor, especially since hegemonic commitments falter recurrently as in East Asia over the decades, particularly under presidents Jimmy Carter, Nixon, and, more recently, President Donald Trump.⁹

Competing neorealist perspectives thus leave us with abundant open-endedness. Scenarios hinging on external threats could do better by considering the domestic political landscapes that heighten or dampen the pressure to respond to such threats with nuclear weapons. Neoclassical realism (Wohlforth 1993), for instance, is more amenable to including such drivers for explaining non-balancing, under-balancing, or nuclear abstention even when some "objective" reality out there—a nuclear North Korea or a more menacing China—would have arguably compelled otherwise.

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The typical neoliberal institutionalist scenario often invokes the NPR's collapse as the prelude to nuclear cascades. This external shock of major proportions, however, could lead to different scenarios, only some featuring more nuclear weapons states. Others find the potential for such cascades to be overstated (Potter and Mukhatzhanova 2010). From Japan's and South Korea's standpoints, the NPR has already failed to guarantee their security. Furthermore, China's permanent seat in the UNSC enables it to dilute sanctions on the Kim dynasty, which continues to boost its nuclear capabilities dramatically (Solingen 2013, 2016). Nor does the NPR provide more protection to Taiwan than it would have in its absence. Failures of collective action and rising Prisoner's Dilemma situations should make some East Asian states "most-likely-cases" for going nuclear, per this theory's logic.

Some constructivist and critical theory tools leave us with even more open-ended scenarios, a feature entirely compatible with these approaches' epistemology and reservations regarding prediction (Abraham 2010). One might nonetheless distill a scenario that upholds norms against nuclear acquisition, perhaps in tandem with progress toward Global Zero, hard as it may seem under current circumstances. By contrast, (p. 375) the emergence of a rival norm could lead to a scenario of more nuclear weapons' states driven by issues of memory, nationalism, and history that fuel Hobbesian mistrust, turning East Asia into a "most likely case" for nuclearization. As norms and ideas "don't float freely," evaluating these different scenarios might be more fruitful if they incorporated particular domestic conditions that help consolidate one norm or the other in each case (Risse Kappen 1994; Checkel 1997), which leads us back to domestic models of political survival.

As argued, expectations from these models are not deterministic; they only suggest that internationalizing models make the development of nuclear weapons less likely than inward-looking ones. They are indeed falsifiable: internationalizing models may embrace nuclear weapons and inward-oriented ones may abandon them. Specific scope conditions may alter expected outcomes. First, the extent to which the regional context shares a congruent orientation toward the global political economy (either positive or negative) can modify nuclear preferences within individual states. A region's center of gravity is consequential for nuclear outcomes, making acquisition more likely, even for isolated internationalizers facing an inward-looking strategic cluster. Second, temporality matters; abandoning nuclear weapons once they exist is different—more costly politically—from abandoning a program prior to fruition, as prospect theory suggests it is far more costly politically to eliminate actual weapons than reverse steps before acquisition. Leaders and publics value more—and are averse to losing—what they have ("endowment effect") than what they might get in an uncertain future. Hence, eliminating existing nuclear weapons is expected to be harder than reversing programs before nuclear weapons are acquired. Reversals are much harder when nuclear weapons acquisition precedes the inception of internationalizing models (e.g. China, India, Israel). Third, political survival models are a dynamic category and hence entail no linear or irreversible trajectory in either direction.

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Four possible scenarios emerge from this framework: two would validate the argument, the other two would falsify it. The vertical axis in Table 25.1 reflects the respective models, internationalizing and inward-looking. The horizontal axis maps two outcomes: more nuclear weapons states or no new nuclear weapons states (status quo). Scenario 1 points to the continuity of internationalizing models in “usual suspect” East Asian states and continued nuclear abstention—despite inward-looking North Korea—an outcome compatible with the framework’s expectations.¹⁰ Scenario 2 entertains a widespread East Asian turn to inward-looking models while retaining NPT-compliant nuclear abstention, an anomaly for the framework. Scenario 3 entails continued dominance of internationalizing models that proceed to acquire nuclear weapons, another anomaly. Scenario 4 features a massive regional shift toward inward-looking models that abandon nuclear abstention, confirming the framework’s expectations. A Chinese leadership that overturns internationalization, for instance, might heighten the odds that neighbors follow suit and reverse prior nuclear restraint. Global and regional downward economic spirals can be a major source of domestic turns and shifts toward hyper-nationalism. Although this trend seems evident in different parts of the world, it has yet to reach the shores of East Asia. (p. 376)

Table 25.1 Models of survival and nuclear outcomes: East Asia

		Models of political survival	
		Internationalizing	Inward-looking
Nuclear outcomes	No new nuclear weapons states	1 Compatible	2 Anomaly
	New nuclear weapons states	3 Anomaly	4 Compatible

Similar scenarios can be constructed for the Middle East. The region’s past inward-looking trajectory already conforms to the attempted acquisition of nuclear weapons in Iraq (prior to 2003), Egypt (prior to 1974), Iran, Libya, and Syria. Israel is reported to possess a sophisticated nuclear arsenal and others surface in studies of potential candidates for future proliferation, including Saudi Arabia and Turkey (Cambpell et al. 2004). Waltz (2012) envisaged a nuclear-armed Iran and Syria but later predicted that “once Iran crosses the nuclear threshold . . . No other country in the region will have an incentive to acquire its own nuclear capability,” an odd prediction given a multipolar context that should, per Waltz’s theory, lead to further nuclearization. The jury is out on the JCPOA but few observers pin its fate on anything other than domestic competition between Iran’s internationalizing and inward-looking camps. Statements by President Trump during the election campaign and barriers to Iran’s reintegration in the global economy strengthen

the latter camp. The Middle East continues to defy the existence of a nuclear taboo curtailing acquisition.

25.4. Conclusions

As the editors suggest, thinking about our theories' implications for the future enhances clarity about our claims. This chapter has reviewed proliferation patterns in recent decades; assessed the record and shortcomings of past predictions; explored conceptual debates underlying predictions; and highlighted the risks of prediction, particularly in this domain. The good news for the discipline is that a promising research agenda attentive to complex systemic effects, reputation, domestic veto-points, dynamics of the global economy, and regime survival seems to be replacing analytically impoverished, policy-deficient, grossly inaccurate forecasts, and stale accounts of states' nuclear choices. All theoretical formulations can benefit from improvements. First, they must be cast in falsifiable terms, with greater precision, and aim at better specification of threshold conditions.¹¹ Second, they must provide clearly defined, a priori testable propositions, avoiding circularity and ex-post-facto rationalizations. Third, they must (p. 377) stipulate the kind of evidence that would challenge or corroborate their expectations. Fourth, they must tighten up rules and procedures for (quantitative or qualitative) data gathering and analysis. Fifth, they must assess findings against competing theoretical claims. Seventh, they must develop ways to discover, dissect, and assess indirect causal pathways, even if they are more difficult to work with. Eight, they must be attentive to temporality and context; choices for or against nuclear weapons are fluid and change over time (Levite 2002). Above all, attention to complexity, contingency, and historical context can enhance predictive accuracy. Tetlock (2005) branded parsimony "snake oil," the enemy of accuracy. Good forecasting must tolerate ambiguity and dissonance, embrace self-criticism, and integrate relevant drivers previously omitted, at great analytical cost, or substituted by invalid proxies.

A unified field theory capable of predicting proliferation may not be in our grasp. Furthermore, much to our dismay, our theories may not work for eternity. Even those that may have done well explaining the past may be less useful for predicting the future. Even if they were to work forever, our ability to manipulate and control drivers is limited. It is emblematic of the challenges inherent in the study of international diffusion that no consensus exists on whether the present outcome—nine nuclear weapons' states—is a success story of non-diffusion (no runaway dominos) or a slow-moving increase in nuclear weapon states that could dangerously approach rapid diffusion along an S-shaped curve (Solingen 2012). Nor is there consensus on whether a presumed success might be a triumph of restraint—many states permanently opting not to convert technical capabilities into weapons—or of hedging. Substantive disagreement remains over whether the NPT is an impressive, most highly subscribed international security treaty gathering 190 states, or a frail firewall unable to prevent determined violations. Further contention exists on whether the IAEA is an effective mechanism for diffusing nuclear energy or one unintentionally spreading nuclear weapons' know-how, and whether learning and socialization with-

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in the broader nonproliferation regime buttresses its survival or fails to stem its deterioration. Deep discrepancy also remains among those for whom the diffusion of nuclear weapons is a great equalizer—“more is better” in Waltz’s unforgettable rendition—and those for whom such diffusion is a recipe for wholesale destruction of the world as we know it.

Our overview raises many additional questions that the discipline will continue to address, particularly regarding change. Will changes in the NPR be evolutionary or revolutionary? Will they occur through implosion or explosion? Will they be re-ordering or counter-ordering? Will rising powers such as China alter the NPR as we know it today? Will what comes next be more coherent or less coherent? Will this evolution be linear or riddled with discontinuities? Will learning about the horrors of nuclear war become, once and for all, sedimented into an enduring normative firewall? Or will nuclear weapons “long be with us,” in another Waltz’s (1995) formulation. Will the domestic, regional or the global levels be more promising arenas of change? These and other uncertainties militate against our ability to discern all likely paths to continuity and change in the world of nuclear proliferation.

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Notes:

(1.) The regime also includes the Nuclear Suppliers Group, the Zangger Committee, the Comprehensive Test Ban Treaty, the Additional Protocol, and nuclear-weapon-free zones, among others. The IAEA Board of Governors and the UN Security Council act as enforcement mechanisms on safeguard agreements. For a comprehensive analysis of this regime, see Wan (2013) and Wan and Solingen (2017).

(2.) Betts (2000: 69) argued that one should be able to name at least one specific country that would have sought nuclear weapons or tested them, but refrained from doing so because of the NPT. He found none that come to mind. Egypt's former Minister of Foreign Affairs Nabil Fahmy argued that very few non-nuclear weapons states joined the treaty because it responded to their immediate security concerns and that most did so for political or economic reasons and had otherwise no reason to pursue nuclear weapons (Carnegie Endowment Conference 2006).

(3.) Schelling (1976: 80) himself made clear that "the most severe inhibitions are undoubtedly those on the actual use of nuclear weapons, not on the possession of them."

(4.) According to Mueller and Schmidt (2010) 36 states are known to have once started nuclear weapons activities.

(5.) On "myth-making" and nuclear weapons, see Lavoy (1993).

(6.) The more inward-looking the target, the less effective are coercion and positive inducements (Solingen 2012). See also Miller (2014).

(7.) Pierre Gallois, Herman Khan, and Nixon himself were among them. A 1957 National Intelligence Estimate advanced that Japan was highly likely to go nuclear within a decade <<http://nsarchive.gwu.edu/NSAEBB/NSAEBB155/>>. Kissinger argued that "We must have

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no illusion: Failure to resolve the North Korean nuclear threat in a clear-cut way will sooner or later lead to the nuclear armament of Japan—regardless of assurances each side offers the other” (Kissinger 2003).

(8.) All references to Makoto in Endicott (1975: 63).

(9.) <http://www.nytimes.com/2016/11/16/opinion/the-trump-effect-on-tokyo.html?ref=world>.

(10.) Following North Korea’s launching of nuclear-capable missiles unto Japan’s exclusive economic zone in 2016, defense minister Inada Tomomi discounted Japan’s consideration of nuclear weapons “at the moment” while declaring that Japan’s constitution has “no restrictions on the types of weapons that Japan can possess as the minimum necessary.” Premier Abe immediately added that “there is no way that Japan will either possess nuclear weapons or consider possessing such arms” <<https://nuclear-news.net/2016/08/07/abe-rules-out-possibility-that-japan-will-possess-nuclear-weapons/>>. Nearly 60 percent of polled South Koreans arguably supported an indigenous nuclear deterrent in 2016 but the government restated its non-nuclear course <http://www.koreatimes.co.kr/www/news/nation/2016/09/205_214598.html>.

(11.) On how non-falsifiable predictions undermine the quality of professional discourse and our ability to improve policy, see Tetlock and Scoblic (2015).

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