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# **An Agent-Based Model of Counterfactual Opportunities for Reducing Atrocities in Syria, 2011 - 2014**

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## **Part 1. Introduction: Critical Junctures and Alternate Histories; A Pilot Project on Syrian Counterfactuals**

Computer-assisted agent-based modeling (ABM) allows us to examine not just history as it happened but history as it could have happened. This ability opens opportunities for causal analysis of variations in atrocities against civilians or in the conditions believed to make civilian atrocities much more likely. Once different pathways into the future from the same set of antecedent conditions are traceable, analysis of large numbers of stochastically perturbed model runs can aid in the evaluation of alternative causal stories. This technique has the potential to test arguments about which factors may have been crucial in determining outcomes, which junctures were critical, and which mitigation strategies would have been preferable, for what reasons.

But in applying available ABM simulation technology to the problem of assessing opportunities for mitigating threats of large-scale civilian atrocities, how practical, direct, and useful would the results be? This general question was translated, in this pilot project, into an exploration of the extent to which an agent-based model of Syria, tuned to 2010, could illuminate the likely effects of plausible policies that the US government could have enacted or contributed to at critical junctures in the Syrian conflict.

As described in part 2 of this report, we built an agent-based model of Syria tuned to 2010, allowing us to experiment with the state space of Syria's past from 2011 to 2015. A key objective was to assess the reasonableness of a variety of contemporaneous policy prescriptions made by decision makers and strategies suggested by informed observers. The counterfactual scenarios for mitigating civilian atrocities in Syria were identified with critical junctures—episodes or states of affairs, at particular points in time, that have been identified as potentially significant bifurcation points leading toward or away from conditions liable to produce high levels of civilian atrocities.

Particular attention was paid to the manner in which those junctures were or could have been influenced by US policy choices. However, given the limits of the model as a pilot project, which focused on Syria and not on the region or the world, considerable variation exists—across the five critical junctures examined—in the extent to which US policies (or their absence) can be understood as being potentially implicated in the path the “real” Syria followed.

A key step in our research design was to survey the literature and journalistic reporting on Syria, in conjunction with the United States Holocaust Memorial Museum's Simon-Skjodt Center for the Prevention of Genocide, to produce a finite list of critical junctures where US influence, directly or indirectly, could have resulted in conditions less apt to have produced as many atrocities against civilians as was in fact the case in the actual history of Syria from 2011 through 2015. In addition to the numerous articles, essays, and commentaries used to generate the five

critical junctures we explore, two works proved to be of particular value: Charles Lister's 2015 *Syrian Jihad* and Emile Hokayem's 2013 *Syria's Uprising and the Fracturing of the Levant*.<sup>1</sup>

The five junctures identified as potentially critical will be presented and discussed according to the extent to which they directly implicate policy choices that were made, or could have been made, by the United States. Two of the five junctures we tested are more or less direct expressions of US policy choices: (a) "Unified Western Support" for the opposition in the summer of 2011 and (b) "US Retaliation" against Assad and the Syrian military in August–September 2013. A third—"Democratizing Bubble" (or democratizing reform of the regime)—can be understood as the hoped-for result of the US policy that was in effect adopted toward Syria from the outbreak of the uprising in March 2011 until official abandonment of that policy in early August 2011. "Weakened Jihadis," the fourth juncture, was a pathway in the Syrian state space counterfactually available beginning in early 2012 for Jabhat al-Nusra (JN) and in April 2013 for the self-proclaimed Islamic State (IS). The critical fifth juncture, "No Iranian Intervention," was implemented as being located in the spring of 2013. Although not entirely so in the eyes of some analysts, the two counterfactuals studied in relation to these critical junctures are deemed mainly as driven by forces outside the control of the United States.

This report is organized as follows. Here in part 1, the overall purposes and strategy of the project are stated. Part 2 presents a brief account of the construction of the ABM computer simulation model of Syria used in this study. This account is preceded by an introduction to the purpose and logic of agent-based modeling and its use as a virtualization strategy for studying putative "critical junctures" and the counterfactual futures that could, with different probabilities, have arisen from them. (Readers familiar with these topics may skim or skip this section of the report.) Part 3 presents analysis of the results of our experimentation, organized by critical juncture and featuring both graphical presentations of results and interpretive discussion. Part 4 offers analytic and policy-relevant conclusions, along with the identification of more generally instructive patterns appearing in the data across experimentation done separately with respect to each of the five critical junctures. Following part 4, we offer an appendix featuring a glossary of key terms and consideration of some detailed modeling and methodological issues.

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<sup>1</sup> Charles R. Lister, *The Syrian Jihad: Al-Qaeda, the Islamic State and the Evolution of an Insurgency* (Oxford: Oxford University Press, 2015); Emile Hokayem, *Syria's Uprising and the Fracturing of the Levant* (London: Routledge, 2013).

## **Part 2: The Strategy of Agent-Based Modeling and the Building of Virtual Syria for Counterfactual Experimentation**

### *Agent-Based Models as Investigation Tools*

A large flock of birds traces a trajectory through the sky that is as distinctive as it is unpredictable. One could extravagantly explain this combination of orderliness and unpredictability as the result of a dictatorial lead bird whose whims govern the direction and speed of every other bird in the flock. A better explanation—because it assumes no more cognitive or communication capacity for birds than we believe they have—is achieved by using a computer to endow each bird with a simple set of algorithms requiring it to stay near, but not too near, the birds in its immediate vicinity. Numerous computer models of such “boids” show how precisely such an agent-based model can produce flocking behavior, thereby explaining it parsimoniously and in strict conformance with what we know about the information-processing capacities of birds.

Any one run of the model—perturbed randomly by the virtual presence of tasty bugs in the line of sight of some boids—traces a flock’s trajectory that will be unique among the trajectories it could follow. Similarly, each interpretation of the future offered by the kind of agent-based model deployed in this study is a trajectory through an immense space of possible trajectories whose boundaries are established by the interactive implications of the theoretical assumptions of the model, its initial conditions, and the exogenous perturbations that may affect it. Built from and decomposable into identifiable theoretical claims, the model is stylized to conform, at  $t = 0$ , to a target political system now or at some stipulated point in the past. By changing parameters, algorithms, or both to reflect adjustments in the theories that we wish to include in the model and by repeating the production of batches of trajectories, we can criticize our own expectations about the future and can critically assess the credibility of different theories (once future outcomes can be compared, systematically, with outcome probabilities as registered by model output).

The algorithms that comprise the model’s transition rules animate masses of interactions among agents instantiated in ways that condense the limited but high-confidence knowledge available from theoretically and ideographically sophisticated experts and their work. But once the model is animated, the massive interaction effects that arise produce emergent processes of dynamic change across the entire “landscape” of agent behavior, processes that cannot be derived, inferred, or predicted from the algorithms themselves. As individual agents update their state and behavior, the entire array of agents moves forward through time within the space of its possible configurations. By collecting data on stochastically perturbed repeated runs of an appropriately assembled model, we can identify outcomes that are typical, plausible, and just possible. Each

outcome is consistent with the assumptions, data, and theoretical operationalizations used to build and instantiate the model but is impossible to infer from them.

Applications of this kind of technology are prevalent in many disciplines, including molecular biology, oncology, archaeology, natural resource management, pharmacology, climatology, immunology, transportation, marketing, and city planning.<sup>2</sup> The approach is now also well established in the social sciences. One of the earliest and still most influential studies animated by this approach was published in 1978 by Thomas C. Schelling, who demonstrated ABM's in-principle fecundity with an agent-based model of segregation.<sup>3</sup> To be sure, Schelling made his seminal contribution without using a computer and even emphasized the importance of doing necessary calculations manually, but he subsequently developed an interest in and spent considerable time investigating how computer programs for exploring his ideas could be designed. Indeed, Schelling-style segregation models run on computers have been used to greatly extend his thinking, by experimenting with different rules that individuals might follow, different patterns of interaction among neighbors, and different tastes for living in integrated or segregated areas.<sup>4</sup>

In political science and other social sciences, computational, bottom-up, or agent-based modeling is a generalization of this method, using computer simulation to explore the often nonlinear relationship between inputs at the unit level, interaction networks, and outputs at the collective level.<sup>5</sup> ABM has been particularly attractive to researchers in domains where intractability problems make algebraically solvable techniques of formal analysis impossible or when either the complexity of conjectures about macropolitical relationships or the openness of the systems

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<sup>2</sup> For details and exemplary studies in each of these fields, see Athinoula A. Martinos Center for Biomedical Imaging, Biosystems Projects web page, <http://www.martinos.org/biosystems/projects.php>; Jeffrey S. Dean et al., "Understanding Anasazi Culture Change through Agent-Based Modeling," in *Human and Primate Societies: Agent-Based Modeling of Social and Spatial Processes*, ed. Timothy A. Kohler and George J. Gumerman (New York: Oxford University Press, 2000), 179–205; L. R. Izquierdo, N. M. Gots, and J. Gary Polhill, "FEARLUS-W: An Agent-Based Model of River Basin Land Use and Water Management" (paper presented at the "Framing Land Use Dynamics" conference, Utrecht University, The Netherlands, April 16–18, 2003); Riccardo Boero and Flaminio Squazzoni, "Does Empirical Embeddedness Matter? Methodological Issues on Agent-Based Models for Analytical Social Science," *Journal of Artificial Societies and Social Simulation* 8, no. 4 (2005): 6, sections 4.42–4.47; Adam Marczyk, "Genetic Algorithms and Evolutionary Computation," TalkOrigins Archive, April 23, 2004, <http://www.talkorigins.org/faqs/genalg/genalg.html>; Biosystems Group Current Interdisciplinary Research web page, <http://biosystems.ucsf.edu/research.html>; Multicellular Systems Biology website, <http://www.msysbio.com/>; Joshua M. Epstein, *Agent Zero: Toward Neurocognitive Foundations for Generative Social Science* (Princeton, NJ: Princeton University Press, 2014).

<sup>3</sup> Thomas C. Schelling, *Micromotives and Macrobehavior* (New York: Norton, 1978).

<sup>4</sup> See Rainer Hegselman, "Thomas C. Schelling and the Computer: Some Notes on Schelling's Essay 'On Letting a Computer Help with the Work,'" *Journal of Artificial Societies and Social Simulation* 15, no. 4 (2012): 9, <http://jasss.soc.surrey.ac.uk/15/4/9.html>.

<sup>5</sup> The most convenient and reliable source for surveying the variety of applications of ABM to social science problems is the *Journal of Artificial Societies and Social Simulation* (<http://jasss.soc.surrey.ac.uk/>).

involved precludes relying on regression or natural experiments. Among the political science domains where ABM techniques have been successfully deployed are (a) collective mobilization, (b) norm and strategy evolution, (c) constructivist identity theory, (d) secessionism, (e) power sharing, (f) party competition, (g) political communication, (h) national state formation, (i) institutionalization, (j) international treaty making, and (k) the relationship between the structure of the international system and the state behavior within it.<sup>6</sup>

Agent-based models are most sensibly deployed to investigate problems that are too complex to be captured algebraically, because of large numbers of relevant dimensions, large numbers of interacting “bodies,” or both. Accordingly, a strong elective affinity exists between ABM and computerization. The reason is the effects of ABM emerge from the algorithmic behavior and simple interactions of masses of autonomous agents, yielding an otherwise-impossible-to-perform multitude of calculations at each time step—calculations that are straightforward at the agent level but overwhelming if approached as an integrated set. Given the immensity of the possibility space, it is almost certain that building an analytically suitable surrogate for the state space of the future will require computerization. Indeed, the automaticity of computer technology itself helps impose the discipline required for the production of this surrogate, by translating initial conditions and a stable set of theoretical propositions into very large numbers of individually distinctive trajectories.

Agent-based models come in three basic varieties: abstract, generic, and virtualization. The booids type of model, referenced earlier, is abstract—it can illuminate fundamental and often surprising emergent patterns that arise from very simple rules of interaction among large numbers of entities. Such models are usually exploratory and are not designed with substantive theories in mind.

Generic models use patterns and typical relationships found in abstract models to capture and explore types of theoretically interesting problems. A model of “secessionism,” for example, entails a rendering, not of any particular country where secessionism might occur but of a type of country where it might occur. Building such a model implies having some basic concepts and theories about what drives secessionism (deep cultural divisions, inequalities of power, etc.) and requires synthetic data organized to correspond to the kinds of circumstances present in countries believed to be susceptible to secessionist pressures.

In contrast, a virtualization model—of the type used in this pilot study of civilian atrocities in Syria—targets a particular place and time and requires data from the real-world target to be used

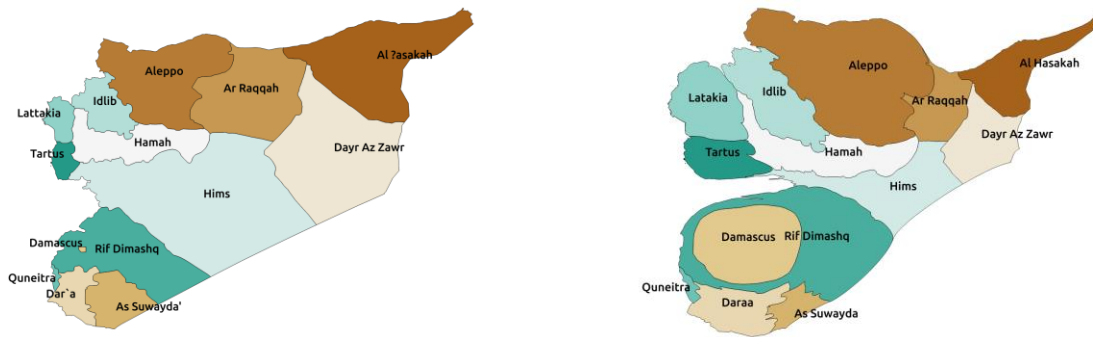
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<sup>6</sup> For a survey of political science applications of ABM, see Ian S. Lustick and Dan Miodownik, “Abstractions, Ensembles, and Virtualizations: Simplicity and Complexity in Agent-Based Modeling,” *Comparative Politics* 41, no. 2 (2009): 223–44.

directly as inputs in the construction of the virtualized version of the object of investigation. That operation presupposes a federation of generic models to provide the platform for the specifications required to produce a model whose behavior can be studied as simulating the behavior, counterfactual or otherwise, of the target.<sup>7</sup>

### *Building Virtual Syria*

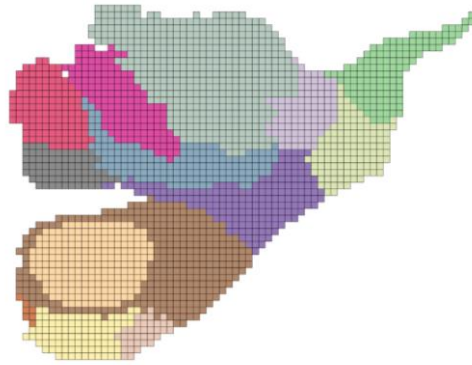
The model-building process for Virtual Syria begins by converting the map of Syria into a cartogram, which changes the size of territories according to their estimated 2010 population figures (figure 1). That cartogram is then converted into a rasterized agent-level model with 2,146 agents (figure 2). Each agent has a set of identities, may be part of an elite network, and can take political action during each time-step of the simulation.<sup>8</sup>



**Figure 1: Transformation from Syria's first administrative districts to a cartogram version resized according to population.**

<sup>7</sup> For more detail and exemplification of these three types of ABMs as they have been deployed by social scientists, see Lustick and Miodownik, "Abstractions, Ensembles, and Virtualizations." On federating substantive theories for building virtualization models. see Ian S. Lustick, Brandon Alcorn, Miguel Garces, and Alicia Ruvinsky, "From Theory to Simulation: The Dynamic Political Hierarchy in Country Virtualisation Models," *Journal of Experimental & Theoretical Artificial Intelligence* 24, no. 3 (2012): 279–99.

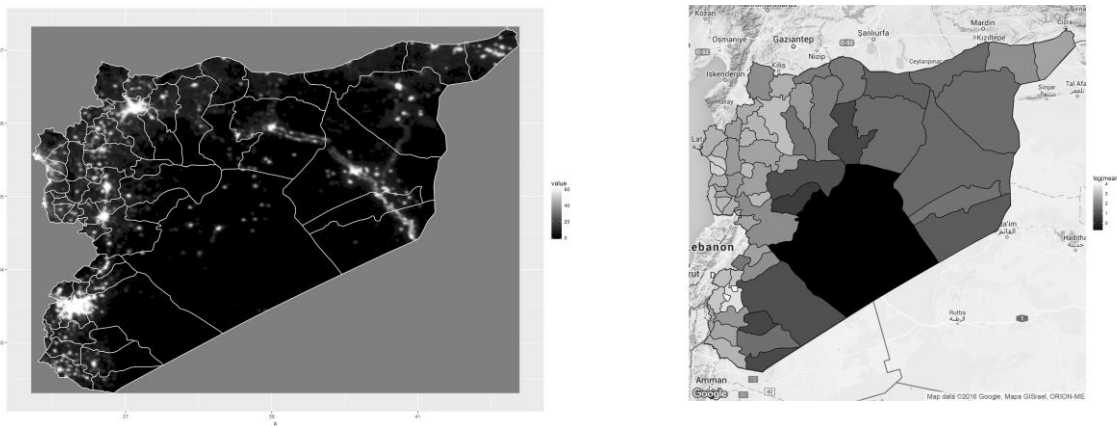
<sup>8</sup> Answering questions about Syria cannot exclude consideration of events and forces outside Syria. But since it is unrealistic to imagine building a model that includes within it all factors that affected Syria, our strategy was to build a model of Syria focused on the official territory of the country in 2011. Factors from outside Syria that affect events within this territory and political system are thus treated as exogenous to the model. We use specific strategies for taking them into account—strategies that will be detailed later in the section titled "Model Updating and Dynamics."



**Figure 2: Final agent-level model output.**

### Elite Agents and Networks

We use three key sources of data to seed the model with elite agents and networks. First, we seed high-level influential elites at the locations of major cities in Syria with populations over 100,000 (2010 data). Second, we convert the National Oceanic and Atmospheric Administration’s “night lights” data into three statistical aggregations at the second administrative district level (figure 3). These are used to seed low-level influentials. Third, we use subject-matter expert data that are input directly into the model to determine how elites communicate with each other during model runs



**Figure 3: Conversion of night lights data into geographic distribution of elite agents in the model.**



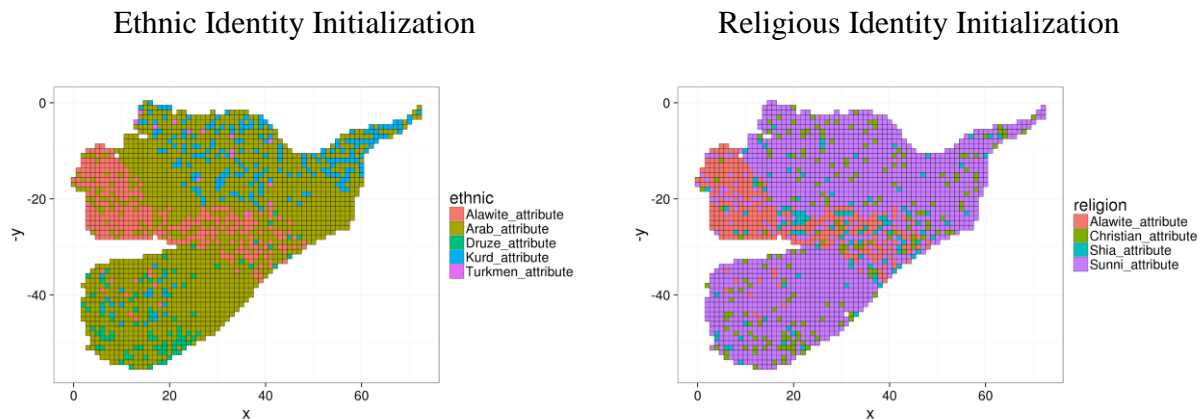
## Identity Groups

Virtual Syria contains dozens of identity groups. The following section briefly describes which groups exist in the model and the data sources used to seed their geographic distribution and density. Identities within the model are divided into five types: (a) ethnic/religious, (b) tribal, (c) regime, (d) militias, and (e) other.

### Ethnic/Religious

To seed ethnic and religious groups, we created governorate-level estimates of all ethnic and religious groups in Syria. The source for these data included the Gulf 2000 data, *Wikipedia* “Governorate” pages, and a number of online maps. We included only the largest groups, which came out to five ethnic groups and three religious groups (see figure 4). We also chose to keep Alawite as a single identity with both an ethnic and religious component.

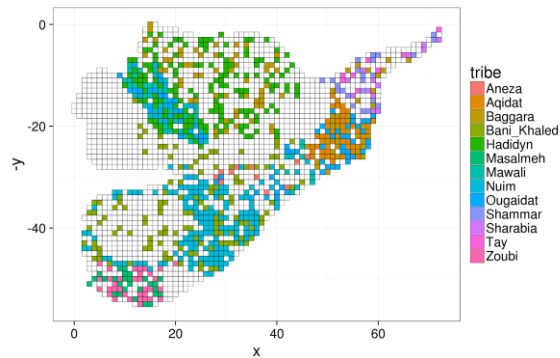
Ethnic and religious groups are also given “thickness” levels, which are meant to register their salience in society (above and beyond people who have an identity “in name only”). These values were developed by subject-matter experts.



**Figure 4: Ethnic and religious identity initialization.**

### Tribal

We seeded the Syria model with 13 tribes (figure 5). Estimates of both the prevalence of particular tribal affiliations and zones of prominence come from a number of sources, including *Wikipedia*, the Congressional Research Service, GlobalSecurity.org, and a number of other websites and maps online. These values were checked and confirmed by a subject-matter expert. Tribes were seeded only in agents with both the Sunni and Arab attributes.



**Figure 5: Initialization of tribal identities.**

### **Regime (State and Military)**

The Syrian state and military identities were seeded using event counts from the Integrated Crisis Early Warning System (ICEWS) event data. These data were created by capturing the average proportion of events carried out by the Syrian state, including the government sector and Bashar al-Assad before 2011 for each governorate. This method gives us a rough estimate of government activity and support per governorate. We captured the same data for the Syrian military, by including events carried out by the military sector.

### **Militias**

The Syria model includes a number of militia groups, some of which existed during the initialization of the model and others that were added during the model run as they appeared in the real world. Those groups include the National Defense Forces, Syrian Social National Party (SSNP), Muslim Brotherhood, Kurdish Democratic Party of Syria, Free Syrian Army, Southern Front, Islamic Front, Al-Nusra Front, Hezbollah, YPG (People’s Protection Units), and the Islamic State. Many sources were used to initialize these groups, including interviews and questionnaires with subject-matter experts, Internet and monographic research, estimates from *Wikipedia’s* territory control maps, and ICEWS event data.

### **Other**

This category includes USA globalizing, business, corruption, Syrian national, and poor. These groups, or political orientations, are implemented using standard procedures employed within our V-SAFT system for modeling many other countries. For example, the “poor” identity was seeded using World Bank estimates of poverty in Syria; “globalizing” identities were implemented as a function of the percentage of gross domestic product that is foreign direct investment.

## **Territorial Zones**

Agents experience their surroundings as a zone within the overall space of the model with which political outcomes have strong effects on their fate. Each of these zones is added via punctuations, and each zone receives a “core” that cannot disappear. These patterns of political authority, responsiveness, conformity, and rebellion that emerge are locally defined and fluid, yielding constant competition at the level of the zones themselves for control of agents (i.e., over the borders of the zones, within Syria). Agents determine their place within each of these “zones of authority” according to algorithms within the dynamic political hierarchy (DPH) module. This array of computer routines—based on theories of cleavage extension, constructivist identity, and nested institutions—classifies identities and agents into five categories: (a) dominant, (b) incumbent, (c) regime, (d) system, and (e) nonsystem.

The largest identity within a zone is first labeled “dominant.” Next, “incumbents” are identified as those groups composed predominantly of agents aligned with the dominant group via overlapping subscribed identities (affiliations included in their repertoire of identities). Put more simply, at the incumbent level are those groups that are most closely aligned with the dominant group. “Regime” groups are those aligned with incumbent groups, “system” groups are those aligned with regime groups, and “nonsystem” groups are not aligned with any groups within their zone of authority. In each time-step, once the DPH calculation is complete, all agents are able to politically mobilize in different ways via either “lobby” (dominant/incumbent groups), “protest” (regime groups), or “violence” (dominant/system/nonsystem groups).<sup>9</sup>

All agents start out in the regime zone, and then punctuation scripts add new zones over time. The model was configured with six of these territorial zones of authority, namely, Assad’s Syria, Free Syrian Army, Al-Nusra Front, Kurdistan, IS, and the Southern Front (see figure 6). Once created, these zones cannot disappear, and new ones cannot emerge endogenously, but the borders and relative size of the zones are “empirically” determined, that is, they are functions of the dynamics occurring within each run.

## **Model Updating and Dynamics**

Identity switching is another key model dynamic, both change in the composition of an agent’s identity repertoire (the identities the agent subscribes to) and change in the particular identity from that repertoire it displays publicly in a particular time-step (the identity the agent activates). Identity is operationalized as the basic logic by which agents at the micro level interact with one another, and identity affiliation is modeled as an attribute that is fungible, multiple, variable in

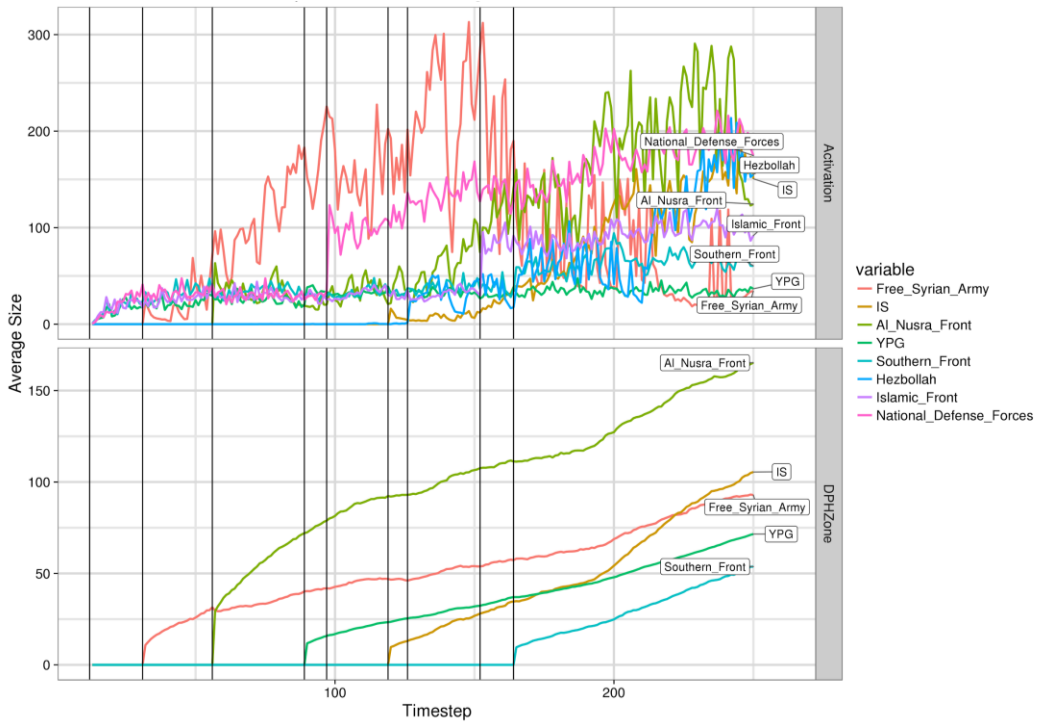
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<sup>9</sup> For greater detail on the dynamic political hierarchy, see Lustick et al., “From Theory to Simulation.”

salience or “stickiness,” but also instrumentalizable. These features reflect core principles within constructivist identity theory.

In each time-step of the model, an agent surveys its neighborhood and available global signals about the relative political desirability of identities. According to a bounded rationality logic, it uses as cues (a) popularity in its neighborhood, including whether it is an “influential” agent, contacts with geographically remote agents within elite networks; (b) the relative influence of neighbors activated on one identity or another; and (c) general signals available, as to currently attractive or unattractive identities. On the basis of the information it gathers, an agent can update its activated identity, update its identity subscriptions, or “stand pat.” Because identity determines relative position within the dynamic political hierarchy it inhabits, it is the interaction of identity and authority that determines political behavior, including mobilization (lobby, protest, attack).

The relative size of identity groups and territorial zones is updated over time, using event data from the ICEWS project. Figure 6 shows identity activation (top) and zone size (bottom) over time on average in our model runs. The variability in identity is determined by the size of those groups according to the corresponding ICEWS event data sectors. The bottom graph shows when particular territorial zones are initialized, although their size after that initialization is completely endogenous to the model. Note that the Syrian state identity and the military zone and identity are excluded from this graph because they are by far the largest identities in the model. Also note that although US and Russian bombings were not included in the model because they primarily occurred after the main period of interest, the Hezbollah identity is meant to represent the foreign intervention of Iranian forces.



**Figure 6: Punctuation scripts over time, average identity activation (top) and zone size (bottom) of key militia groups in the model. The vertical black lines represent each model punctuation where identities, zones, or both are introduced to the model.**

## Part 3: Results and Analysis of Five Counterfactual Experiments

### Unified Western Support

In contemporaneous debates and in retrospective discussions of the unfolding disaster in Syria, an important argument is that a crucial opportunity was missed to use substantial levels of external support to shorten the tenure of the Assad regime and to reduce the scale and intensity of violence in Syria. One key version of this argument emphasizes that the sheer magnitude of domestically based opposition to Assad was sufficient to remove him from power, had that opposition not been as fragmented as it was in 2011. Lister, for example, treats this period as a critical juncture, claiming that had external sources of aid channeled that support to one address, it would have helped maintain and strengthen the unity of the opposition and yielded a less violent and destructive Syrian future. Instead, the fragmentation of the aid, distributed among rival groups, promoted and aggravated splits in the opposition to Assad. “The consistent failure of external states with interests in supporting the revolution to unify their provision of assistance explains not only the proliferation of insurgent factions, but also the opposition’s incapacity to present a genuine threat to the Assad regime.”<sup>10</sup>

To examine this logic and its consequences, we devised a “treatment condition” to compare with the distribution of outcomes that our “baseline” model produces. The key feature of this treatment is that the Free Syrian Army (FSA) is endowed with an exogenous flow of substantially increased resources beginning at the end of August 2011. Information about the FSA—which was collected for months and years following August 2011 in actual Syria—is used in the baseline for lagged updating of model runs, a procedure omitted in the treatment condition.<sup>11</sup>

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<sup>10</sup> Lister, *The Syrian Jihad*, 2. For contemporaneous suggestions of the importance of channeling assistance to a united opposition, see Elliot Abrams, “American Options in Syria,” Policy Innovation Memorandum no. 9, Council on Foreign Relations, New York, October 2011; Michael Doran and Salman Shaikh, “The Ghosts of Hama,” in *America and the Transformation of the Middle East*, ed. Kenneth M. Pollack (Washington, DC: Brookings Institution, 2011), 238; and Trudy Rubin, “Why is U.S. Still Refusing to Arm Rebels?” *Philadelphia Inquirer*, November 9, 2012, posted by Joshua Landis, <http://www.joshualandis.com/blog/obama-recognizes-national-coalition-trudy-rubin-arm-rebels/>. For Kenneth M. Pollack’s advice along these lines, offered somewhat later than is imagined for this counterfactual, see “An Army to Defeat Assad: How to Turn Syria’s Opposition into a Real Fighting Force,” op-ed, Brookings Institution, Washington, DC, September 2, 2014, <https://www.brookings.edu/opinions/an-army-to-defeat-assad-how-to-turn-syrias-opposition-into-a-real-fighting-force/>. It is important to note that most discursively advanced counterfactuals, whether explicit or implicit, are couched in terms that make them extremely complex by interacting the factor identified as important with other counterfactual conditions and then comparing the consequences of these interaction effects on outcomes. In this case, for example, Lister mentions the importance for appreciating the effect of the failure of external aid to be focused and coordinated on ideological differences among dissident leaders and the proliferative effects of decentralized social media use by opposition groups. Lister, *The Syrian Jihad*, 3–4.

<sup>11</sup> For more information on model updating, please see the appendix and the model creation process documentation.

## Technical Operationalization

- The Free Syrian Army receives an asymmetric positive bias (-1 to +4) at time-step 31 (July 2011) and is not steered for the remainder of the run.

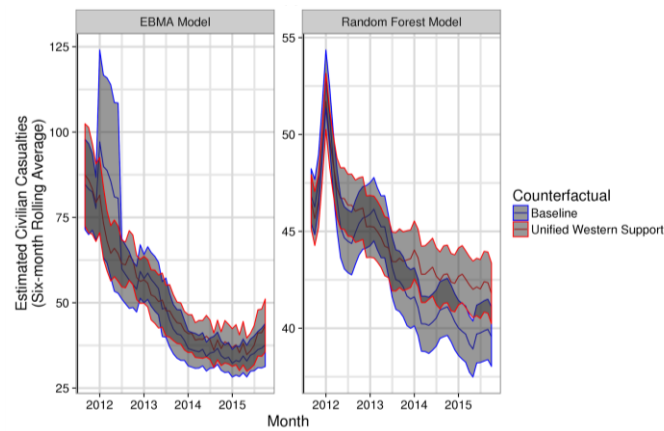
## Effect of Treatment

NB: As will be the case throughout this report, in the figures (7–11) reporting the results of this experiment, red registers average values for the treatment condition (unified support for the FSA), compared with average baseline values in blue. The shaded area represents the 95 percent confidence interval of the average.

Figure 7 reports the main effect on civilian casualties of significantly increasing support to the rebels delivered without dividing that support among competing groups. We see that it was not strong enough to appear significant via the ensemble Bayesian model averaging (EBMA) version of our dependent measure. But using the random forest operationalization for civilian atrocities, we observe an increase compared with the baseline.<sup>12</sup> We shall see that, with one important exception, this undesirable effect of individual counterfactual policies is a pattern across our experiments. In the case of the unified opposition counterfactual, it appears that the increase in civilian casualties is mainly due to a changed pattern of conflict in which many small adjustments in the boundaries separating zones dominated by contending forces are replaced by a smaller number of much larger changes in the context of which more civilians became vulnerable to violence and its effects.

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<sup>12</sup> For a full description of the random forest and EBMA versions of our civilian atrocity model, please see our phase I report at [LustickConsulting.com](http://LustickConsulting.com). For a short description of both models, see the glossary. It is important to remember that our operationalization of civilian deaths, or civilian atrocities, is more precisely rendered as the conditions that were determined to correlate with civilian deaths or atrocities.



**Figure 7: Estimated civilian casualties in baseline and Unified Western Support counterfactual. Compared with the baseline, Western support actually makes civilian deaths more likely (in the random forest model).**

Assessing the credibility of experimental findings requires a manipulation check. Accordingly, for each counterfactual we consider, we will discuss the extent to which the immediate effects of the treatment and its direct consequences, in the world of the model, comport with the main expectation of those who offered the counterfactual as policies or developments that could have had a salutary effect on the extent of civilian casualties. In this case, the question with regard to the potency of the manipulation is, did the operationalization we implemented as the treatment condition actually strengthen the FSA rebels?

Overall, we do observe across the distribution of futures in this condition a substantial increase in the treatment condition of the average strength of the FSA (measured as the number of agents activated on the FSA identity). We also see a pattern of indirect effects, signaling that the operationalization was strong enough to affect various relevant processes and relationships within Syria. These effects included reductions in the strength of the Southern Front and of Hezbollah (figure 8), a decrease in the strength of the IS, Muslim Brotherhood, and general “Sunni” Islam, along with a substantially lower profile for activity we code in the model as “criminal and corrupt.” There was no significant change for Jabhat al-Nusra (JN).

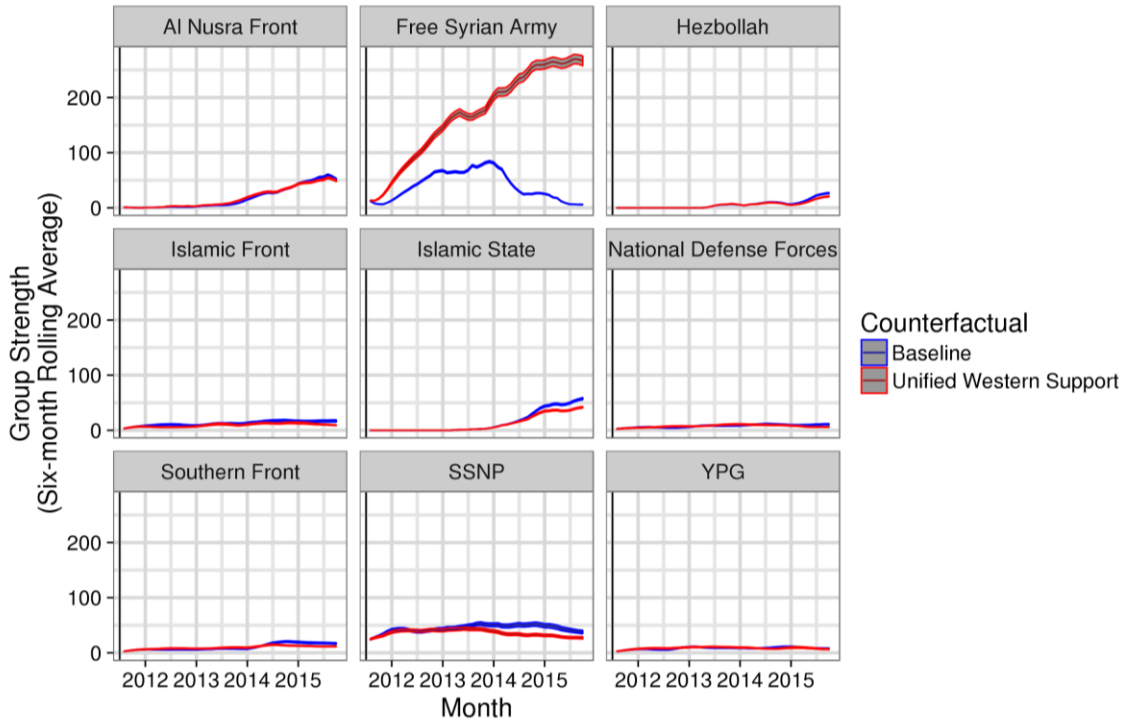
Another result of providing substantial and unified aid to the rebels was to increase the average size of the territories under both FSA and JN control (figure 9). The FSA’s control of the regions in which it dominated was also more thorough, reflected in higher FSA cohesion values.<sup>13</sup> Small increases in cohesion values for other groups—along with a significant reduction in the proportion of Syria controlled by the Syrian state—produced an overall effect of increased fragmentation, and clustering, across the country (figure 10). With respect to the size of the

<sup>13</sup> See the glossary for the technical definition of *cohesion*.



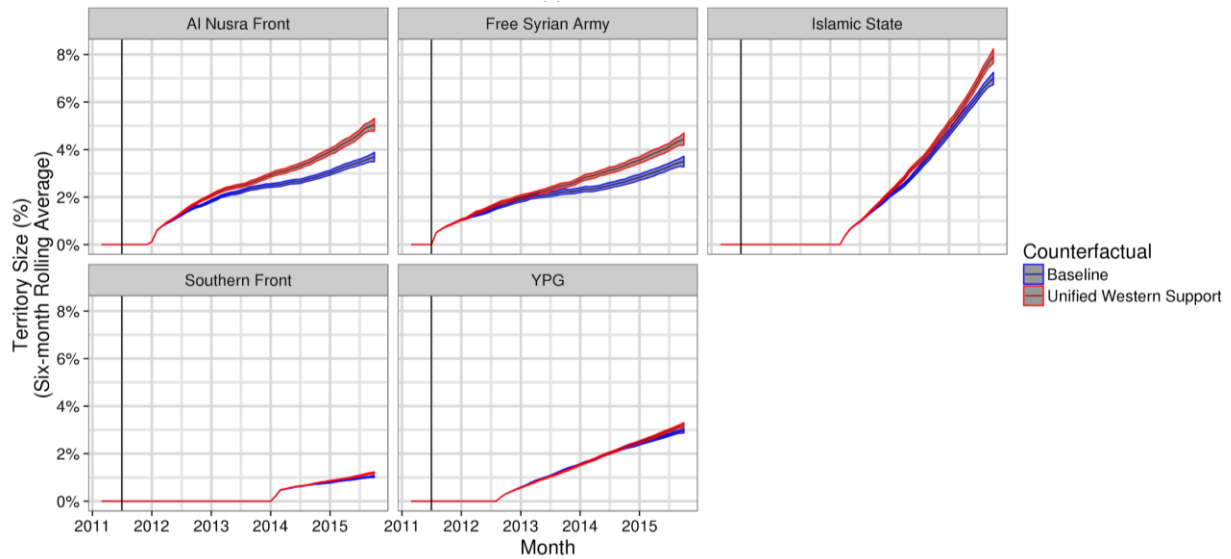
Syrian state, a paired comparison analysis of runs from the baseline and treatment condition showed that in 21.5 percent of the treatment futures, the unified opposition significantly reduces the size of the Syrian state. However, illustrating the complexity of the problem and the number of other variables involved, in 14 percent of the futures, the opposite is the case (figure 11).

In contrast, we observe no significant change in the degree of sectarianism in Syria compared with the baseline.<sup>14</sup>

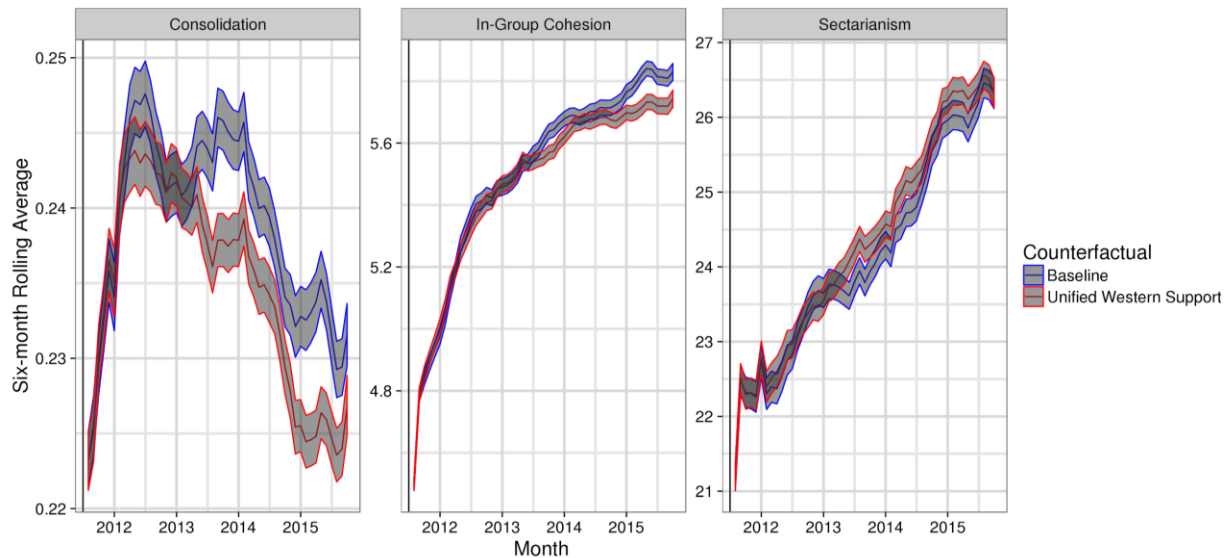


**Figure 8: Militia group strength in baseline and Unified Western Support counterfactual. Activation of selected identities graphed with a six-month rolling average. Note that the direct effect of Unified Western Support is to assist the Free Syrian Army. Second-order effects are noticeable in the statistically significant decrease of most other groups, especially the Islamic State and the SSNP.**

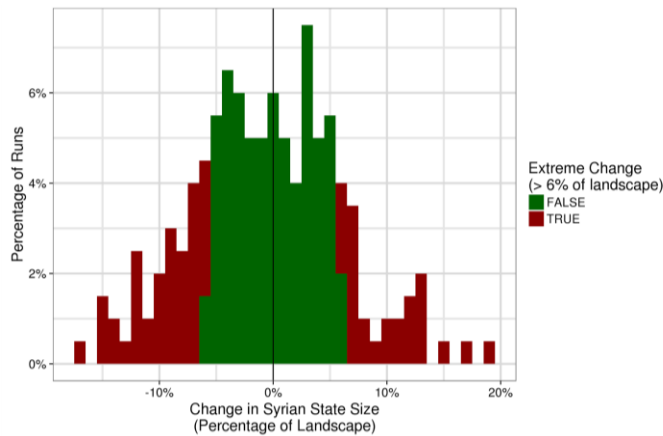
<sup>14</sup> See the glossary for the technical definition of *sectarianism*.



**Figure 9: Territory size in baseline and Unified Western Support counterfactual. As we saw in figure 7, the IS and most other groups actually show a decrease in activation with this treatment. However, here, we see that the associated territory of many of those groups increases. When we see territories grow despite the weakness of the core identity, it suggests that the core identity was exclusionary in a way that restricted the territory’s growth.**



**Figure 10: Sectarianism in baseline and Unified Western Support counterfactual. Although both consolidation and cohesion decrease, consolidation decreases faster, leading to a small but noticeable rise in our measure of sectarianism.**



**Figure 11: Change in size of Syrian state in Unified Western Support counterfactual. Although the Syrian state identity has the same average activation level in the baseline and treatment conditions, we can see that the distribution is uneven. Our model results suggest that an extreme drop in Syria state activation is somewhat more likely than an extreme rise.**

### US Retaliation

In August 2013, the Assad regime killed more than 1,400 people in a sarin gas attack, thereby crossing the “red line” that had been drawn by the Obama administration in connection with Syria’s use of chemical weapons. In both public and closed door debates over US Syrian policy, a prominent counterfactual has pertained to what would have happened had the United States, in late August or early September of 2013, responded by severely punishing the regime for its deployment of weapons of mass destruction. In actuality, the United States did not attack the Assad regime. Absent explicit authorization from Congress, the Obama administration instead partnered with Russia to achieve and implement an agreement that deprived Damascus of most if not all of its chemical weapons capability.

Those advocating American military action against Assad sought thereby to weaken the regime and make it vulnerable to FSA attacks. It was imagined that associated with an American retaliation campaign would be a no-fly zone over the country that could have afforded shelter for moderate rebels and civilians, especially refugees. Such a zone would deprive Assad of one of his most effective weapons and discourage subsequent Russian airpower intervention. Lister argues that this was a critical juncture. By mid-2013, jihadi influence in the Syrian uprising was strong but not yet dominant. Western diplomatic initiatives and the external umbrella organizations seeking to represent the opposition, although heavily criticized from within Syria, retained some credibility.

Although Islamists in Syria expressed public opposition to US intervention, they were not yet the dominant force in the uprising. But according to Lister, when the US did not intervene, “it was perceived by the opposition as a betrayal of the revolution and the Syrian people.”<sup>15</sup> Frustrated with the failure of the Western powers to act effectively, “groups on the ground . . . lost their patience.”<sup>16</sup> Insurgent groups in Syria turned against those outside Syria, whether Syrian or not, seeking to represent the revolution. That reaction prompted important mergers of groups within Syria that brought Islamists to the forefront, leading to widespread denunciation of Geneva II—and by extension the Western supported FSA. That marked the point at which Islamists, led by JN, became the dominant force within the Syrian opposition, pushing the conflict in Syria toward a deep sectarianization, making a peaceful resolution an order of magnitude more difficult. (See data for baseline sectarianism traced in figure 15.) Although Lister, and others, contended that a forceful American response, including a bombing campaign, would have had positive results,<sup>17</sup> more experts contended that the consequences of US retaliation would be negative (or would have been negative) and would have “intensif[ied] the conflict and increase[d] the number of people killed or displaced.”<sup>18</sup>

To explore the claim that the failure to retaliate was a branching point in the conflict, we devised a counterfactual featuring an American military intervention via air power involving a punctuation introduced into our baseline run in September 2013. The punctuation included externally based strikes against state and military elites, a substantial increase in mobilization by key insurgent groups, and a comparable reduction in mobilization rates by established anti-US insurgent groups.

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<sup>15</sup> Lister, *The Syrian Jihad*, 165.

<sup>16</sup> *Ibid.*, 168.

<sup>17</sup> See, for example, Bret Stephens, “Target Assad,” *Wall Street Journal*, August 27, 2013. On August 27, 2013, an open letter to President Obama was published in the *Weekly Standard* signed by 50 well-known political figures, neoconservative commentators, and former foreign policy and national security officials, urging strong retaliation against the Assad regime that would reduce its ability to commit regime atrocities. The signatories included Elliot Abrams, Fouad Ajami, Max Boot, Eliot Cohen, Larry Diamond, Reuel Marc Gerecht, Robert Kagan, William Kristol, Karl Rove, and Leon Wieseltier. Daniel Halper, “Experts to Obama: Here’s What to Do in Syria,” <http://www.weeklystandard.com/experts-obama-here-what-do-syria/article/751267?page=1>. Senators John McCain and Lindsey Graham were among the most vociferous advocates of a forceful US retaliation in response to the chemical weapons attack. See Jason Seher, “McCain, Graham Blast Proposed Syria Solution,” September 14, 2013, CNN, <http://politicalticker.blogs.cnn.com/2013/09/14/mccain-graham-blast-proposed-syria-solution/comment-page-20/>.

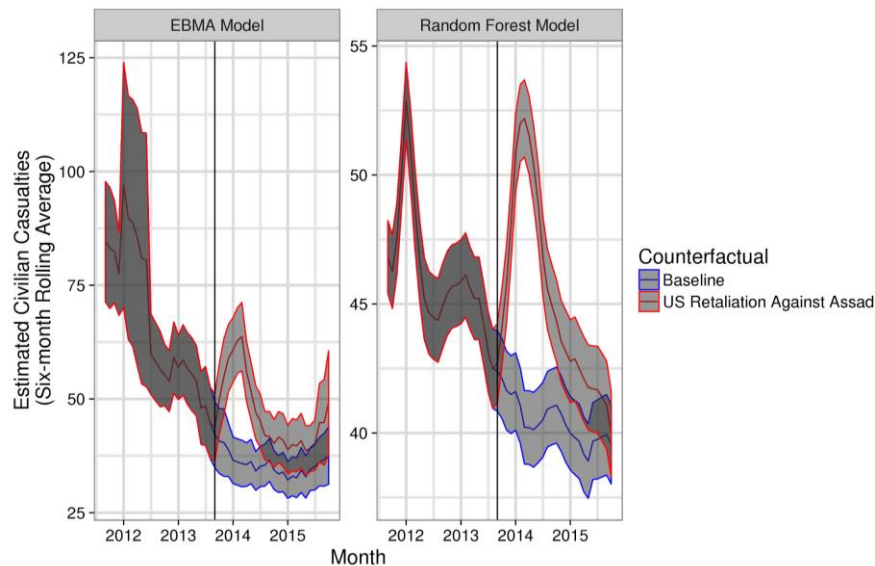
<sup>18</sup> Fareed Zakaria, “Obama Is on the Path to Success in Syria,” *Washington Post*, September 11, 2013. Zakaria was among those warning against US intervention via retaliation for the sarin gas attack, including Juan Cole, “A US Attack on Syria Will Prolong the War,” *Informed Comment*, September 4, 2013, <http://www.juancole.com/2013/09/attack-syria-prolong.html>; and Joshua Landis, “Should the Use of Chemical Weapons Prompt a US Attack in Syria?” *Syria Comment*, August 26, 2013, <http://www.joshualandis.com/blog/should-the-use-of-chemical-weapons-prompt-a-us-attack-in-syria/>.

## Technical Operationalization

- After Assad crosses the “red line” in September 2013 (time-step 142), the United States retaliates by attacking 20 percent of Syrian state elites and 10 percent of Syrian military agents for eight time-steps.
- Twenty-five percent of the Southern Front, Islamic Front, and Free Syrian Army agents that are subscribed but not activated become activated.
- Baseline reward (25 percent activation as above) for anti-US groups (JN and the IS) is removed.

## Effect of Treatment

The effect of US retaliation was a sharp spike in civilian casualties, followed by decline over time, but on average not falling below the baseline condition. Significantly, this pattern, displayed in figure 12, was registered by both our models of conditions producing high levels of civilian casualties. Also significant is that neither model experienced a long-term decline in the rate of civilian casualties following the spike.



**Figure 12: Estimated civilian casualties in baseline and US Retaliation against Assad counterfactual. Both of our atrocity models forecast an increase in civilian deaths as a result of direct US strikes against the Assad state in August–September 2013.**

Again, we can evaluate the credibility of this result by assessing the potency and appropriateness of the manipulations used to operationalize US retaliation against the Assad regime. In this

connection, we observe that the direct result of American retaliation was a sharp drop in the strength of the Syrian state and a notable reduction in Syrian military activation. The reduced prevalence of the Syrian state identity provides opportunities for groups associated with the state, but not of it, to increase their prominence, namely, the Alawites and the National Defense Forces. But Sunni Muslim mobilization also increases. These relatively immediate developments set the stage for a contraction in the size of the segment of Syria within which the regime strongly operates.

The reason this counterfactual policy produces negative results with respect to civilian casualties is that a direct effect of the attacks is to open up political space for other actors, and not just for rebels, such as the FSA. On average, as the runs in this condition move into the future, we observe significant growth in influence, not only of Sunni Muslims but also of business elites and criminal and corrupt elements (which indicates free-wheeling and unregulated but not necessarily violent patterns of competition). With the contraction of the domain of the Syrian state DPH zone, we also observe increases in the average size of all other DPH zones (especially within the “IS” and “Southern Front” zones), indicating a boost to opposition forces in Syria, both jihadi and not.

Thus, the increase in dynamism introduced into Syria by US retaliation is complex and not uniformly positive. On the one hand, the overall amount of violence in Syria drops sharply. The number of attacks registered across the country (both attacks by dominant political forces against dissidents [“dominant violence”] as well as by dissidents against dominant [“subversive violence”]) does subsequently increase but stays well below average baseline levels (figure 13). On the other hand, as noted, both our civilian atrocity models indicate an *increase* in the average presence of conditions productive of civilian atrocities in the wake of American retaliation compared with the baseline.

On the one hand, a substantial decrease in attacks by the Syrian state and military accounts for the overall decrease in violence. On the other hand, by weakening the dominant frameworks of power that protect some districts from violence while restraining extremists within the Syrian state and its allies, the bombing also opens up a kind of Pandora’s box of diffuse attacks by smaller groups on one another—vigilante, paramilitary, tribal, severely alienated, among others—in a more fluid and, in some respects, more dangerous political landscape.

Figure 14 shows that although violence carried out by dominant groups like the Syrian state decreases, it is coupled with a sharp increase in subversive violence from elements isolated from the Syrian political structure.<sup>19</sup> Our analysis shows that subversive violence is more likely to be associated with civilian deaths and is therefore a high risk indicator in our two civilian atrocity

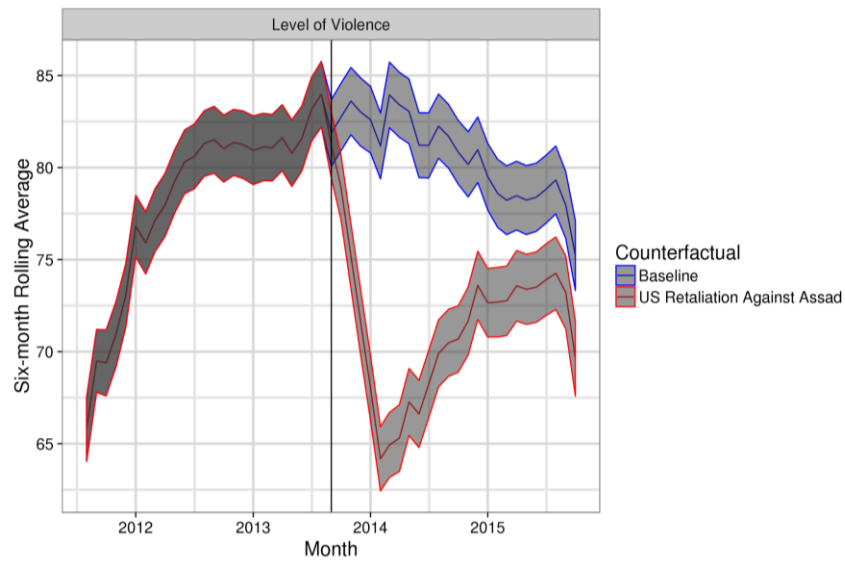
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<sup>19</sup> See the glossary for the technical definitions of *dominant violence* and *subversive violence*.

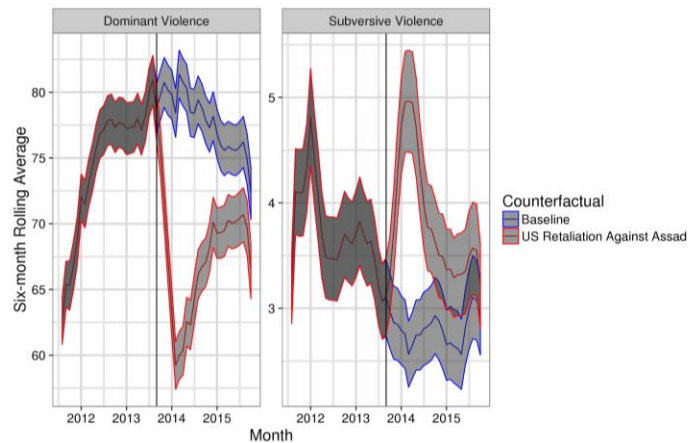
models. Also note in figure 15 how US retaliation simultaneously increases sociopolitical fragmentation (reduction in consolidation) and exposes more individuals to attack by potential opponents (drop in cohesion). Together, we interpret these effects as producing a temporary increase in sectarianism, primarily because of the rapid proliferation of clusters of significant group activation facing off against one another in a kind of pseudo-Hobbesian environment.

A key question, aside from the level of civilian casualties, is what effect US Retaliation had on the FSA, since it might be argued that the risk of increasing civilian casualties would have been worth a boost to FSA prospects? Close examination of model results suggests something more complex. The scatter plots in figure 16 show how the baseline and treatment runs produce patterns of futures featuring higher or lower civilian casualties as correlated with stronger or weaker performance by the FSA. All other things equal, we would prefer futures in the lower right quadrant, with high values for FSA prevalence and low values for civilian casualties. The number of futures in this quadrant was identical—42 out of 200—in both conditions. It is worth noting, however, that the very best futures—the two futures with the lowest civilian casualties and the two futures with the highest FSA values—appear as a result of US Retaliation. Unfortunately, the treatment condition also produces the very worst futures on each of these measures.

Overall, although US bombing had no significant effect on the average of FSA strength, it did have an important effect for those futures in which the FSA was relatively weak. Indeed, we observe that the number of futures in the upper left quadrant changes most dramatically, featuring low FSA influence and high civilian casualties. Figure 17 shows boldface arrows indicating which runs moved from one quadrant to another as a result of the bombing. We see that most of these arrows lead from the lower left quadrant to the upper left quadrant. That movement means that the bombing's main effect on the overall distribution of futures for Syria was in those futures where the FSA was already relatively weak. This result suggests that had the United States retaliated without regard to whether the FSA was positioned to fill the vacuum that would be created, at least temporarily, by the bombing, then there would be substantially enhanced prospects for civilian casualties in the severely unregulated and even anarchic conditions that would be produced in its wake.

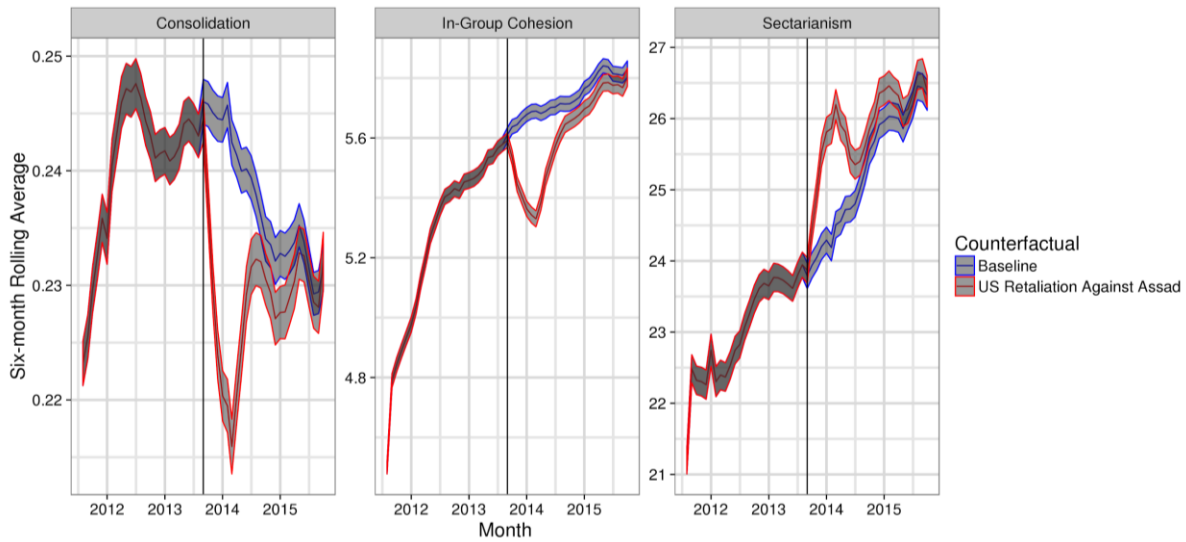


**Figure 13: Overall level of violence in baseline and US Retaliation counterfactual. US attacks on the Assad regime does actually act to dampen the Syrian conflict with respect to overall violence.**

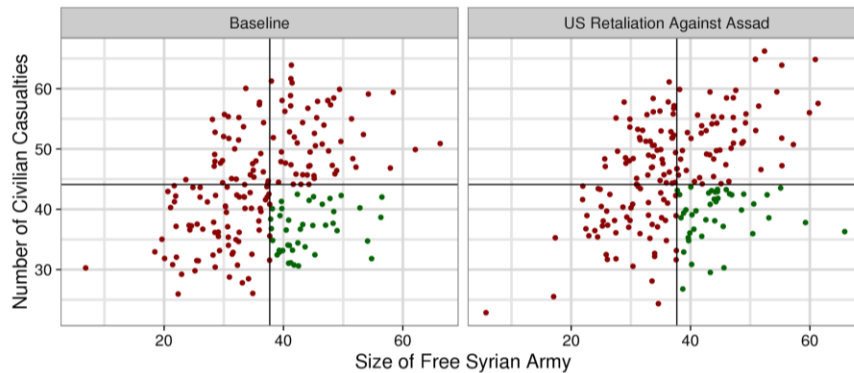


**Figure 14: Dominant and subversive violence in baseline and US Retaliation counterfactual. The drop in overall violence in figure 13 was driven by the decrease in dominant violence (theoretically originating in established and organized political structures). The increase in subversive violence is much smaller in magnitude, but subversive (generally unregulated and somewhat disorganized) violence is a significant factor in both of our civilian death models.**

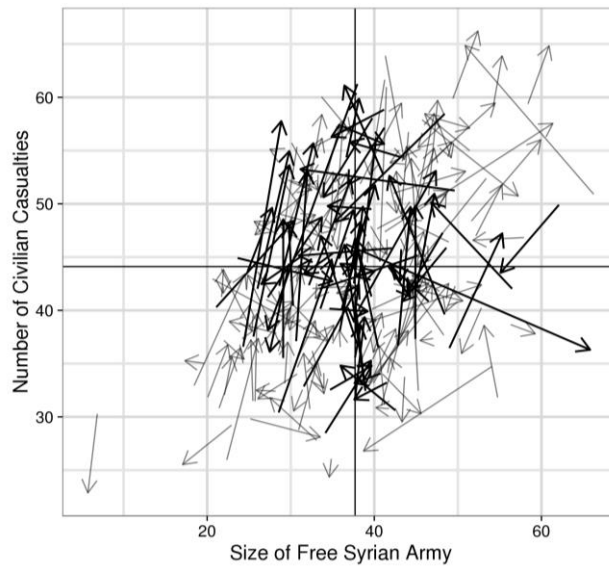




**Figure 15: Sectarianism in baseline and US Retaliation counterfactual. Under the US Retaliation treatment, consolidation and in-group cohesion both fall as the external attacks break up the established distribution of identities. As consolidation falls faster, the net result is a temporary increase in sectarianism (rightmost chart), with the effect decreasing over time.**



**Figure 16: Scatter diagram of size of Free Syrian Army and number of civilian casualties in baseline and US Retaliation counterfactual. Shown are the average size of the Free Syrian Army and number of civilian casualties per run in the baseline and counterfactual cases. The visuals are split into four quadrants where the values are either above or below the global average between the two experiments.**



**Figure 17: Free Syrian Army and number of civilian casualties in baseline and US Retaliation counterfactual. This visual shows the same data as in figure 16, but each run is compared in both the baseline and treatment conditions. Each arrow shows the direction and magnitude of change from the baseline, pointing to the counterfactual condition. Bold arrows are those that move from one quadrant to another. Out of the runs that did change quadrants, most moved from the bottom left to the top left. That movement indicates that the increase in civilian atrocities in the treatment condition is most likely to occur in runs with low FSA strength.**

### **Democratizing Bubble**

In the months following the outbreak of anti-regime protests in Syria, observers commonly suggested the importance of maintaining the nonviolent character of the movement to replace the Assad regime. As the brutality and scale of the regime’s crackdown became apparent, comment and analysis shifted to the strategy of the regime in doing so. The consensus has been that by using savage violence against protesters, the regime induced armed resistance, turning a popular movement demanding democratic change into a civil war, meanwhile hoping to legitimize the regime’s repression against “terrorist” attacks.

Before this view became dominant, some thought Assad exhibited an inclination to hold subordinates accountable for abuses, thereby opening up the possibility of dealing with the opposition politically rather than militarily. Consistent with seeing the correctness of this analysis as plausible, if not probable, until August 2011, high-level US spokespersons repeatedly called on the Assad regime to permit peaceful demonstrations and enter a negotiating process

with the purpose of regime reform, not regime change.<sup>20</sup> When asked in late May 2011, whether the United States viewed Assad in the same way it had viewed Gaddafi, Secretary of State Hillary Clinton made a distinction between Libya as having had a regime whose policies and threats toward civilians could not be tolerated, and Syria, whose leader was “different.” Clinton justified an American decision not to intervene in Syria, in part, on the basis that “many of the members of Congress of both parties who have gone to Syria in recent months have said they believe he’s a reformer.”<sup>21</sup> By August, however, it became unavoidably apparent that the regime was refusing to entertain reform, instead using brutal force to shift the ongoing confrontation to the kind of game it could win, given its overwhelming military superiority and its virtual monopoly on heavy weapons. In August 2011, President Obama marked an abandonment of American hope for democratic reform in Damascus by calling for regime change in Syria.<sup>22</sup>

By treating the regime’s crackdown, present in our baseline, as a critical juncture, we developed a treatment condition we call a Democratizing Bubble. In this counterfactual world, early US policy succeeds in convincing the Assad government to responding in an inclusive and tolerant way to the outpouring of dissent and the desire for change. This treatment condition consists of an opposition movement that emerges in March 2011 that is both broader and less disconnected from political hierarchy than in our baseline condition. This is combined with omitting regime violence directed at opposition elements in the key regions of Syria—Homs and Daraa—where the revolution began. We deem this condition to be so substantial that it makes sense to avoid lagged updating of model runs based on information collected about conditions in actual Syria in the months and years following March 2011.

### Technical Operationalization

- No steering starts at time-step 0 (January 2011).
- The model is still punctuated with the revolution, but the rise of the opposition identity is much stronger.

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<sup>20</sup> See Adam Coutts, “Syria’s Uprising Could Have Been Avoided through Reform,” *Guardian*, May 18, 2011, <https://www.theguardian.com/commentisfree/2011/may/18/syria-uprising-reform-bashar-al-assad>; and Peter Harling, “Crunch Time for the Syrian Regime,” *Foreign Policy*, posted by Joshua Landis, April 29, 2011, <http://www.joshualandis.com/blog/crunch-time-for-the-syrian-regime-by-peter-harling/>.

<sup>21</sup> *Face the Nation* transcript, May 27, 2011, [http://www.cbsnews.com/htdocs/pdf/FTN\\_032711.pdf](http://www.cbsnews.com/htdocs/pdf/FTN_032711.pdf). See also Dominic Tierney, “Bashar al-Assad and the Devil’s Gambit,” *Atlantic*, July 16, 2014, <http://www.theatlantic.com/international/archive/2014/07/assad-and-the-art-of-the-devils-gambit/374501/>; and Hokayem, *Syria’s Uprising*, 15, 40–41. Particularly revealing is an account of a slow change of mind within the administration by a State Department official with responsibility to advise on policy toward Assad and Syria in early 2011. See Frederic Hof, “I Got Syria So Wrong,” *Politico*, October 14, 2015, <http://www.politico.com/magazine/story/2015/10/syria-civil-war-213242>.

<sup>22</sup> Scott Wilson and Joby Warrick, “Obama: Assad Must Go,” *Washington Post*, August 18, 2011, [https://www.washingtonpost.com/politics/assad-must-go-obama-says/2011/08/18/gIQAelheOJ\\_story.html](https://www.washingtonpost.com/politics/assad-must-go-obama-says/2011/08/18/gIQAelheOJ_story.html).

- Identification with the opposition is more diffusely present across regions of Syria and exists within multiple existing elite networks.
- Removal of regime violence directed at opposition elements in the key regions of Syria—Homs and Daraa—where the revolution began.

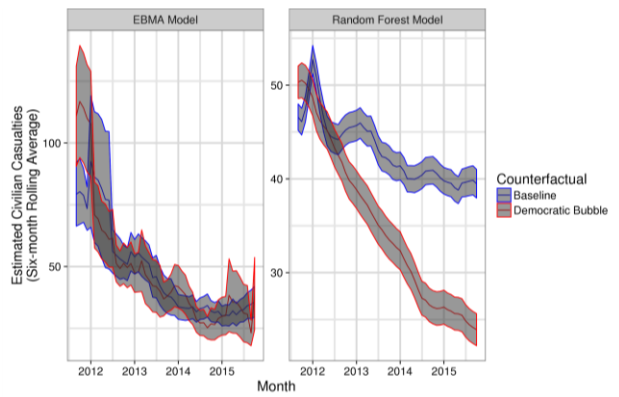
### **Effect of Treatment**

As is apparent from the results of the random forest model displayed in figure 18, civilian casualties are greatly reduced in the distribution of treatment condition futures—that is, assuming regime engagement with the opposition in a process of democratizing reform. This effect is not apparent from the EBMA model, but for reasons explained in the appendix, we believe that in this case the random forest model should be assessed as more reliable as a measure of civilian casualties than the EBMA model. Indeed, the effects of this manipulation on the possible futures of Syria were quite dramatic. The drop in expected civilian atrocities is pronounced and is associated with substantially reduced levels of violence, lower levels of sectarianism, greater integration of more Syrians into the political system, and small numbers of dangerously alienated agents.

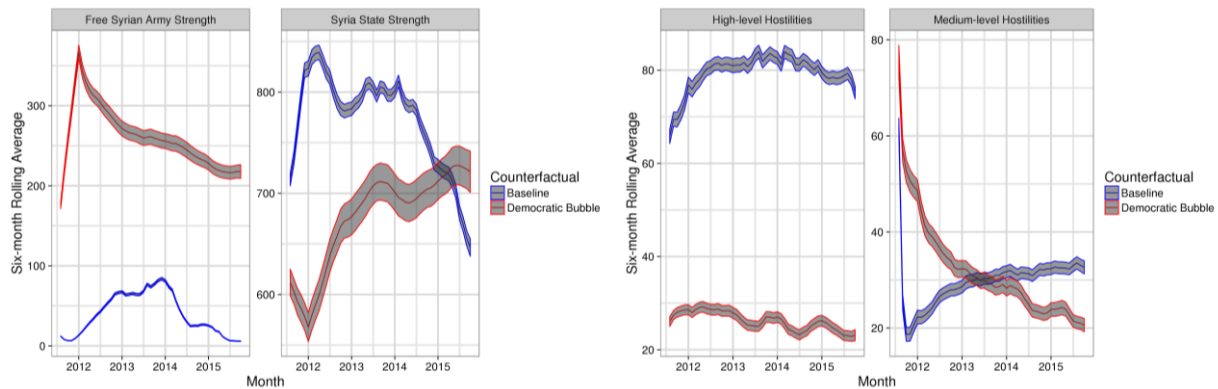
More generally, and again focusing on whether the manipulation used to operationalize the Democratizing Bubble had its immediate intended effects, we see that in the treatment condition, the Syrian opposition is more widely present and better integrated into existing networks of influence than in the baseline (which features an early and severe regime crackdown and a concomitant isolation of opposition elements from important sectors of Syrian society). In figure 19, we see that the strength of the Free Syrian Army (perhaps a misnomer in the treatment condition, since the reform movement did not become an armed organization until after the regime crackdown) is substantially greater in the treatment condition, as measured by the proportion of the population actively identifying with it. Simultaneously, the prevalence of the Syrian state as well as of the Syrian military remains much reduced compared with the baseline. Interestingly, whereas the Syrian military’s salience remains low compared with the baseline, the Syrian state itself eventually recovers its strength, although it never achieves the levels of domination of the society observed in the baseline condition.

Although most identities experience a decrease in cohesion, overall Syria experiences an increase in cohesion of certain large groups that dominate more thoroughly the regions where they are most prevalent. These groups include especially the FSA, but also Sunnis and the poor. In this treatment condition, the model also shows that corruption and criminality intensify their domination of significant portions of Syria. In general, we observe considerably less

fragmentation (greater consolidation) as measured by the number of groups attracting public support<sup>23</sup> (figure 20).



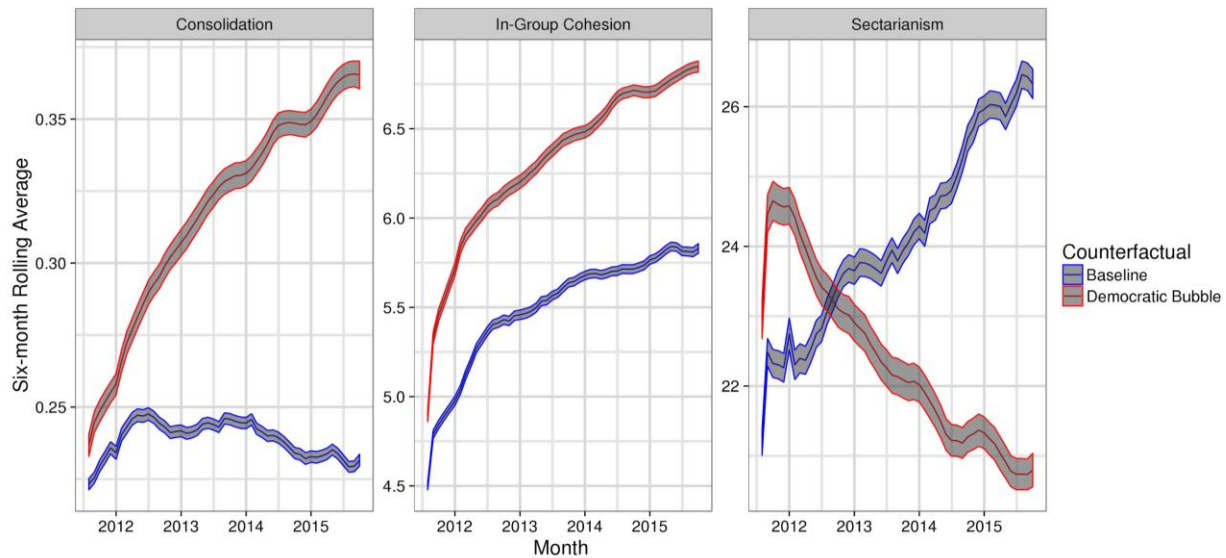
**Figure 18: Estimated civilian casualties in baseline and Democratizing Bubble counterfactual. The EBMA and random forest forecasts of civilian atrocities are based on model outputs. The random forest model shows a significant and steady decline in civilian deaths, though the EBMA model does not. (See the appendix for more information on why the EBMA does not see a change in the estimate.)**



**Figure 19: Comparisons of Free Syrian Army and the Syrian state (left) and hostilities in baseline and Democratizing Bubble counterfactual (right). Note that the less violent Democratizing Bubble causes a significant strengthening of the FSA that the model dynamics generally maintain. However, although the Syrian state begins much weaker, it ends in a stronger position than the conflict-ridden baseline. The comparison on the right underlines that dynamic, with the treatment showing far lower violence (left) and a level of protest that begins higher but ends lower than the baseline, indicating a model that is**

<sup>23</sup> See the glossary for the technical definition of *consolidation*.

significantly more peaceful and shows a tendency toward political stabilization.



**Figure 20: Sectarianism in baseline and Democratizing Bubble counterfactual. The two factors and final sectarianism metric for the Democratizing Bubble experiment are illustrated. Consolidation increases, outpacing in-group cohesion. This outcome suggests that a few identities become much more prevalent in the map, but that those identities are far more tolerant of interspersed minority-activated identities—the portrait of a unified but tolerant society. The overall sectarianism measure reflects that with a steady decrease afterward.**

### Weakened Jihadis

We make the reasonable assumption that an early overthrow of the regime and the assumption of power by the non-jihadi Syrian opposition would have reduced civilian atrocities. This type of trajectory for Syria features a successful rebellion against the Assad regime, even after it conducts a brutal crackdown and even absent unified external support. One specific argument along these lines is that this type of future was attainable had jihadi groups such as JN and the IS not emerged in Syria or had they been prevented from mobilizing effectively as armed groups intervening in Syria. A specific version of this counterfactual, inferable from Lister’s analysis, is that the jihadization of the conflict strongly contributed to its sectarianization, thereby establishing JN and the IS as “objective” allies of the Assad regime. In this particular respect, Lister makes no important distinction between JN and the IS. For the purposes of his analysis of the conflict in Syria, both organizations pursued a policy of sectarianization to mobilize Sunnis across the region, and within Syria in particular, against non-Sunni groups, states, and

organizations. This kind of mobilization directly interfered with the ability of the opposition to build a cross-communal “Syrian” movement of democratic and even secular opposition to the regime.<sup>24</sup>

Accordingly, we designed a counterfactual experiment to observe the effect on political outcomes and on civilian casualties of substantially weaker intrusions by both JN and the IS into the Syrian space. As in the baseline, JN is introduced in January 2012. The IS is introduced in April 2013. We do the same in the treatment condition, but adjust the stochastic stream of below-the-analytic-horizon perturbations so as to reduce the availability of favorable circumstances for the growth of these movements.

### Technical Operationalization

- Although the Al-Nusra Front and the Islamic State are still both introduced into the model, the identities both receive asymmetric negative biases (−4 to +1) and are not steered for the remainder of the run starting at time-step 56 (January 2012).

### Effect of Treatment

As shown in figure 21, the effect of Weakened Jihadis on civilian casualties, in both our models for estimating that outcome, was insignificant for the three years following the counterfactual weakening of Jabhat al-Nusra at the beginning of 2012 and the two years following the counterfactual weakening of the IS in April 2013. However, the treatment condition did produce a delayed *increase* in civilian casualties that was substantial, an increase appearing in late 2014 and early 2015, according, respectively, to the EBMA and random forest models. We may seek to understand this intriguing result by focusing on the role of sectarianism.

As expected, the treatment greatly reduces the profile of both JN and the IS. The reduction of jihadi influence naturally opens up opportunities for other groups. Thus, the prevalence of Hezbollah activation exhibits a notable increase as does that of the Islamic Front, an organization established as a non-jihadi framework for Sunni Muslim mobilization against the Assad regime. Also benefiting from jihadi weakness were the National Defense Forces, and Syrians activated on what we treat as a cosmopolitan pro-Western “globalizing” identity. Despite the relative weakness of what, in the baseline condition, were the dominant (jihadi) groups within the

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<sup>24</sup> See Lister, *The Syrian Jihad*, 79–81, 90–93, 128–29, 153, 221–43. See also Hokayem, *Syria’s Uprising*, 90–100. A study prepared in late 2012 for the Center for Genocide Prevention of the United States Holocaust Memorial Museum emphasized that the sectarianization of the conflict—beginning with anti-Sunni Alawite-centric policies of the Assad regime and then reinforced by the anti-Nusayri (Alawite) and anti-Shia rhetoric and violence of jihadi groups such as Jabhat al-Nusra—was making it dangerously liable to produce large-scale civilian atrocities, and even genocide. Frederic C. Hof and Alex Simon, “Sectarian Violence in Syria’s Civil War: Causes, Consequences, and Recommendations for Mitigation” (paper commissioned by the Center for the Prevention of Genocide, United States Holocaust Memorial Museum, March 2013), <https://www.ushmm.org/m/pdfs/20130325-syria-report.pdf>.

“Nusra” and “IS” zones of political contestation, the Syrian state and its allies are generally not strong enough to exert their domination over those areas. Indeed, the dynamics of competition within these zones lead to slight increases in their size. Within those larger zones, with the jihadis weakened, tribal and Sunni Muslims tend to emerge as most influential.

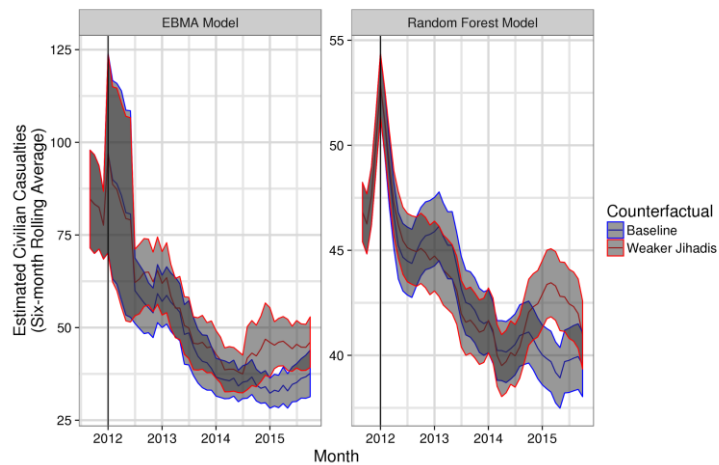
A key pattern we observe—in keeping with expectations of analysts whose work offered this counterfactual as a promising future for Syria—is that by substantially weakening the influence of JN and the IS, a significant reduction in sectarianism was achieved (figure 22). According to Lister, other authors, and theorists of communal conflict, such as Barry Posen and Chaim Kaufmann, sectarianization greatly reduces the credibility of postconflict commitments by elites.<sup>25</sup> This factor drives the conflict into vicious cycles of fear and aggression that make negotiated resolutions of the fighting extremely difficult, auguring for higher civilian casualty levels over longer periods.

Our findings raise questions about that relationship. Our measures of sectarianism and its components (fragmentation—the inverse of consolidation; and in-group cohesion) suggest that sectarianization proceeded apace, with little difference between treatment and baseline conditions, until early 2015 when we note an increase in in-group cohesion and overall sectarianism, while an uptick occurs in consolidation. This factor may be interpreted as an increase in the intensity of competition among a smaller (but still significant) number of large but increasingly parochial groups. So the overall results do not establish the potent and linear relationships posited between jihadism and sectarianism, and between sectarianism and civilian casualties. At the same time, data collected from the 2015 period of the runs do support the idea that a new, more broadly distributed kind of sectarianism would likely have emerged by that time, even in the absence of a strong jihadi group. Consistent with the intuition of Lister and others, the timing of this increase was associated with higher civilian casualties.

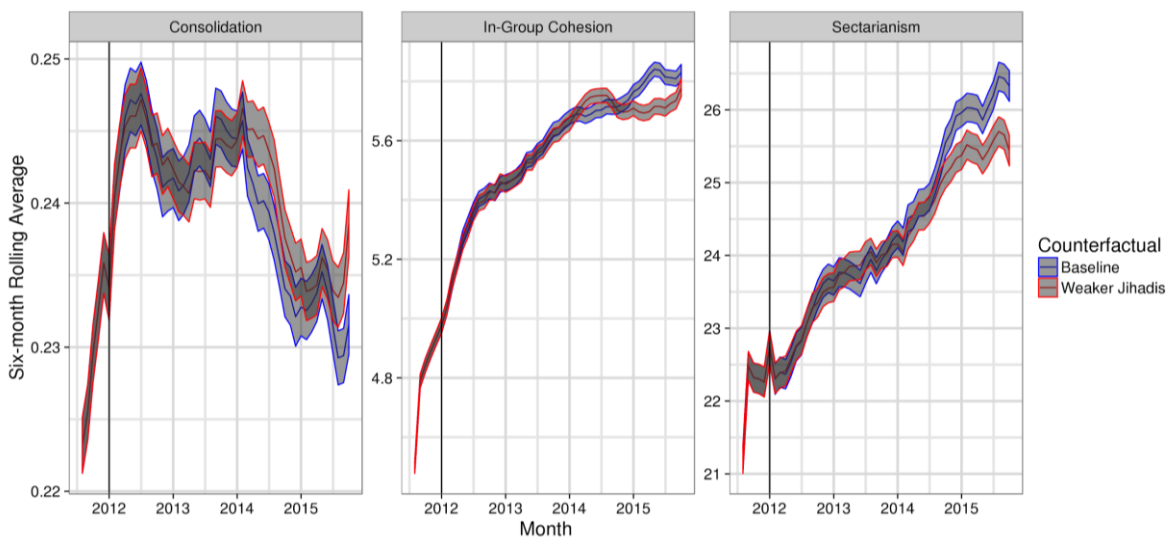
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<sup>25</sup> Barry Posen, “The Security Dilemma and Ethnic Conflict,” *Survival* 35, no. 1 (1993): 27–47; Chaim Kaufmann, “Possible and Impossible Solutions to Ethnic Conflict,” *International Security* 20, no. 4 (1996): 136–75. For extensive treatment of ideas of sectarianism and sectarianization as applied to the contemporary Middle East, see “The Gulf’s Escalating Sectarianism,” POMEPS Briefing, no. 28, January 5, 2016, especially 6–33. For a thorough and critical treatment of the mechanisms through which sectarianization operates, see James D. Fearon and David D. Laitin, “Violence and the Social Construction of Ethnic Identities,” *International Organization* 54, no. 4 (2000): 845–77.





**Figure 21: Estimated civilian casualties in baseline and Weakened Jihadis counterfactual. The Weakened Jihadis treatment condition actually leads to a slight increase in both of our civilian death models.**



**Figure 22: Sectarianism and contributing factors for the Weakened Jihadis experiment. Both factors contribute to a slight decrease in overall sectarianism, confirming that weakening the most historically divisive identities does actually lower the overall sectarianism of our model. The decrease is not particularly large, which is understandable given the sheer number of active identities contributing to Syrian sectarianism.**

## No Iranian Intervention

Until mid-2012, Lister characterizes the conflict in Syria as a “fledgling insurgency,” after which it took on the shape of a “bloody and complex civil conflict.”<sup>26</sup> By his account, however, the Assad regime was still vulnerable; distinctly so following a series of rebel victories in the 12 months between mid-2012 and mid-2013. It was at this point that an Iranian-backed Hezbollah offensive—launched from Lebanon and featuring recapture of the Syrian town of Qaysar in June 2013—turned the tide in favor of the Syrian state. Subsequently, steadily building Iranian military aid to the Assad regime, including the influx of Shia militia fighters from outside Syria, led to six months of victories for the regime over insurgents.

We may thus consider Iranian intervention, especially via Hezbollah and other fighters, as a possible critical juncture in the Syrian conflict. This in turn implies the interesting counterfactual of what would have been consequent on an Iranian decision not to have substantially escalated its support for Assad in the first half of 2013, including sponsorship of Hezbollah as a potent actor within the Syrian conflict. Although this decision would have had to have been taken in Tehran, a US policy of “containment” toward Iran was, during this period, identified as a factor that could have influenced the Iranian regime to have made this choice and thereby prevented the potent Iranian intervention in Syria.<sup>27</sup>

Our baseline distribution of futures was produced using a script that reflects the actual course of events in Syria in 2013 and that includes an intervention by a sizable Hezbollah force of external origins into the areas of Syria in which Hezbollah became a potent actor at that time. The script also includes a sustained pulse of attacks against the FSA, intended to simulate a boost in the military potency of the Syrian state that coincided with Iranian intervention and the reality of a substantial Iranian increase in its aid at this time to the operating capacity and weaponry of the Syrian military. The treatment condition (No Iranian Intervention) is produced by running the baseline script *without* these punctuations.

## Technical Operationalization

- The Hezbollah identity is not introduced, and no additional attacks occur in May 2013 (time-step 126), representing the rearming of the Syrian state.

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<sup>26</sup> Lister, *The Syrian Jihad*, 5.

<sup>27</sup> See, for example, Karim Sadjadpour and Diane de Gramont, “Reading Kennan in Tehran,” *Foreign Affairs* 90, no. 2 (2011): 160–63; Ted Bromund and James Phillips, “Containing a Nuclear Iran: Difficult, Costly, and Dangerous,” *Backgrounder*, no. 2157, February 14, 2011, [http://thf\\_media.s3.amazonaws.com/2011/pdf/bg2517.pdf](http://thf_media.s3.amazonaws.com/2011/pdf/bg2517.pdf); and Steven Heydemann, Fred Lawson, David Lesch, and Patrick Seale, “Roundtable on Syria Today,” *Jadaliyya*, March 31, 2011, <http://www.jadaliyya.com/pages/index/1077/roundtable-on-syria-today-%28part-1%29>.

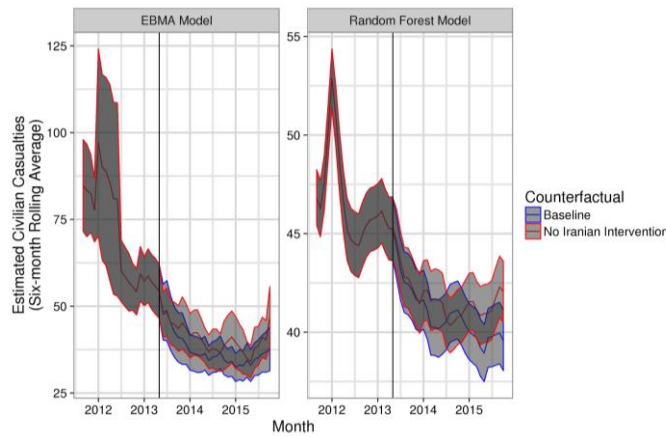
- Steering in May 2013 is stopped (since it represents the world where Iran did support the regime).

## **Effect of Treatment**

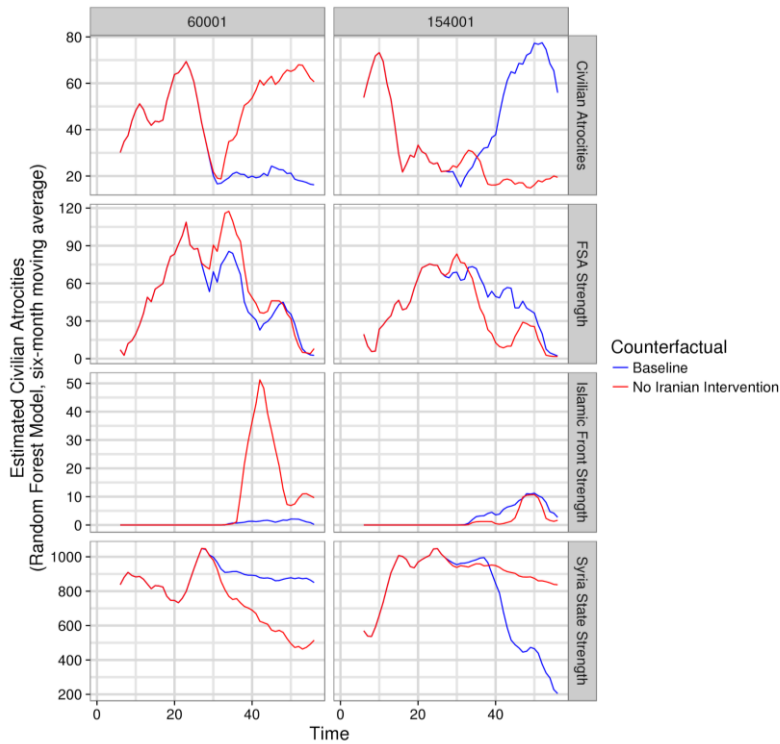
According to both our models, civilian atrocities would on average have risen somewhat in the absence of the Iranian intervention (figure 23). Again, this outcome seems related to the theoretical importance of conditions of unregulated competition as a circumstance that powerfully drives the likelihood of atrocity events. But it is also worth noting that with Hezbollah's virtual disappearance from the scene, the IS enjoys even more success than in the baseline, accounting, perhaps, for a substantial proportion of the increase in civilian casualties.

However, we should not only think in relation to averages, but also regard every counterfactual world as a complete ensemble. Accordingly, no world that could be actual is traceable as an "average" world. Indeed, even if average values of the baseline and treatment conditions are not dramatically different, a pairwise comparison of individual runs of the model can reveal quite dramatic differences in certain particular counterfactual futures. We see this in figure 24, which displays the results of the random forest model's interpretation of the effects of No Iranian Intervention on several key outcome variables. Most notably, in the top row, reporting civilian atrocities, we see in this particular future a very dramatic drop in the scale of civilian atrocities as a result of Iran's absence from the conflict.

Checking the efficacy of the manipulations that produced the treatment condition, we note one obvious, direct, and intended effect of the treatment condition: with Iran's not intervening in mid-2013 via Hezbollah and with a boost to the Syrian military's capability and aggressiveness, Hezbollah itself is hardly present in Syria. Partially as a consequence, we also observe an increase, although temporary, in FSA influence in Syria (figure 25). Additionally, we see increased competition in the regions of Syria bordering Lebanon where the Hezbollah intervention was most salient. This outcome includes more fragmentation and more intense competition among groups such as the SSNP, the poor, and the Islamic Front that scramble for support in these areas as rivals of one another. Secondary and tertiary effects of the manipulation include higher levels of criminal and corrupt activity, which in our models are normally associated with more fluid political dynamics. Somewhat surprising, perhaps, the treatment condition does not increase sectarianism (at least as we are measuring it), though it does marginally reduce support for the US globalizing identity. This latter pattern may reflect the propensity of some Syrian actors, in the baseline condition, to exploit the animosity between the US and Iran by mobilizing on that identity.

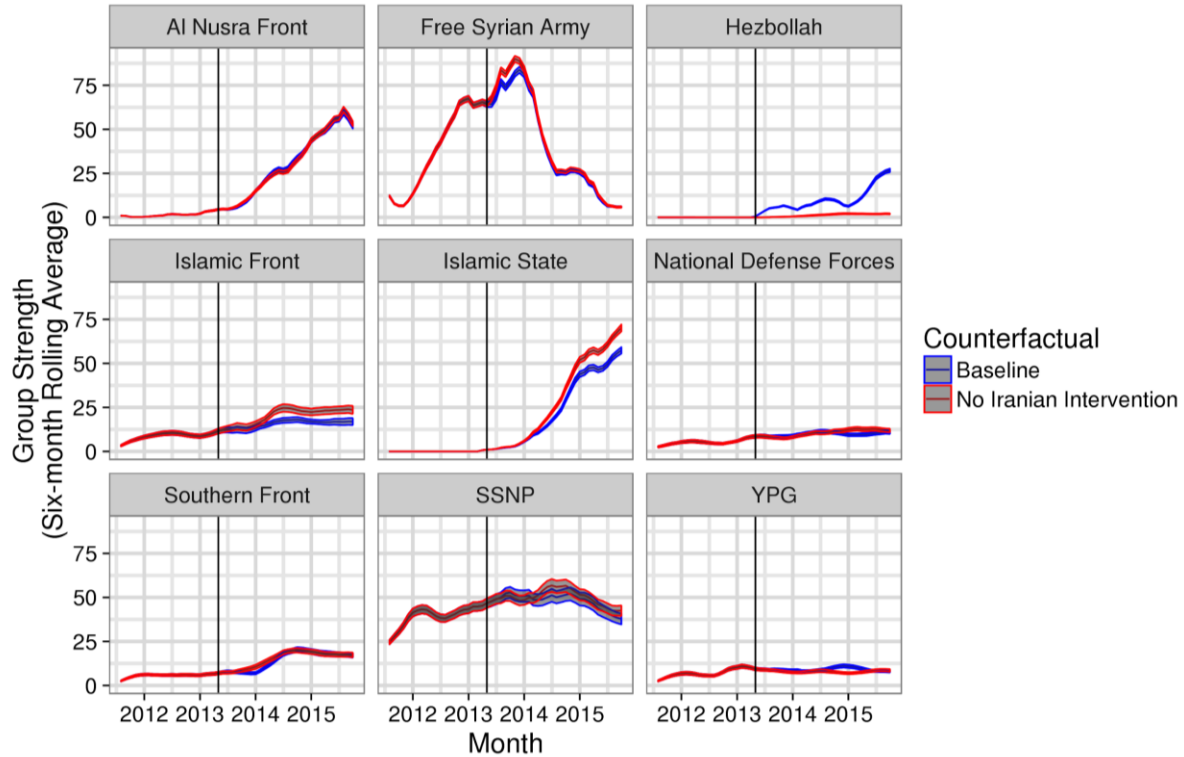


**Figure 23: Estimated civilian casualties in baseline and No Iranian Intervention counterfactual. Both models suggest that without the Iranian intervention, civilian atrocities would have been marginally higher, though the result is rather weak statistically.**



**Figure 24: Comparison of baseline and No Iranian Intervention counterfactual. In these two runs, the punctuation had a significant and rather drastic effect on the course of the model's history, especially with respect to civilian atrocities and Syrian state strength. However, the effects were opposites. This result demonstrates that a weak or nonexistent**

effect on average does not mean a counterfactual had no effect, as it is perhaps more likely that in the chaotic context of Syria, it merely had an unpredictable and evenly distributed effect.



**Figure 25: Militia group strength in baseline and No Iranian Intervention counterfactual. The activation of select identities in worlds where Iran did (blue) and did not (red) intervene in Syria is compared. Hezbollah practically disappears as a direct effect. The Islamic Front and the Islamic State do noticeably better. The Free Syrian Army does better in the short term but fails to consolidate and maintain the advantage.**

## Part 4: Conclusion

Each of our counterfactual treatment conditions—introduced at points hypothesized to be critical junctures—led to substantially different distributions of futures. That result supports the suggestion that each was indeed a branching point in the vast network of unfolding counterfactual worlds through which the Syria that has become “actual” traveled, but it does not confirm the “criticalness” of those branching points. That is to say, the presence or absence of these treatment conditions may each divide the state space of the possible into more or less separate zones of potential outcomes without those zones differing significantly in the prominence of desirable or undesirable outcomes.

The results speak directly, if not happily, to the question at the center of this inquiry: whether and how the scale of civilian casualties associated with the Syrian conflict could have been reduced. Leaving aside the Democratizing Bubble, each of our treatment conditions—including two that would have expressed direct US intervention (Unified Western Support for the opposition and US Retaliation) and two that could have been encouraged to occur, depending on US policy choices (Weakened Jihadis and No Iranian Intervention)—resulted in *increased* civilian casualties. To be sure, this effect was less clear with regard to Unified Support and No Iranian Intervention than it was in connection with US Retaliation and Weakened Jihadis. But in none of these conditions (aside from the Democratizing Bubble) did taking the path forward that at least some commentators or policy makers had advocated result in conditions likely to have produced fewer civilian casualties.

As noted, however, we found that one treatment condition did yield a high probability of a dramatic drop in the number of civilian casualties: the Democratizing Bubble. Interestingly, that was the policy option pursued by the US government for the first half year of the disturbances in Syria. That policy failed and was abandoned in the face of incontrovertible evidence that the Assad regime was unwilling to allow a peaceful reform process to develop. So we may think of it as a misguided or mistaken policy. But we may also think of it as the only way that the slim but real opportunity to avoid the Syrian catastrophe could have been effectively pursued.

The bottom line is that this welcome outcome required a regime ready to accept mass mobilization toward reform and a high likelihood of a change in the social and political composition of the rulership of the country. Had that reading of the regime’s potential been correct, our experiments strongly suggest that the strategy could have been successful. Our implementation of this version of possible regime response to the dissident wave in early 2011—including especially the absence of large-scale state-sponsored coercion against Assad opponents—yielded positive results on virtually every dimension of interest to policy makers, not just in the reduction of civilian casualties. Not only were civilian casualties substantially

reduced but so was the influence of the Syrian military and the strength of jihadi organizations and movements. The dissidents who became the FSA in actual Syria were greatly strengthened in the distribution of counterfactual Syrias produced by this treatment, and large groups disenfranchised under the rule of Assad emerged as significant political forces on the national scene. Patterns within these futures showed an initial weakening of the regime as these new forces entered the arena of legal contestation, but then, encouragingly, a strengthening of the state as new alliances formed to produced new equilibriums.

But the implications of these results are themselves sobering. That allowing legal mobilization by masses of dissidents would translate into effective reform of the regime, contraction of the Syrian state, and its political reconstruction is precisely the belief that drove the decision of Assad and his tight circle of supporters to prevent it. Thus, may we appreciate the powerful assessment of self-interest that drove Assad to use brutal violence to transform a nonviolent mobilization for reform into a bloody armed conflict. In other words, what we may see in these results is the rationality, for Assad, of the policy he chose. And if that was the dominant option for him, it would help explain why in fact the peaceful and democratic potential of the uprising was not permitted to be realized, and why perhaps it never had much of a chance of being realized.

In the end, we are constrained to conclude that the only apparently reliable path to avoiding large-scale civilian atrocities in Syria ran through Damascus or, perhaps, Latakia. Absent a decision by Assad to take his chances with a legalized mass movement of dissent, and absent a decision by the West and the regime's regional foes to allow Assad to impose his brutal will relatively quickly via elimination of his internal enemies, prospects for avoiding catastrophe for large numbers of Syrians were not high. Furthermore, although in some futures associated with various interventions, Syrians were better off along most dimensions than they were in reality, no one course of action studied here can be considered to have been a reliable route to the achievement of that end.

**Table 1: Overview of Counterfactual Outcomes**

<b>Counterfactual Treatment Condition</b>	<b>Effect on Conditions Liable to Produce High Rates of Civilian Casualties</b>	<b>Syrian State Strength</b>	<b>FSA Strength</b>	<b>JN and IS Strength</b>	<b>Other</b>
<b>Unified Western Support for the opposition</b>	Increased by one model; no significant difference in the other	Reduced	Increased	JN: Unchanged, but slight increase in territorial control IS: Decreased	Contraction in territorial control of Syrian state; increase in territorial control of opposition groups; decreased criminal activity
<b>US Retaliation</b>	Increased, especially under conditions of FSA weakness	Short-term decrease, no change long term	Not significantly affected	No change	Dramatic drop in violence; amounts increase but level off in 2015 at significantly lower values; temporary increase in sectarianism
<b>Democratizing Bubble</b>	Dramatic drop	Greatly reduced, but recovers; Syrian military reduced	Greatly increased	Greatly reduced	Sunnis and poor mobilize more widely and effectively
<b>Weakened Jihadis</b>	Increase, apparent after two-year delay	No change	No change	Greatly reduced	Increase in Hezbollah, NDF, Islamic Front, tribes
<b>No Iranian Intervention</b>	Slight increase; but in some futures dramatic increase	Temporary increase	No change	No change in JN; slight increase in IS	More intense competition and violence in areas of Syria bordering Lebanon; more criminal activity

*Note:* Red = negative; green = positive; white = neutral; FSA = Free Syrian Army; IS = Islamic State; JN = Jabhat al Nusra; NDF = National Defense Forces.



As discussed in the report of experimental results, the effects of our counterfactual treatments were not confined to their implications for civilian casualties. The relative attractiveness of these treatments, as policy options, is exhibited along different dimensions. Again, the Democratizing Bubble stands out for the fact that in its aftermath, every metric listed in table 1 registered the probability of improvement in Syrian outcomes. The second most promising counterfactual, involving early Unified Western Support for the opposition, was promising, not because it reduced expected civilian casualties (in the time frame of the study, that is, up to but not including 2016), but because it featured a stronger FSA, a weaker Syrian state, weaker jihadis, and a reduction in criminal activity. For the others, however, improvements on one dimension were accompanied by unwelcome developments on other dimensions, as is apparent from the pattern of red highlighted cells in table 1.

An added level of complexity in assessing these results for lessons learned about which policies would and would not have had various results is accidents matter. Pairwise comparison of individual runs from the baseline and treatment conditions—though affected by the same stream of below-the-analytic-horizon stochastic perturbations—typically differed very substantially along important dimensions. The complexity and scale of these changes are not fully captured in averages or standard errors used to describe the resulting distributions.<sup>28</sup> This factor tells us that the model exhibits chaotic effects, meaning that small changes in initial conditions are very likely to produce importantly different outcomes. Chaos theory does predict that patterns in those outcomes do exist, but tracing them would require much better theory than we now have (or imagine having) and a larger number of runs than were possible within the scope of this pilot project.

From the point of view of the decision maker, however, certain points are clear. The kinds of interventions imagined as being useful for potentially producing much better futures for Syria than the one it actually experienced are blunt instruments—very blunt instruments. Specifically, the majority of expert analysts who opposed US retaliation in August–September 2013 on the grounds that it would not improve the situation on the ground, and even risked making things worse, were likely correct.

In most cases, not only were the “positive” effects of counterfactual treatments often temporary, but all good things did not necessarily go together. In three of the five conditions, substantial gains on some metrics were associated with equally substantial increases in civilian casualties. Under some conditions, overall amounts of violence were observed to decline, even as the number of civilian atrocities went up. At the same time, the rate of civilian casualties can go down, even as the strength of the Syrian state or jihadis increases. Prospects for defeat of Assad’s regime can indeed be increased, but often at the cost of increasing and extending the conditions

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<sup>28</sup> Graphical documentation of this kind of variation is not included in this report but is available from the authors.

very likely to produce high rates of civilian casualties—especially ongoing war and anarchy-like conditions.

These lessons are most poignant, perhaps, with respect to our US Retaliation counterfactual experiment. In this case, involving the use of considerable force by the United States, though delivered only via a bombing campaign, unintended consequences were particularly salient. In this experiment, the intended consequence of weakening the Syrian regime was achieved, but that effect was temporary and produced conditions that increased the likelihood of unregulated violence, often against civilians. Similarly, the Unified Western Support for the opposition counterfactual did strengthen the Free Syrian Army. But a stronger FSA also led to an increase in the expected number of civilian deaths. This outcome is partly due to the fact that although the United States can choose which groups to support ahead of time, that choice does not insure control of those groups' actions on the battlefield—a concern that was voiced by many who at the time opposed more active Western support for the rebels.

Even more important, perhaps, is that the very increase in the prospects of the armed opposition (consequent on the improved fortunes of the FSA) meant that fighting in some areas might be more intense and more prolonged than absent that support, depending on the resilience exhibited by the regime in particular runs (futures). In this experiment, as in others, we found evidence of the cruel trade-off between creating conditions conducive to the defeat of the Syrian regime and conditions likely to produce higher numbers of civilian casualties. In this respect, it would appear, the conventional wisdom is correct: Assad, as did Saddam, held his people hostage; if not to his own violence against them, then to the consequences of effective action by his enemies to defeat him.

Another important pattern to note is that what may appear as a very substantial change in the short run (weeks, months) can reverse itself over the long run (years) or at least show a marked reduction in the scale of its effect. This result can be considered an important takeaway for decision makers and analysts who may well be too quick to celebrate the apparent success of their suggested interventions, triggering bigger follow-on commitments even as the long-term effects of the measures involved have not been appreciated. Consider the dramatic and immediate drop in violence occasioned by US retaliation—a reduction that is sustained but not nearly in the same degree when measured years, not months, after it occurs. Consider also the very temporary fillip that the noninvolvement of Hezbollah provides to FSA strength. However, the opposite can also be true. After some weeks or months, the Weakened Jihadis counterfactual would not have been judged to have had an effect on civilian deaths, but after several years that increase did become apparent.

### *Limitations and Concerns*

An important limitation of this pilot study should be kept in mind, however, before concluding that more vigorous intervention against the Assad regime, or its allies, or the jihadis, would have failed to reduce the scope of the tragedy for Syrian civilians. It would have been outside the scope of this pilot effort to consider the implications of combining two or three of these counterfactuals with one another, though in most cases no logical or empirical reason exists for why such combinations could not be considered highly plausible. For example, the effect of Unified Western Support for the rebels could have been substantially more positive had it been accompanied by No Iranian Intervention, Weakened Jihadis, or US Retaliation (though it is important to remember that these junctures did not occur simultaneously, introducing considerable complexity into experiments recognizing the importance of sequence and the probability that given one treatment condition the baseline against which subsequent opportunities for counterfactual experimentation would be changed).

The significance of this question, about the potential for simultaneous or sequenced treatments, is highlighted by current discussion of the deepening Syrian tragedy. For example, recently Senator John McCain, who had been a supporter of US retaliation against the Assad regime in August–September 2013, advocated not only military deployments and threats to “ground the Syrian air force” but also action to threaten Russian planes operating over Syria, increases in military assistance to the Syrian opposition, and the creation of safe zones for Syrian civilians.<sup>29</sup>

Another aspect of the comparison of these counterfactual experiments that bears emphasis is that no attempt has been made to make the overall potency or scale of the interventions equivalent. For example, the magnitude of the effects of the No Iranian Intervention counterfactual is considerably smaller than that of the US Retaliation operationalization. In other cases, however, it is difficult to know how to measure the magnitudes of the interventions. By imagining a Syria without JN or the IS (the Weakened Jihadis treatment), is Syria being subjected to a “stronger” or “weaker” causal shove than by US Retaliation or Unified Western Support?

A related concern pertains to timing. Given the path dependence exhibited by this model, how consequential an intervention, or imagined change, might be is a function of its timing and sequence. Clearly, the most consequential of all the counterfactual treatments was the Democratizing Bubble, which produced a dramatic and sustained drop in expected civilian casualties. This was the earliest critical juncture—pertaining to the situation that could have been different in early and mid-2011, when leverage over the developing Syrian catastrophe was greatest. One might argue, of course, that the assumptions made by this counterfactual are the

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<sup>29</sup> John McCain, “Stop Assad Now—Or Expect Years of War,” *Wall Street Journal*, October 4, 2016.

most heroic of all—that Assad’s regime could have refrained from using brutal violence as its strategy for ending the mobilization of dissent and effective demands for reform.

Instead, as noted, that was in fact the official assessment and policy of the US government for the first six months of the Syrian conflict. And it was based, at least in part, on the beliefs of some experts and policy makers that it was a plausible kind of scenario, given their interpretation of the balance of power within the Syrian regime and the character of Bashar al-Assad.

Certainly, it did not require assumptions about large states such as Iran or the United States making changes in their positions or deployments. Nor did it entail the use of more violence (on the part of anyone) as a required factor for the solution to the Syrian problem. In those respects, it was perhaps less a challenge to the principle of cotenability than the other counterfactuals.

A somewhat surprising difficulty encountered in our work was the operationalization of “sectarianism.” Many of the theories applied to the Syrian case, or the commentaries and analyses of experts such as Lister, rely on a presumed relationship between increased sectarianism and increased amounts and brutality of violence. These claims, which appear convincing and almost commonsensical, prove to be difficult to examine because, it turns out, what is meant by sectarianism is so rarely clarified. To be useful, of course, it must mean something other than group attitudes that are “prone to more and more vicious violence.”

We have experimented with conceptualizing sectarianism in a variety of ways, including (a) how mobilized a group is, as measured by the ratio of those having the attribute of the group and those publicly identifying with it; (b) how compactly organized the group is; and (c) how isolated the group’s members are from sharing attributes of members of other groups. For this project, we settled on imagining sectarianism as a condition in a political space featuring relatively large numbers of compactly organized rival groups. Based on this conceptualization, we do report some findings with respect to sectarianism, but in general we did not find strong support for the emphasis on sectarianization as a crucial driver of the nature of the conflict in Syria. That may be because it is not, or it may be because we have not discovered a correct way to operationalize a clear concept of “sectarianism” that does exist, or it may be because those who use the idea have not articulated clearly enough what they mean and why they think it delivers the effects they claim.

## **Appendix: Technical Notes**

### **Number of Casualties**

The y-axis on the charts in this document for both the EBMA and random forest models is too low, given what we know about how the Syrian civil war unfolded. Most of our models predict only about 45–50 civilian deaths per month on average, but we know the true baseline number should be closer to thousands of dead per month. Our casualty numbers are so low because the Syrian civil war is well out of scope compared with the 16 legacy countries we used in phase I to build our civilian atrocities models. Most of those countries experienced relatively low levels of civilian deaths that resulted from clashes with insurgents, political violence, and ethnic or religious violence. None of our cases rose to the level of the Syrian conflict in intensity or overall casualty rates.

However, we do think that the “direction of change” of our civilian death prediction is a reasonable indicator of what would have happened in our counterfactual worlds. The reason is the model uses model outputs as indicators for when we would most likely expect civilian deaths to occur, which has already been empirically validated in phase I of our project. However, since the new case is very different from our initial country set, the results should be presented with that caveat.

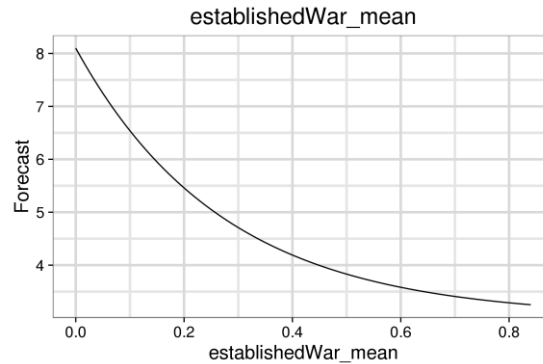
### **Established War Variable**

In figure 7, we note a surprising difference between our EBMA and random forest model results. The key driver for the EBMA model that increases civilian violence above expected levels (making it similar to the baseline) is the “established war” variable. We found in the first phase of our project that the likelihood of what we called an “established war” in our country models reduced the likelihood of civilian deaths. *Established war* is defined as violence that is perpetrated by similar groups between time-steps, meaning that identifying which groups perpetrated violence last week is a good predictor of who we would expect to be violent again this week. When the likelihood of that kind of “regular” violence is high, our model predicts low levels of civilian deaths.

This factor made sense to us during phase I. But in our Democratizing Bubble counterfactual, we found a low likelihood of established war and a low likelihood of much violence at all. We believe that the reason for a failure of the EBMA model in this case is again caused by the limited scope of our original cases. Since we did not include many countries with low levels of conflict in the original set of cases, a low level of established war was usually coupled with a high level of conflict. We essentially selected the dependent variable in the V-SAFT case set,

since conflict is what we are studying, and having a sample of Western countries with little conflict was out of the scope of that original project.

Figure 26 shows the predicted number of civilian atrocities, given an average level of established war in the EBMA output.



**Figure 26: The predicted number of civilian atrocities given an average level of “established war. *Established war* is defined as conflict that is carried out by the same perpetrators week to week in the model.**

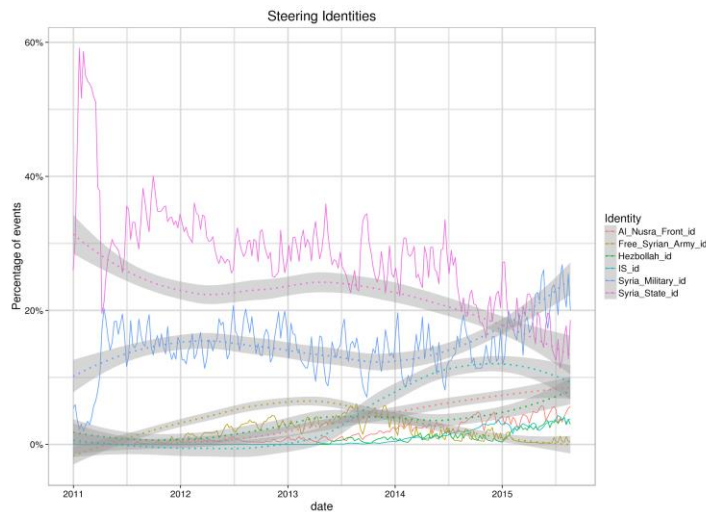
### Steering and Cotenability

To create a baseline model that creates outcomes that look like the real world, we update it using two methods: punctuations and steering. Punctuations include large-scale events that our model would not normally produce naturally and that could be too large and concentrated in their effects to be captured by the stochastic perturbations used to operationalize below-the-analytic-horizon accidents. For example, although a government crackdown can occur in our model, it would be unlikely to occur with regularity during the time-steps in the model when a real-world crackdown occurred. To take another example, new zones of territorial control do not develop endogenously in our model, so that change must be made external to the regular model dynamics. Our baseline model run has ten primary punctuations. For more information, see the Syria model creation process documentation.

The second updating procedure we employ is steering. For this project, we are specifically interested in the course that events took in Syria since 2010 and in paths branching from that course of events. Our core focus is on variations of what actually happened, and not on the much vaster question of the space of the theoretically possible that was present in 2010, say, absent the uprising. Therefore, we need to restrict our attention to relevant zones of that space. We do so by adjusting the availability of bias values assignable (randomly) over time to individual identities. The size, direction, and timing of these adjustments are governed by data input from the ICEWS

project that tracks which actors in the country did something that was reported in the news media. Those whose behavior is coded by ICEWS can include any political actor in the country. Each actor is associated with a set of sectors that help us match them to an identity group in the model.

We total all these actions by each group and use those data to nudge the model toward producing average values for identity prevalence of those groups without determining or requiring any particular outcome in any particular run of the model. In general, the more actions registered by actors in a sector  $t$  in the real world, the higher we would expect activation of identities associated with those sectors in the model. Again, we execute steering by tweaking the biases for particular identities in a positive or negative direction as though the historical accidents occurring below the analytic horizon of the model consistently trend in one direction or another. Figure 27 shows the ICEWS data (dotted line) compared with our model data (solid line). A discrepancy occurs between these values in our baseline run, which means that although we are trying to “nudge” our model in one direction, it is resisting that nudge.



**Figure 27: Comparison of ICEWS data (dotted line with standard error) and model data (solid line).**

What causes the lines in the ICEWS data to move in the direction they do? Many factors are involved, including endogenous political dynamics within the country, exogenous support or influence from outside actors, and historical accidents that cumulate into a trend but may have led to a different outcome if history were rerun. Because the real-world data contain these different kinds of elements, we need to consider carefully which trends we would like to continue to steer in our counterfactual experiments. In our five counterfactuals, depending on our evaluation of cotenability questions related to each scenario, we have chosen to implement our

steering algorithms fully, to eliminate steering, or to steer some identities but not others. When an intervention or counterfactual change is made, we make judgments about the extent to which the fate of particular actors is so directly and strongly affected that the ICEWS data reflecting the actual course of events would be unhelpful as an updating tool. Here is a summary of the results of those judgments:

- Unified Western Support: Free Syrian Army loses steering
- Democratizing Bubble: no steering
- Weakened Jihadis: the IS and JN lose steering
- US Retaliation: steering continues
- No Iranian Intervention: steering ends in May 2013

For example, the Democratizing Bubble counterfactual occurs in a world where the opposition party achieves a much broader base of support and the Assad regime is more tolerant, but also where the endogenous, exogenous, and accidental effects we experienced in the real world also do not occur. In the No Iranian Intervention counterfactual, Hezbollah is not introduced into the model, but in addition, the effects that led to the size of the Syrian state and military (part of which is caused by external Iranian support) are also allowed to vary without respect to steering.



## Appendix: Glossary

Below is a short list of terms used in this report specifically, but more information on many of these topics are available in Lustick Consulting's published work and reports ([LustickConsulting.com](http://LustickConsulting.com)).

- **Cohesion** is operationalized as the average number of agents surrounded by a given agent in the model that shares that agent's activated identity. We use cohesion in this report to measure how much identity clustering occurs during a model time-step.
- **Consolidation** is operationalized as the Herfindahl index of activation of the model during a given time-step. We use consolidation (or inversely, fragmentation) to measure how many groups are active during a model time-step and how much the landscape is either monopolized by one or a few groups or is fragmented with equal shares taken up by many groups. (For information on how the Herfindahl index is calculated, see [https://en.wikipedia.org/wiki/Herfindahl\\_index](https://en.wikipedia.org/wiki/Herfindahl_index).)
- **Dominant violence** is measured as attacks in the model carried out by agents that are subscribed to the dominant identity in the landscape. In turn, the *dominant identity* is defined as the largest group within a particular territory in the model. Attacks can be carried out only by subversive or dominant groups.
- **EBMA** (ensemble Bayesian model averaging) is a statistical modeling technique for combining different models into one. We use EBMA to combine five theme models capturing different aspects of civilian deaths. For more information, see our phase I report (<http://lustickconsulting.com/wp-content/uploads/2016/08/AtrocitiesStatusReportV3-1.pdf>).
- **Random forest** is a statistical modeling technique that allows for capturing nonlinear correlational trends in large amounts of data by creating partitioned trees. For more information, see our phase I report (<http://lustickconsulting.com/wp-content/uploads/2016/08/AtrocitiesStatusReportV3-1.pdf>).
- **Sectarianism** is operationalized as cohesion divided by consolidation. Generally, this means that either higher levels of cohesion or lower level of consolidation will increase sectarianism.
- **Subversive violence** is measured as attacks in the model carried out by agents subscribed only to identities that are isolated from the center of political power within their territory. Groups are isolated from political power when they do not share identities with groups

that are defined as dominant, incumbent, or regime level. Attacks can be carried out only by subversive or dominant groups.

### **The Simon-Skjodt Center for the Prevention of Genocide**

of the United States Holocaust Memorial Museum works to prevent genocide and related crimes against humanity. The Simon-Skjodt Center is dedicated to stimulating timely global action to prevent genocide and to catalyze an international response when it occurs. Our goal is to make the prevention of genocide a core foreign policy priority for leaders around the world through a multi-pronged program of research, education, and public outreach. We work to equip decision makers, starting with officials in the United States but also extending to other governments, with the knowledge, tools, and institutional support required to prevent—or, if necessary, halt—genocide and related crimes against humanity.

*The assertions, opinions, and conclusions in this occasional paper are those of the author. They do not necessarily reflect those of the United States Holocaust Memorial Museum.*

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