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Adam N. Stulberg, Matthew Fuhrmann, eds. *The Nuclear Renaissance and International Security*. Palo Alto: Stanford University Press, 2013. 376 pp. \$60.00 (cloth), ISBN 978-0-8047-8417-7.

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A Political Science Perspective on Nuclear Renaissance

The Nuclear Renaissance and International Security is a welcome addition to a still insufficiently explored field—the intersection of nuclear energy and international relations theory. It certainly achieves the goal that is set in the beginning—bridging the gap between scholars who study international security and practitioners who need to make decisions on developing nuclear energy in their countries, on providing assistance to other countries; and on charting the course between the Scylla of Article IV of the Nonproliferation Treaty (NPT), which contains the obligation to provide assistance, and the Charybdis of nuclear proliferation.

The phenomenon of “nuclear renaissance,” the expectation of a large-scale expansion of the nuclear industry after two decades of hiatus following the Chernobyl accident, has been tackled by the international community of experts and politicians in a rather loose, nonsystematic fashion, which partially accounts for oscillation between optimism and pessimism. Early expectation of large-scale global expansion of the nuclear energy sector was replaced, after the Fukushima accident, with skepticism that led some countries (Germany is the best known, but not the only case) to abandon reliance on the nuclear industry or to scale down earlier plans. Optimists primarily emphasize economic and environmental arguments while pessimists exploit safety and proliferation concerns. It has been difficult to make sense out of a plethora of cases for and against expansion of nuclear industry and even more difficult to predict its prospects after Fukushima.

The volume edited by Adam N. Stulberg and Matthew Fuhrman seeks to explore the phenomenon of “nuclear renaissance” using a methodologically sound approach—informed primarily by political science theory—to introduce domestic and international politics into what has heretofore been mostly a technical and/or security discourse, and, even more important, to establish a reliable predictive framework that will allow better understanding of the phenomenon and better policy planning. The book does not shy away from asking questions that might seem obvious, but are so difficult to answer that few dare tackle them: why do states choose to develop the nuclear energy option; under what conditions are states likely to graduate from statements of intention to investment into that option; what might be the scale of expansion of nuclear industry, if any, given all the relevant variables (including, but not limited to, the impact of Fukushima); how might development of the nuclear industry affect the likelihood of international conflict; and what are the prospects of alternative avenues of nuclear energy development (including multilateral arrangements)? The answers to these and related questions are convincing, well informed, nonobvious, and in many cases counterintuitive.

The authors correctly note that interest in the widely expected resurgence of nuclear power has been primarily limited to possible proliferation consequences while other, no less important aspects have remained in relative obscurity. Thus, a broader look that is better informed by international relations theory and methods is very

much welcome. A description of positive contributions of the volume should rightly begin with an assessment of the prospects of the “nuclear renaissance” phenomenon, which has been heretofore usually approached through intuition, statements about intentions made by governments of aspiring states, or far-reaching plans of nuclear industry hoping for a resurgence after two decades of slowdown. The conclusion of the authors about “nuclear resurgence”—a modest growth in construction of nuclear power plants that is mostly limited to countries with an already significant share of nuclear power in their energy balance—is grounded in serious historical analysis and has been confirmed by developments that have taken place after the book was sent to the printing press.

Chapters 3 and 5 offer a detailed and well-researched analysis of the dynamics of the costs of nuclear power, with a special focus on the significant upfront investment and the possibility of savings only in the long run. These, as well as a range of other factors, deserve close attention and are likely to represent a lasting contribution of the volume to the field. Indeed, these factors tend to create path dependence in states that have embarked on the nuclear power path many years ago, but create high barriers for newcomers to the field. Equally interesting is the discussion of the climate change arguments, which are routinely and widely used to justify expansion of nuclear industry. The findings that the two are only weakly related and that positive climate change impact can only be achieved in case of a significant expansion of nuclear energy, which is unlikely for a range of other reasons, is counterintuitive and can help better inform national and business decisions with regard to construction of new nuclear power plants, in particular in entry-level countries.

Analysis of reasons why states may embark on nuclear energy development (chapters 1 and 2) confirms, develops, and refines “educated guesses” that largely dominate relevant literature; now we can talk about the variables that affect national decisions with much greater confidence and hence our predictions will be more reliable. Chapter 1, by Bernard Gourley and Stulberg, unveils several important findings. In particular, decisions to develop nuclear power have been found to correlate mostly with dependence on energy imports. While this might on the surface sound as a restatement of the obvious, this finding is valuable because it allows better differentiation among a broad range of other explanations that have been offered based on “common sense” (such as status). Another finding that will have lasting value is the absence of a relationship between regime type and decisions to pursue nuclear power. This finding, to a de-

gree, stands in contrast to the widespread propensity to explain the majority, if not all, political decisions by the nature of the regime. In fact, countries with the same regime type were found to pursue radically different policies with regard to nuclear energy.

Discussion of the limited impact of the Fukushima accident on the future of nuclear energy is quite compelling as well. Here regime type appears to play a significant role as democratic countries were found to be more sensitive to accidents compared to non-democracies. The authors note the limits of that variable by pointing out that in some cases expansion of nuclear industry would have been modest even without Fukushima. One possible extension of these arguments that authors might additionally explore in the future is consideration of comparative resource mobilization capacity, which is often higher in nondemocratic states and which could affect the likelihood of a decision to “join the club” of states with nuclear power. Among democratic states, in contrast, only those that are “rich” can afford to make the necessary investment, but those states already have a significant civilian nuclear industry and hence they fall into a different category of “resurgence”—states that expand the existing capacity rather than embark on a new path.

The volume offers an exceptionally interesting and informative discussion of multilateral nuclear approaches (MNA) to nuclear fuel cycle (chapter 4), especially the discussion of power asymmetries and the credibility problem. This analysis serves as a convincing explanation why MNAs have not taken off in spite of many years of efforts and the apparent cost-effectiveness. Stulberg points out, in particular, that the credible commitment problem (including reliability of supply) is not fully resolved even under multilateral arrangements, leaving customers highly vulnerable to possible exercise of power by suppliers.

The authors could have referenced an additional variable, however: the phenomenon of suppliers’ dependence on the ability to sell, which can be seen particularly clearly in the case of Russian oil and gas exports to Europe, but works equally well in the nuclear fuel market. When seeking to exercise political leverage, the supplier has to be mindful of potential loss of both immediate profits and credibility, which is critical to expanding business in the future. This dual system of constraints (the customer’s interest in buying and the supplier’s interest in selling) helps ensure the stability of fuel deliveries in the vast majority of cases. In most cases, fuel supply arrangements work quite well and, instead of try-

ing to leverage their position, suppliers work to expand markets.

Another potential limit on the effectiveness of MNAs is more technical in nature. After all, international banks of low-enriched uranium (LEU), which have been at the center of international discussions, do not fully guarantee access to nuclear fuel, because the fuel has to be fabricated and involves both dedicated facilities and know-how. Replicating fuel technology is not an easy task, as has been demonstrated by the so far unsuccessful attempts of Westinghouse to provide an alternative to Soviet/Russian fuel and the decision of Finland and the Czech Republic to switch back from Westinghouse to Russia-produced fuel for their Soviet-built reactors. This variable strengthens but also refines the main argument of Stulberg about power asymmetry: the degree of dependence of customers on one or very few suppliers of fuel might be hard to alleviate using the majority of MNA options that are currently on the table. As a side comment, the need to fabricate fuel casts doubt on the Iranian claim that uranium enrichment is needed in part to protect against possible termination of fuel supply to the Russian-built Bushehr nuclear power plant. Such fuel cannot be manufactured indigenously without Russia agreeing to sell the technology and perhaps help build the necessary industrial capability. In the case of Ukraine, similar concerns were resolved through an agreement with Moscow to build a fuel fabrication plant in Ukraine; there are no reports that Iran is pursuing that option.

Discussion of the relationship between nuclear power resurgence and international conflict is also very interesting and comes to a conclusion that appears convincing—namely, that “nuclear renaissance” (or, rather, as the authors demonstrate, “nuclear resurgence”) will hardly enhance the probability of international conflict. That conclusion, unfortunately, is not as rigorously supported by evidence and analysis as other findings. It is difficult to criticize the authors, though: the pool of data (in particular, the use of force against civilian nuclear installations) is extremely small, thus conclusions can only be tentative. One clear trend that the authors note is that in the past authoritarian regimes have been far more likely to become the target of the use of force. The authors hypothesize (chapters 11 and 12) that this is the case because potential attackers have less confidence that nuclear energy programs in authoritarian states will remain peaceful. While, at least at first glance, this hypothesis seems justified, one could also add another variable that the authors do not consider: the capacity to

strike. The use of force against this class of targets requires highly capable conventional strike assets, which only a handful of countries have. That is, one needs to account for the characteristics of both the target and the attacker.

Another important consideration is the fact that an attack on a civilian nuclear facility is analogous to the use of a radiological weapon due to high risk of dispersion of radioactive materials. Consequently, these attacks are bound to be rare and, moreover, be mostly limited to unfinished facilities that do not yet have radioactive material in significant quantity. The reluctance of the United States to use force against North Korean and Iranian nuclear facilities demonstrates the existence of serious hindrances that go beyond the variables that are discussed in the volume.

The authors admit that the book “only scratches the surface when it comes to understanding the role of the NPT and the IAEA [International Atomic Energy Agency] in international politics” (p. 334). They correctly note the scarcity of analytical work on international nuclear cooperation; equally little is known about the mechanics of the safeguards regime, the Nuclear Suppliers’ Group (NSG), etc. For fairness, it should be noted that much of this information is not in the public domain and is usually addressed by technical experts rather than by political scientists. While scarcity of analysis of these issues is a serious drawback of the volume—one can say, the only serious drawback—it is by no means limited to its authors. These issues represent a major gap in political science literature, especially in the literature on international governmental organizations. Better knowledge of the safeguards mechanism could have provided the authors with important clues for their discussion of international nuclear energy cooperation, among other issues.

Certainly, as Fuhrman suggests in chapter 3, trustworthiness of the recipient of nuclear assistance plays an important role in a decision to provide it. However, the degree of trust is not defined solely by the nature of the potential customer, but to a large extent also by the system of IAEA safeguards that ensures provision of significant amount of data about the nuclear program in the recipient state and helps track its progress over time. The recipient’s track record under safeguards and the scope of safeguards in place (e.g., Comprehensive Safeguards vs. the Additional Protocol) play an important role in national decisions on provision of assistance and also represent an important foundation for the NSG standards in

that area.

Moreover, when it comes to safeguards, historical data, unfortunately, has limited value for a researcher since the safeguards regime has evolved quite considerably in the past forty-plus years. As a result, cases of clandestine nuclear weapons programs using legitimate international assistance (they are noted in the volume) have become less likely. Modern safeguards provide better chances of detecting such diversions and hence better protection against such behavior. Obviously, the safeguards regime is by no means perfect. The case of the United States-Indian nuclear deal and the subsequent NSG decision to authorize international nuclear coopera-

tion with that country, in spite of the fact that only part of its nuclear facilities are under safeguards and there is no clear line dividing the civilian and the military parts of its nuclear program, is well known. Nonetheless, safeguards represent an important variable that has to be considered when analyzing the future of “nuclear renaissance.”

Overall, the volume represents a rare and valuable contribution to the field that has remained woefully underresearched—the intersection of political science and nuclear energy. It has enriched our understanding of the issue and has introduced a long-awaited element of rigorous, methodologically and theoretically sound analysis into both the world of science and the world of politics.

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