NAVAL POSTGRADUATE SCHOOL

MONTEREY, CALIFORNIA

THESIS

FORECASTING THE FUTURE OF THE ISLAMIC STATE: AN AGENT-BASED RATIONAL CHOICE MODEL AND SOCIAL NETWORK ANALYSIS APPROACH

by

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December 2017

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REPORT DOCUMENTATION PAGE			Form Approved OMB No. 0704-0188

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instruction, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188) Washington, DC 20503.

1. AGENCY USE ONLY *(Leave blank)*	2. REPORT DATE December 2017	3. REPORT TYPE AND DATES COVERED Master's thesis

4. TITLE AND SUBTITLE FORECASTING THE FUTURE OF THE ISLAMIC STATE: AN AGENT-BASED RATIONAL CHOICE MODEL AND SOCIAL NETWORK ANALYSIS APPROACH	5. FUNDING NUMBERS
6. AUTHOR(S) Peter R. Wilcox	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Naval Postgraduate School Monterey, CA 93943-5000	8. PERFORMING ORGANIZATION REPORT NUMBER
9. SPONSORING /MONITORING AGENCY NAME(S) AND ADDRESS(ES) N/A	10. SPONSORING / MONITORING AGENCY REPORT NUMBER

11. SUPPLEMENTARY NOTES The views expressed in this thesis are those of the author and do not reflect the official policy or position of the Department of Defense or the U.S. Government. IRB number 0092.

12a. DISTRIBUTION / AVAILABILITY STATEMENT Approved for public release. Distribution is unlimited.	12b. DISTRIBUTION CODE

13. ABSTRACT (maximum 200 words)

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14. SUBJECT TERMS expected utility model (EUM), social network analysis (SNA), Islamic State (IS), political fabric space (PFS)	15. NUMBER OF PAGES 169
	16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT
Unclassified	Unclassified	Unclassified	UU

NSN 7540-01-280-5500 Standard Form 298 (Rev. 2-89)
Prescribed by ANSI Std. 239-18

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Submitted in partial fulfillment of the
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MASTER OF SCIENCE IN INFORMATION STRATEGY AND POLITICAL WARFARE

from the

NAVAL POSTGRADUATE SCHOOL
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Failure to analyze critically the impact and consequences of political decisions increases the prospect for developing military strategies that fail to deliver on U.S. policy objectives, and, at worst, risks defeat. This work provides an applied analytical framework from which political and military analysts can systematically analyze the potential impact of political decisions on military operations. This thesis introduces an expected utility model (EUM) and social network analysis (SNA) in a manner that guides analysts from the theoretical assumptions underpinning both tool sets, through their technical specifications, to an applied case study (the Islamic State) to demonstrate that political analysis and prediction are not only possible but also informative and relevant to the U.S. services. The thesis concludes that while the Islamic State (IS) caliphate in Iraq is expected to be defeated, it will likely endure as an insurgency. Forecasting the future of the IS caliphate demonstrates that the EUM and SNA remain applied facilitative means to examine, analyze, and extrapolate inferences about policy decisions and their impact on current and future military affairs.

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LIST OF ACRONYMS AND ABBREVIATIONS

ABRC	Agent-Based Rational Choice Models
DIME	Diplomatic, Informational, Military, and Economic Power
EUM	Expected Utility Model
IS	Islamic State
NLO	Non-lethal operations
PMF	Popular Mobilization Force
RLT	Radical Leveling Technologies
SE-I	Super Empowered-Individual
SNA	Social Network Analysis

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EXECUTIVE SUMMARY

Failure to analyze critically the impact and consequences of political decisions increases the prospect for developing military strategies that fail to deliver on U.S. policy objectives, and at worst, risks defeat. This thesis seeks to demonstrate that the expected utility model (EUM) and social network analysis (SNA) remain an applied social science tools that should be integrated within the analytical process when formulating policy or military strategies in support of U.S. interests. To demonstrate the efficacy of EUM and SNA in real-time, this thesis evaluates President Barack Obama's global coalition strategy to defeat the Islamic State (IS) by (1) forecasting the future state of the IS as a caliphate and as an insurgency, (2) determining the prospect for partitioning Iraq along Shi'a, Sunni, and Kurdish ethnic lines after the IS is defeated, and (3) leveraging SNA to determine Iran's current locus of power in Iraq. Each of the policy issue forecasts was generated using a derivative of Bruce Bueno de Mesquita's EUM, developed by RAND in 2011. Data on the IS for this thesis were collected and redefined throughout June 2017.

A. IS POLITICAL ISSUES

- What is the prospect that the global coalition and other relevant stakeholders (Russia, Iran, and Syria) will degrade and ultimately defeat the IS caliphate in Iraq?
- Should the IS be defeated militarily, what is the prospect that the movement will endure as an insurgency?
- What are the policy preferences of the Iraqi national political organizations, ranging from partitioning Iraq into separate Shi'a, Sunni, and Kurdish states, to various forms of unified states, in which local governorates remain subordinate to the government of Iraq?

B. THE EUM RESULTS

- President Obama's decision to form a global coalition proved a prudent strategic decision. In effect, the global coalition, and the bulk of individuals and state and non-state agents, are expected to unify as an enterprise to degrade and ultimately defeat the IS caliphate, despite animosities existing between such high-profile nation-state actors as Iran and the U.S.

Consequently, the defeat of the caliphate will also prompt the IS leadership to abscond to an IS-affiliate, such as the Philippines.

- Despite the global coalition's success in eradicating the IS as a caliphate from Iraq, the movement writ large is expected to devolve into a nimbly diffused network and endure as an insurgency. Interestingly, a factor owing to the IS's longevity as an insurgent movement is the expectation that the global coalition will reduce its overall capability contribution to the fight, suggesting a shift in priorities amongst the nation-states involved.

- After the expected defeat of the IS caliphate, the appetite for partitioning Iraq into Shi'a, Sunni, and Kurdish states remain unfavorable, despite Kurdistan's recent referendum for independence with Israel's support.

B. POLICY RECOMMENDATIONS

- The global coalition should sustain Iraq's counterterrorism efforts to eliminate the IS, even after the movement is expected to survive as an insurgency. The global coalition should also maintain the robust partnerships established with the Middle East nations. This will be crucial to facilitating the flow of intelligence and partnered counterterrorism operations.

- To defeat the IS insurgency, the global coalition should expend the same rate of effort used to defeat the IS as a caliphate. This includes cutting IS's access and means to recruit followers and curtailing the dissemination of propaganda.

- Until the IS is politically and militarily defeated, the subject of partitioning Iraq should be postponed. Revisiting the issue in several years or so, and exploring the implications for a blend of the soft partitioning and autonomy, does remain an ideal route worth pursuing.

C. SNA RESULTS

Using two one-mode asymmetric networks to capture the military resource and training support and trust (or loyalty) between the same agents used to generate the EUM forecasts, SNA revealed that Iran's current locus of power stems from the close relationship it currently enjoys with some of the largest PMF units. This influence expanse is greatly attributed to Iran's provision of military advisory, logistics, and weapons support to the PMF. In return, these PMF organizations have professed their loyalty to Iran. Should the leadership of the PMF organizations loyal to Iran gain parliamentary seats within Iraq's

government, they could potentially subvert Iraq's sovereignty by leveraging voting power to support policies amenable to Iran's interests.

C. OPTIONS FOR ROLLING BACK IRAN'S INFLUENCE EXPANSE

- The Iraqi government can leverage the same constitutional authorities used to legitimize the PMF to integrate, disperse, and retrain (IDR) PMF units into the Iraqi Army.
- The Iraqi government can dissolve the PMF altogether.
- The Iraqi government has the option to leverage non-lethal military options, such as information operations, or deception, to fracture existing relationships among PMF units loyal to Iran.

D. RECOMMENDATIONS FOR POLITICAL AND MILITARY ANALYSTS

Forecasting the future state of the IS demonstrates that political and military analysts would benefit from integrating and harmonizing the EUM and SNA into their analytical process because, (1) it will help sift through the fog and noise generated by uncertainties, (2) it will assist with identifying agents attempting to influence U.S. policy for nefarious purpose, (3) it will illuminate a range of strategies amenable to U.S. interests, and (4) it will identify discrepancies between political aims and those of the U.S. military objectives.

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ACKNOWLEDGMENTS

The subject of this thesis had its inception nearly three years ago. While stationed at United States Army Africa (USARAF), I, along with several Information Operations (IO) specialists, endeavored to identify if within the U.S. Army arsenal there were social science tools that could better make sense of the complex evolving twenty-first century information environment. Critical to our analysis, however, was identifying the means to capture the interests, values, and beliefs of decision-makers to better analyze their overall impact on military affairs. This thesis, in effect, is an attempt to answer that question.

To recollect the many individuals who contributed to this body of work is all but impossible. I have benefited immensely from the support of colleagues, friends, and the NPS faculty. However, I wish to recognize the few who were instrumental.

First, I would like to thank my thesis advisors, Dr. William Fox, Dr. Jesse Hammond, and Dr. Craig Whiteside, for their unwavering support, patience, and guidance in helping me complete this ambitious project. I remain eternally grateful for their mentorship and constructive comments, and for allowing me to use their precious office hours to expound on radical ideas and concepts I believed would enrich the overall product.

Second, I wish to thank the subject-matter experts (SMEs) who contributed to the data collection process, especially Dr. Whiteside, and Dr. Howard Shatz of the RAND Corporation. This acknowledgement includes those SMEs who wished to remain nameless.

Third, I am thankful for the outstanding feedback and support of Dr. Eric Larson of RAND Corporation, Dr. Eric Jesse, and Mr. Christopher Callaghan. Dr. Larson patiently guided me through much of Bueno de Mesquita's work, the theories underpinning his expected utility model, and the type of analysis that must be done to achieve accurate forecast rates. Dr. Jesse was not only kind enough to provide me with his derivative version of the EUM for the thesis, but also kind enough to read drafts of this thesis to improve the overall quality. I owe a special thanks to Mr. Callaghan of NPS's Common Operational Research Environment (CORE) Lab. Mr. Callaghan generously dedicated his weekends to instruct, navigate, and help generate products for both the expected utility model and the

social network analysis. Of course, errors contained in the present thesis remain entirely my own.

I am grateful for the support received from the staff of NPS's CORE Lab. The staff and facility remain one of NPS's few locales where students can truly explore, test, and employ social science concepts and tools.

No Army officer becomes successful in the absence of mentorship and guidance. As a professional Army officer, I have benefited from the intellectual influence and mentorship of LTC (Ret.) Eric Henderson, LTC (Ret.) Gary Myers, LTC (Ret.) Edwin Ortega, LTC Andrew Whiskeyman, and LTC Jason Brown. I could not have asked, worked, nor hoped for better exemplars of the U.S. Army profession; truly, these are remarkable men.

Finally, I wish to thank my family for their enduring support over the years, especially Mike and Kay Wilcox. I am eternally grateful and forever indebted to them. Of course, it takes a village to raise an orphan. A special thanks goes out to the Todd, Anderson, and Jandro families for their support, as well. Last but not least, I owe my sincere appreciation to Ilda Nunez-Wilcox for her unstinting love and patience as I chipped away at this pet project of mine.

I. INTRODUCTION

In the early 1800s, the Spanish painter Francisco José de Goya y Lucientes drafted eighty-two etchings (plates), visually depicting the brutality of the Dos de Mayo Uprising and later the Peninsular War[1]. The second and third plates, *Con Razon o sin Ella*, (rightly or wrongly) and *Lo Mismo* (the same), are particularly noteworthy, as they convey Goya's struggle to answer the following seemingly basic question: Is war an emergent phenomenon of reason or of the blind natural forces—"hatred, "enmity," and "primordial violence"—that Carl von Clausewitz observed in his great opus *On War*? The former etching vividly captures the bloody contest unfolding between peasants and soldiers. The latter portrays a man with an axe about to sever the head of a fallen soldier. These bounded etchings, titled *Los Desastres de la Guerra* (the Disasters of War), capture the complexity this enduring question poses. The truth, however, is that while blind passions inevitably play a critical role in rupturing man's sense of reason, war, as Clausewitz (1976) also observed, "should never be thought of as something autonomous but always as an instrument of *policy* [author's emphasis]; otherwise the entire history of war would contradict us" (p. 88). Political leaders, thus, exercise reasoned calculated judgment in crafting and implementing policies when employing the Leviathan[2] to wage war, be it for the benefit of a nation, a political party, or for themselves.

A. PURPOSE

The purpose of this thesis is to bring attention to two critical information tool sets that rigorously evaluate the impact of policy decisions: the expected utility model (EUM) and social network analysis (SNA). The U.S. military expends immense intellectual capital

[1] The use of the Goya etching narrative is inspired by Bueno de Mesquita and Lalman's exploration of the relationship between war and reason and its impact on foreign policy. See Bueno de Mesquita's *War and Reason: Domestic and International Imperatives*.

[2] I use Thomas P.M. Barnett's definition of Leviathan, which he defines as "The U.S. military's warfighting capacity and the high performance combat troops, weapon systems, aircraft, armor, and ships associated with all-out war against traditionally defined opponents (i.e., other great-power militaries). This is the force America created to defend the West against the Soviet threat, now transformed from its industrial era roots to its information-age capacity for high-speed, high-lethality, and high-lethality, and high-precision major combat operations" (Barnett, n.d.).

designing ground, aerial, sea, space, and cyber strategies in support of political objectives. Yet, that same intellectual analytical rigor seems largely devoid in analyzing the evolution of policies, their consequences, and more important, their impact on future military operations. While no crystal ball can predict the next war or its character, what does remain within the realm of the possible is applied social science theories and concepts analysts can leverage to evaluate policies. The EUM and, SNA, combined with subject matter or area expert analysis, have the potential to (1) yield inferences about the nature of political climate in any theater of operation and, (2) identify strategic opportunities that best align with U.S. interests.

B. MOTIVATION

As the great Prussian strategist Clausewitz observed, "War is a serious means to a serious end" (Clauswitz, 1976, p. 86). Therefore, thinking critically about the relationship between *policy* and *war* is paramount to sound strategic thinking. Failure to analyze the impact and consequences of political decisions risks developing military strategies that fail to deliver on U.S. policy objectives, and at worst, risks defeat. Thus, as Sir Michael Howard observed, "The roots of victory and defeat often have to be sought far from the battlefield, in political, social, and economic factors which explain why armies are constituted as they are, and why their leaders conduct them in the way they do" (Howard, 1962, p. 7). Military strategy development, then, necessarily begins with assessing and evaluating the feasibility of any one political decision. The integration of EUM and SNA into the strategy development process can (1) foster clear thinking about agents attempting to influence U.S. policy for nefarious purposes and (2) shed light on national security issues pertaining to military affairs that sole reliance on expert analysis may fall short of delivering.

C. INTENT AND GOALS

The intent of this thesis is to introduce the EUM and SNA in a manner that guides analysts from the theoretic assumptions underpinning both tool sets, through their technical specifications, to an applied case study (forecasting the future of the Islamic State [IS] caliphate) to demonstrate that political analysis and prediction is not only possible but also informative and relevant to military affairs. The goals of this thesis are twofold: (1) to

develop a framework that analysts can leverage to conceptualize the primary agents aiming to influence political outcomes on some policy issue and (2) to demonstrate that the EUM and SNA remain an applied facilitative means to examine, analyze, and extrapolate inferences about policy decisions by forecasting the future of the IS, using a mixed method approach. The target audiences for this thesis are policy and military analysts, strategists, and specialists involved in the business of influence.

D. RESEARCH QUESTIONS

This thesis addresses three broad questions: How do the EUM and SNA realistically capture the decision calculus of agents operating in the political sphere, given the complexity and uncertainty that plagues the twenty-first century information environment? In analyzing the outcomes from the applied IS caliphate case study, how do the EUM and SNA contribute the overall findings? Finally, why do EUMs and SNA remain appropriate analytical tools for combatant commands to integrate into their planning process in support of theater-wide operations? Answers to these questions will yield insights about the efficacy of these tools and the extent they can practically inform future policies and or military strategies.

E. THESIS SCOPE AND METHODOLOGY

The framework for this thesis centers on three foundational components that drive the argument forward: the political fabric space (PFS), the EUM and SNA mixed-method approach, and the IS case study. First, I challenge conventional wisdom that the political domain is fraught with such complexity and uncertainty that the application of any one elegant and logical analytical tool will be ineffective. The subject of complexity and uncertainty should not deter progress toward efforts to foster accurate predictions to inform the craft of U.S. policy, especially those that relate to future military operations. The PFS construct, thus, aims to assist analysts to think critically about common agent-types—namely, nation-states, illicit organizations, and individuals—that exert gravitational influence to shift the trajectory of any one political outcome. Second, I argue explicitly why the EUM and SNA methodologies remain appropriate for analyzing policy decisions. The former allows analysts chart the evolution of policies with a high degree of certainty.

The latter conveniently identifies relationship types (religious, ideological, or material) that bind nation-states, organizations, or individuals together. Third, the approaches are integrated to evaluate and assess President Barack Obama's global coalition strategy to degrade and dismantle the IS. The combined approaches of the PFS, and the EUM and SNA, chart the rise and fall of the caliphate through a Maoist revolutionary warfare framework. This thesis argues that combined with expert analysis, these methodological tools remain a facilitative means to examine, analyze, and convey *what is* and provide robust recommendations of *what could be* for analysts in search of crafting effective policy or military strategies that best align with U.S. interests.

F. ORGANIZATION OF THE THESIS

The thesis consists of nine chapters, including the introduction. Chapter II briefly highlights the influence complexity and nonlinearity has had on international relations (IR) scholars' attempt to develop accurate conceptual models for explaining nation-state interaction. This analysis extends to the U.S. military. The aim is to bring attention cogently to a subject that not only influenced both spheres of thought but also, to a certain extent, has deterred efforts to mitigate uncertainty. Chapter III introduces the political fabric space (PFS) metaphor to give structure and form to thinking about complexity and uncertainty. It seeks to categorically identify the common types of constitutive agents that influence policy outcomes, to include their constraints. Chapter IV argues that agent-based rational choice models (ABRC) remain appropriate practical tools to account for the uncertain and complex interactions of competing interests that evolve between agents that operate within the PFS over some policy issue. This is followed by a brief background of the EUM, a type of ABRC model, developed by Bruce Bueno de Mesquita in the 1980s. This chapter also examines core arguments for and against its use. Chapter V conveys the EUM's overarching components. Chapter VI introduces the IS case study to test both the EUM and the SNA. I unpack this case study through Mao's framework of revolutionary warfare, which explains how such a powerful movement evolved to operate and influence the policies of many nation-states within the PFS, irrespective of the intended outcome. Chapter VII provides a brief overview of the IS data elicitation process and the policy questions used for the forecast. Chapter VIII provides forecast details concerning three

policy issues relevant to the IS case study. Chapter IX provides a brief overview of SNA and its contribution to the IS case study. In particular, SNA is used to identify the relationships that bind agents together and the types of inferences that can be extrapolated from the network. The thesis concludes with additional remarks and future research recommendations.

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II. WHAT COMPLEXITY AND UNCERTAINTY HAVE WROUGHT

> From Plato to NATO, the history of command in war consists of an endless quest for certainty.
>
> —Martin Van Creveld[3]

> The fundamentally complex and interactive nature of war *generates* uncertainty. Uncertainty is not merely an existing environmental condition; it is a natural byproduct of war.
>
> —U.S. Marine Corps Command and Control Doctrine, 1996[4]

International relations scholars have long sought to develop models for conceptualizing the complexity inherent in the international relations (IR) arena. In particular, the employment of models was effectively an effort to impose logic on the otherwise unpredictable centrifugal forces unleashed by nonlinear multi-state actor (or nation) interaction. Hans Morgenthau (1948) provided realists with a balance of power construct. Arnold Wolfers explained geopolitics with the billiard-ball concept of "self-contained states colliding with one another" (Slaughter, 2009, p.95). Kenneth Organski (1980) formulated the power transition theory, arguing that "an even distribution of political, economic, and military capabilities between contending groups" is likely to evolve into war (p.19). Peace, Organski and Kugler (1980) maintained, is achieved when nation-states arrive at an "imbalance of national capabilities between disadvantaged and advantaged nations" (p. 19). George Modelski (1978) expounded on the "long cycle" paradigm of global political order[5]. Joseph Nye's (2006) soft power model enlightened many to the potential powerful effects of persuasion in the absence of coercion or force.

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[3] Van Creveld. (2002). *Command in War*. Cambridge, MA: Harvard University Press, p. 264.

[4] U.S. Marine Corps (1996). *Command and Control, MCDP 6*. Washington, D.C.

[5] In sum, "long cycles" refer to the inherent relationship between the cycles of war, the ebb-and-flow of world leadership, and economic systems.

Kenneth Waltz (2001) tapped various eclectic academic fields, such as anthropology, psychology, history, and philosophy, to explore the causes of war. Thomas Schelling (1960) demonstrated game theory's potency when applied to deterrence. Even in the international arena predictability is a sought-after virtue. Nevertheless, the various IR theoretical models indicate IR scholars' attempt to develop schemas, or to borrow paradigms from the natural world, to explain the complex dynamical systems of the international structure in some fashion.

Upon close observation, as Bousquet (2011) seemingly implies, all theoretical models have an ontological embarkation point for conceptualizing the international system and a debarkation point where the essence and characteristics of those theories lose traction with the rub of reality.[6] The ebb and flow of the international system may validate a given theory, and then eventually invalidate it. There are numerous reasons for this occurrence, some of which deal with non-linearity phenomena of the international system that defy explanation. Another presumably entails human beings as complex dynamical interacting agents, naturally defying prediction. The emergence of unforeseen anomalous "system perturbations" (shocks) to the international system undoubtedly contributes to this phenomenon as well (Barnett, 2004).

Incidentally, the subject of nonlinearity and complexity trickled down to the U.S. military to impart its indelible mark. Russian General Valery Gerasimov's publication "The value of science is in the foresight: New challenges demand rethinking the forms and methods of carrying out combat operations" prompted U.S. security experts to develop

[6] The celebrated historian John Lewis Gaddis was said to have concluded that the "field of international politics failed to provide a basis for making accurate predictions about political events (such as the end of the Cold War)" (Ray & Russett, 1996).

such novel lexical phrases as "hybrid warfare"[7] (Bartles, 2016) and "gray zone"[8] conflicts (Brands, 2016, Wilson & Smithson, 2017) to rationalize the seemingly asymmetric novel employment of elements of national power (diplomatic, information, military and economic, or DIME), in such military operations like the annexation of Crimea from Eastern Ukraine. To grapple with the increased volatility of the operational environment, virtually permeating and influencing every fabric of the twenty-first century human and societal life (Department of the Army, 2017), the U.S. Army introduced the term "human domain" (Hoffman & Davies, 2013; Herbert, 2014). Influenced by seminal works of war theorists such as Carl von Clausewitz, Julian Corbett, Antoine-Henri de Jomini, and Sun Tzu, the U.S. military continually searches for the right set of intellectual and technological tools. From autonomous unmanned aerial vehicles (Thurnher, 2012), network-centric warfare concepts (Cebrowski, 1998), space and cyber capabilities (Applegate, Carpenter, & West, 2017), and advanced simulation and war-gaming approaches (Ducharme, 2016), the U.S. military persistently strives to pierce the veil of uncertainty to bring about certainty, believing in Francis Bacon's dictum that *Scientia potentia est* (knowledge is power), and persuaded by Jomini's assertion that "all strategy is controlled by invariable scientific principles" (Shy, 1986). With former Secretary of Defense Chuck Hagel's pronouncement of the "Third Offset Strategy"[9] the U.S.'s military penchant for inventing revolutionary technologies (Norwood & Jensen, 2016) to dominate the twenty-first century battlefield and to bring about certainty was solidified.

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[7] "Hybrid warfare" is the synergistic employment of a nation-state's elements of national power (diplomatic, information, military and economic) in pursuit of national objectives typically outside its territory. The emphasis is on minimal use of conventional military forces, and the maximal use of "nonmilitary" means, such as influence or psychological operations (Chivvis, 2017).

[8] Wilson & Smithson argue "gray zone" conflicts typify adversarial competition below threshold levels of armed conflict. Conceptually speaking, it is the space between war and peace. It is the employment of elements of national power in an effort to attain political or security end-state objectives. Attribution becomes difficult to pinpoint. The employment of psychological warfare, cyber weapons, and sophisticated information operations campaigns are examples of actions taken in the gray zone. See Wilson & Smithson (2017) for an expanded explanation.

[9] The Third Offset Strategy aims to identify "specific investments in promising new technologies and capabilities such as high-speed strike weapons, advanced aeronautics, rail guns and high-energy lasers." Additionally, it consists of leveraging "current capabilities in new and creative ways—like adapting our Tomahawk missiles to be used against moving targets in a maritime environment, or using smart projectiles that can be fired from many of our existing land- and ship-based artillery guns to defeat incoming missiles at much lower cost per round" (Norwood & Jensen, p.35, 2016).

For both academic and military institutions, the ultimate measure of success seems to be the complete elimination of uncertainty to achieve control, prediction, and to manipulate whatever environment they find themselves analyzing or operating within, according to specific interests. IR scholars seek novel theories (or concepts) to explain accurately the evolution of interstate and intrastate conflict to inform the craft of policymaking. Accordingly, the U.S. military strives to find the next revolutionary technology to lift the fog of war, which ostensibly is perceived as the acme of battlespace dominance. The penchant for eclectic fields such as robotics, three-dimensional printing, cyber capabilities, advanced sensor technologies, and artificial intelligence to deal with the nonlinear complexities of the operational environment (Sullivan, Bauer, Berry, & Shabro, 2017) speak to this effect.

The twenty-first century's chaotic and confusing environment, however, defies ease of achieving certainty. Indeed, since the earliest human battles there has been no shortage of constant reminders from academic and military practitioners alike cautioning those who seek to eliminate uncertainty to approach with caution. The great historian Thucydides asserted that "Think, too, of the great part that is played by the unpredictable in war: think of it now, before you are actually committed to war. The longer a war lasts, the more things tend to depend on accidents. Neither you nor we can see them: we have to abide their outcome in the dark" (Strassler, 1996). Machiavelli (2004), too, forewarns, "that Fortune is the mistress of one half of our actions, and yet leaves the control of the other half, or a little less, to ourselves. And I would liken her to one of those wild torrents which, when angry, overflow the plains, sweep away trees and houses, and carry off soil from one bank to throw it down upon the other" (pp. 119–120). Clausewitz, (1976) observed that "war is the realm of uncertainty; three quarters of the factors on which action in war is based are wrapped in a fog of greater or lesser uncertainty" (p. 101). Offering his interpretation on Clausewitz's works, Alan Beyerchen (1993) reminds readers of Clausewitz's assertion that war is characteristically plagued with uncertainty and nonlinear eventualities that defy prediction. The ability, he argues, to forecast "the course of and outcome of any given conflict is severely limited," especially for those "searching for a predictive theory" (p. 61). In recommending how a typical U.S. military joint force should

adapt under "conditions of complexity and uncertainty" National Security Advisor Lieutenant General H.R. McMaster (2003), lists the complete denouncement of "the orthodoxy of near certainty in future war and make an explicit statement that future war will remain in the realm of uncertainty" at the top of his list (p. 97). And more recently Due, Finney, and Byerly (2015) argue that "uncertainty is a factor in everything military forces must do" in supporting U.S. policy objectives (p. 27).

Unfortunately, terms like "uncertainty," "nonlinearity," and "complexity," have become elusive, evading precision and deterring academic and military practitioners alike seeking to bring logic, analytical rigor, and quantification to the study of politics and war. This thesis does not aim to ignore or traduce uncertainty or complexity's role in warfare. Beyerchen's (1993) insistence that war consists of manifestations of nonlinear phenomena, where velocity, intensity, and friction, and fog of chance remain common elements, is valid enough. The point, rather, is (1) to acknowledge that modern advances in information systems exist to begin addressing nonlinear problem-sets, and (2) to shift the discourse toward a particular area academic institutions have performed bricolage to mitigate complexity and uncertainty with increasing success.[10]

One of this thesis's central claims is that twenty-first century advances in ABRC and SNA afford analysts unique opportunities to account for uncertainty, ambiguity, and nonlinear events evolving within the political domain. For example, these advances have allowed academic (Bueno de Mesquita, 1994, 1997; Kugler, Abdollahian, & Tammen, 2000) and military analysts (Jesse, 2011) the means to chart the evolution of policies with precision. Indeed, using ABRC models, Bueno de Mesquita (1994, 1997), Abdollahian, Baranick, Efird, and Kugler (2006) and Jesse (2011) demonstrated the uniquely potent effect of combining game theoretic concepts with spatial decision-making theories to *probabilistically* determine agent interaction, the impact of policy selection, and their attendant consequences with precision. This was achieved by absolutely and explicitly

[10] In this context the term "bricolage" is defined as "the assembly of different knowledge elements that are readily available to the researcher (Boxenaum & Rouleau, p.208, 2011). The term can be extended to mean the borrowing and integrating of core concepts from such academic disciplines as international relations, computer science, sociology, philosophy, psychology, economics, and business.

abandoning the need to eliminate uncertainty altogether in order to achieve high forecast rates. In essence, Bueno de Mesquita and several of his contemporaries understood that with assistance from twenty-first century information technologies, the field of mathematics offered applied theories that could elegantly be leveraged to illuminate policy preferences of nation-states, organizations, and influential individuals. Understanding the consequences emanating from policy decisions and their impact on military strategy requires (1) accounting for newfound knowledge attributed to the integration of technology and eclectic fields of academic disciplines, (2) abandoning the need to achieve absolute certainty, and (3) remaining undeterred by such lexical terms as "complexity" or "uncertainty." This process begins with discussion conceived here as the political fabric space (PFS) with special emphasis on the super-empowered individual (SE-I). When examined in conjunction with supplementary facilitative factors, the PFS provides a robust conceptual framework for identifying the types of agents that influence policies, irrespective of the intent or outcome.

III. THE POLITICAL FABRIC SPACE: A DIFFERENT APPROACH TO THINKING ABOUT COMPLEXITY AND UNCERTAINTY

> You don't see something until you have the right metaphor to let you perceive it.
>
> —Robert Stetson Shaw

The strategic thinker and international relations scholar Colin Gray (2010) once observed that "there is nothing of fundamental importance that is genuinely new about war and strategy in the twenty-first century. The stage sets, the dress, the civilian and military equipment, and some of the language are always changing, but the human, political, and strategic plots, alas, remain all too familiar" (p. 11). While conceptually Gray's assessment has merit, one can contest that our understanding of the evolution of policies and their attendant consequences has fundamentally improved since the 1980s. This improvement remains of critical importance to future military and political analysts seeking to design practical strategies in pursuit of U.S. objectives. A common approach for bringing clarity to this line of thought is through the employment of metaphors. Metaphors remain powerful analytical tools to bring shape and clarity to otherwise haphazard abstract concepts (Bousquet, 2011). The purpose of the proceeding chapter is to eliminate the analytical blinders inclined to partition the subject of war, policy, and its tangential sub-topics, into compartmental specialties to be examined through a specialized scope. Using research that preceded this thesis, the focus is to synthesize a multitude of ideas and concepts to bring about form and clarity to this very important subject.

A. THE POLITICAL FABRIC SPACE

The political fabric space (PFS) consists of agents, be it nation-states, organizations, and individuals who warp (influence) the local or international curvature of the political domain by galvanizing popular support or by employing elements of national power--diplomatic, information, military, and economic (DIME)--in pursuit of specific

policy agenda, irrespective of intent or outcome. Leaders of nation-states are natural ascendants within this space as they occupy positions of extreme power and create and implement policies, whether a dictatorship, an autocracy, or a democratic or constitutional republic. Leaders may embrace James Madison's ideal governing concept of equal representation among people (Rakove, n.d.), as is typical of republican political institutions. They may altogether prefer the opposite approach, as in North Korea's Kim Jong-un, where life for the people is, in the famous words of Thomas Hobbes, typically "solitary, poor, nasty, brutish, and short" (Warburton, 2012). They may also chiefly prefer ruling by accruing personal wealth at the expense of those governed, as in Russia's Vladimir Vladimirovich Putin's kleptocratic government (Dawisha, 2015). The point being, absent revolutions and major nonviolent resistance movements populations rarely gain enough gravitational traction *en masse* to ascend within the PFS to influence its curvature in support of specific policy outcomes[11]. More often, the power to influence the trajectory of policy rests within institutional power; namely, the nation-state apparatus.

The next great influence upon the PFS is illicit organizations/networks.[12] International terrorist organizations, violent non-state actors, and transnational criminal organizations such as Al-Nusra Front, Tehrik-e Taliban Pakistan, Al-Shabaab, Hezbollah, Boko Haram, Taliban, al-Qaeda, and the Islamic State (IS) belong to this category. Leveraging novel ground and aerial tactics such as weaponized vehicles (Johnson, 2016) and hijacking of airplanes (Rowland & Theye, 2008), and promulgated through the effective employment of social media and other information technologies, terrorist

[11] Chenoweth and Stephan (2008) define non-violent resistance movements as a "civilian-based method used to wage conflict through social, psychological, economic, and political means without the threat or use of violence" (p. 9). Often such tactics entail "acts of omission, acts of commission, or a combination of both" (p. 9).

[12] Conceptually, the PFS is in its infancy. However, it does broadly serve as an effective illustrative metaphorical concept for identifying the types of agents that typically exert some form of power to influence policy decisions. The context the PFS is used in this thesis excludes benign organizations such as the World Health Organization, Doctors without Borders, non-profit and non-for-profit organizations, and other non-governmental entities that exert some form of influence to affect policy change. The focus, rather, is on nefarious organizations and SE-I influence on nation-state policy. Additionally, benign organizations and nefarious organizations use different approaches to influence policy (indirect/direct). Nefarious organizations use direct-based violent methods/approaches such as suicide attacks, harassment and ambushes, target-selection killings, and vehicle/improvised explosive devices to influence, etc. Conversely, benign organizations leverage a nation-state's existing normative legal structures to influence policy.

organizations like al-Qaeda (Lederer, 2015) and IS (Clarke & Winter, 2017), have generated such significant gravitas within the PFS as to alter national and international security policies on an unprecedented scale. The IS, for example, effectively warped the PFS to such extent as to influence an enterprise of sixty-eight nations to wage war against it (Wilkinson, 2017).

The final value of action is the *individual*, or what Thomas L. Friedman (1999) and Cebrowski and Barnett (2003) properly term the "super-empowered individual" (SE-I). The fundamental nature of warping within the PFS has its inception with SE-Is, typically with support from small a group of loyalists or winning coalition[13] (Bueno de Mesquita, Smith, Siverson, & Morrow, 2005). Transnational criminal organizations, illicit organizations or corporations, and revolutions are not entities that ascend to the PFS of their own volition. Rather, they are strategically corralled and directed toward fulfilling the policy objectives of the SE-I subsumed with vision and purpose.

More than any other agent operating within the PFS, it is the SE-I that most effectively taps the fountain of power (narratives) to unify populations in support of policy objectives. The SE-I finds, exacerbates, and harnesses the invisible currents of discontent—often found in economic, religious, social, or ideological grievances—to convert a given population into a powerful movement of change. Before the 1990s, only a handful of security and policy experts knew of al-Qaeda and its founder, Osama bin Laden. Yet, through employing a powerful "mythic" narrative serving "both a persuasive and an epistemic device... based in religion or an ideological/mythic system similar to religion" (Rowland & Theye, 2008, p. 54) bin Laden transformed into an SE-I, galvanizing and accruing legitimacy among discontented local and foreign sympathetic populations; ultimately, ascending to the PFS to influence the policies and actions of many powerful nation-states. Abu Musab al-Zarqawi and his organization, the IS, ascended in similar fashion with arguably equal effects.

[13] Bueno de Mesquita et al. defines the winning coalition as the "group" that "controls the essential features that constitute political power in the system" (2003, p.7). In democracies, these individuals are responsible for electing the leader. In other types of governments, it is the "set of people who control enough other instruments of power to keep the leader in office" (2003, p. 8). See the *Logic of Political Survival* (2003) for an in-depth explanation.

A distinguishing feature of SE-Is is the acute ability to galvanize and weaponize what Clausewitz (1976) referred to as the "blind natural forces" (*hatred*, *enmity*, and *primordial violence*) of specific populations against a target-set, be it an oppositional party, a local government, or an international government(s). The blind natural forces constitute the necessary chemical ingredients that must react and bind within a given population prior to wars' initiation. While Clausewitz had nation-state conflict in mind when committing this thought to paper, the concept equally applies to SE-Is attempting to rally support in pursuit of a policy objective. Unlike most nation-states, however, SE-Is intuitively perceive the blind natural forces as "the precious metal[s], the real weapon, the finely honed blade" that "constitute the spirit that permeates" (Clausewitz, 1976, p. 184) not just wars, but also insurgencies. Thus, SE-Is like Osama bin Laden or Abu Bakr al-Baghdadi, the Islamic State's current leader, expend immense energies constructing potent narratives "to stir the hearts of potential recruits ... to reinforce Westerners' perception ... as ruthless devotees beyond comprehension" (Brendan, 2016). For SE-Is, underwriting success for their movement absolutely depends on creating powerful narratives necessary to ignite a target population's blind passions.

An attendant and particularly noteworthy feature of SE-Is is their proclivity for increased awareness to environmental changes brought on by the onset of the information revolution. The diffusion and amplification of cheap information technologies and the rise of sophisticated innovative communication platforms within cyberspace—such as WhatsApp, Facebook, and Telegram—have afforded SE-Is new opportunities to actualize and to accelerate the chemical blind forces of target populations in novel ways previously unobserved. Moreover, the information revolution gave birth to a proliferation of what Jennifer Snow (2015) termed "radical leveling technologies" (RLT), where disadvantaged SE-Is circumvent nation-state strengths and exploit chasms of vulnerabilities to achieve an equal playing field. The IS's use of social media to project a powerful propagandistic narrative recruiting "nearly 30,000 foreign fighters from over eighty countries" (Zeitzoff, 2017) invariably exemplifies this effect. For SE-Is, warping the PFS to their advantage—irrespective of intent or outcome—is not just a real novel strategic shift in circumventing nation-state superiority, while exposing nation-state vulnerabilities, but it is also

increasingly becoming a common occurrence. To paraphrase the Chief of the General Staff of the Russian Federation, General Valery Gerasimov (2016), SE-Is adroitly leverage RLT asymmetric approaches thus "enabling the nullification of an enemy's [nation-state] advantages in armed conflict" (p.25). As such, the Information Age has explicitly afforded SE-Is the means to ignite the blind forces of domestic and foreign populations with greater ease and acceleration.

B. CONSTRAINTS WITHIN THE POLITICAL FABRIC SPACE

The PFS metaphor seeks to identify the types of agents that typically ascend within the political domain to influence policy. Agents operating within this space face constraints, however. First, agents remain restricted to the capabilities they possess (Bueno de Mesquita, 1994, 1997; Abdollahian et al., 2006). While nation-states have at their disposal a discursive menu-option of tools spanning the elements of national power (Jesse, 2011), they nonetheless face institutional and international constraints. Domestic laws constrain the extent nation-state leaders can embark on military power projection. And while adherence to international law is not mandatory, almost all nations, according to Louis Henkin, "observe almost all principles of international law and almost all of their obligations almost all of the time" (Koh, 1997, p. 2599), albeit with the caveat that some nations choose to ignore or stretch the limits of both domestic and international law.

Conversely for SE-Is and the illicit organizations they represent, capabilities are almost exclusively accrued through illegal channels. Clarke, Jackson, Johnston, Robinson, and Shatz, (2017), for example, cogently credit IS's rise as perhaps the wealthiest terrorist organization in history to the illicit taxation, extortion, and oil theft (p. 1–9). Nevertheless, the amount of material support available to SE-Is inevitably correlate to their movement's survival. However, capabilities for SE-Is also encompass spheres of influence and networking abilities. The current influential leader of IS, Abu Bakr al-Baghdadi, expended significant energies networking and aligning with sympathetic local and foreign illicit organizations in such locales as Egypt, Africa, Yemen (Flynn, 2016), and the Philippines (Paddock & Villamor, 2017) on an unprecedented scale. Leveraging RLTs (Snow, 2015),

IS effectively established pods of global affiliates on an unpresented scale to (1) increase the survival rate of their movement and (2) recover from decapitation campaign efforts.

The second constraint is best illustrated by Bueno de Mesquita's use of the term "salience" (Bueno de Mesquita, 1994, 1997; Abdollahian et al.; Jesse, 2011). Salience represents the extent nation-state leaders, SE-Is, and illicit organizations, remain committed to exerting power on the PFS to achieve specific policy outcomes. For nation-states, the salience threshold for responding to external threats likely correlate to the extent they interpret emerging threats as existential. For example, once IS proclaimed itself the new Islamist caliphate, and unilaterally declaring statehood in June 2014 (Bradley, 2014), it took the United States and the international community approximately four months to determine the movement a direct threat to Iraq's sovereignty and a powerful destabilizing force to the international order before establishing a global coalition (Department of State [DoS], 2014). For nation-states countering threats emanating from SE-Is and their illicit organizations debatably require the threat threshold to be relatively high. Conversely, the salience threshold for SE-I action is much lower. While the impetus for action lay internal to the SE-Is, the mobilizing fuel for action and sustainment reside externally with roots to ideological, political, religious, or social grievances. Either one or a combination of the four factors prompts, moves, and sustains SE-Is to see a policy objective through.

The final constraint and perhaps the most important, is the galvanization of population support proportional to the aim of the policy objective. This constraint applies equally to nation-state leaders and SE-Is. This is effectively achieved, as previously mentioned, by igniting and crystalizing the passions (Clausewitz, 1976) of a target-population toward the perceived threat. The means consistently relied on by nation-states and SE-Is is simply the narrative. Leaders of nation-states use the narrative to generate what John Mueller properly termed "the rally around flag effect" (1973) phenomena to accrue the requisite public support for military operations overseas in response to external threats. For SE-Is, the narrative remains the key potent ingredient for manufacturing movements of change. It is, to paraphrase Clausewitz (1976), their "hub of all power and movement, on which everything depends" (p.595-596). In essence, the absence of a compelling narrative makes it wholly difficult for any one nation-state or SE-I to ignite the

chemical reactions necessary for the blind natural forces of a given population to come to fruition.

However, SE-Is place a greater value on the narrative than nation-states. SE-Is intuitively understand narratives are explicitly linked to the longevity of their movement, given the limited access to illicit funds, capabilities, and manpower. They also appreciate narratives for their potent effects on generating and preserving the longevity of movements. Like flying buttresses that undergird the aesthetic yet practical structural features of cathedrals, the narrative for SE-Is is the structural feature that stimulates, creates, and sustains movements of change. SE-Is generate powerful narratives that, as Arquilla and Ronfeldt (2001) observe, create "a sense of identity and belonging" and "a sense of cause, purpose, and mission" (p. 328). As Clarke and Winter (2017) stated of the Islamic State: "Its leaders evidently value narrative dominance more than their enemies do. Consequently, they have put, in proportionate terms, far more time and money into militarizing it. Rather than viewing information as a complementary good, they considered it a commodity of critical importance, and thus dedicated unparalleled resources—and operations security planning—to it". Absent the narrative, all else is minutely relevant.

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IV. AGENT-BASED RATIONAL CHOICE MODELS: AN APPROACH TO ACCOUNT FOR COMPLEXITY AND UNCERTAINTY OF THE POLITICAL DOMAIN

Scientific theory is a contrived foothold in the chaos of living phenomena.

—Wilhelm Reich

The political fabric space (PFS) metaphor allows for the imposition of structure and meaning of common agent-types ascending to the political domain to influence policy outcomes. This includes a discursive range of capabilities and associated constraints. Within this conceptual framework, analysts can leverage twenty-first century computing power, advances in software, social network analysis (SNA),[14] and various eclectic academic disciplines to account for uncertainty. Indeed, the present age affords novel methodological approaches for analyzing the evolution of policies and, as Beyerchen (1993) rightly points out, for attacking "nonlinear problems numerically" while "highlighting patterns of instability" (p. 65). Agent-based rational choice (ABRC) models remain an applied means to probabilistically capture the policy preferences of agents operating within the PFS.

ABRC models are computational models that systematically allow analysts to create, experiment, and assign decision rules to agents (individuals, organizations, and non-states) within an environment to assess and inform analysis of a given phenomenon (Axelrod, 1997; Cederman 2003; Jesse, 2011). Computer simulations provide the means for analysts to interrogate the behavior of agents, based on an identifiable set of circumscribed rules (Cederman, 2003). The synthesis of ABRC models coupled with country or regional subject matter expert (SME) analysis, thus, provides a powerful means

[14] Social network analysis (SNA) is a set of tools used to analyze social structures using networks. According to Cunningham, Everton, and Murphy (2016), one can perceive SNA as a means with which to better grasp how social ties (relationships) "help, enable, and constrain the knowledge, reach, and capacities of people and other actors" (p. 3). When used with reliable data, SNA provides a unique perspective traditional methods of analysis cannot provide.

to generate insights into agents' social and human behaviors that previously was all but impossible. Forecasting the future state of policies and their attendant consequences for future military strategies becomes a real possibility.

Interestingly, ABRC models have become central to many international relations (IR) theorists' fixation with interrogating nation-state interaction, having now expanded the number of import academic disciplines used to inform analysis and prediction from political psychology (Sullivan, Snyder, & Sullivan, 2007) to game theory (Bueno de Mesquita et al., 2005; Goldburg, 1994; Jesse, 2011; Morrow, 1994; Schelling, 1960) with success. The U.S. military has yet to capitalize fully on this increasingly practical application. Nevertheless, the most prominent of ABRC models in vogue is Bruce Bueno de Mesquita's expected utility model (EUM). Bueno de Mesquita first developed the EUM in the 1980s (Jesse, 2011), which has since evolved in sophistication and accuracy. The EUM leverages rational theory postulates,[15] and, according to Larson (2008), derives insights from "spatial politics, social choice theory, game theory, and expected utility theory" to generate reliable policy forecasts with minimal variable input (p. 29). The EUM remains the most coherent predictive model to capture complex agent interaction concerning the evolution of policies within the PFS for three reasons. First, because agents desiring to influence policy outcomes have to make themselves publicly aware, the number of agents can readily be identified. Second, as previously mentioned, agent access to capabilities largely determine the extent they can influence policies. Here again, analysts can leverage the intelligence community, SMEs, and open-source data to obtain a sense of the capabilities agents can employ to influence policy outcomes relative to their detractors and supporters. And third, the EUM provides a robust means to address uncertainty previous analytical means, such as sole reliance on SMEs, experienced difficulty mitigating (Bueno de Mesquita, 2009; Jesse, 2011). The EUM's axioms is grounded in game theory,

[15] Rational choice theory postulates assert the following: (1) outcomes, whether social or political, result from the interaction of individual choices; (2) individuals aim to extract the largest possible gain of the choices provided; (3) individual's preferences are transitive. For example, if A is preferred to B and B to C, then A is preferred to C as well; (4) each game is structured by identifying the agents involved, their preferences, and information regarding preferences at each stage of the game, which ultimately determines the outcome; (5) once parameters are identified, analysts seek to identify the equilibrium of the game, which is the predicted outcome (Walt, 1999).

which interprets and mitigates uncertainty in two fundamental ways. First, "systems perturbations" can generate insatiability (Barnett, 2004) within the PFS, and can therefore produce unforeseen shocks that influence agents to alter, as Bueno de Mesquita (2011a) observes, their "expectations and ... the actions they choose" (p. 62). The rise of the Islamic State (IS) caliphate, for example, altered the international communities' expectations about its prospects for defeating the movement unilaterally. The decision to form a global coalition to mitigate the situation reflects a shift among agent preferences toward a multi-lateral enterprise, which proved a prudent strategic move. As such, the EUM offers analysts a means to simulate shocks to events through manipulating input variables and running various sensitivity analysis or Monte Carlo simulations. Analysts can proceed to check forecasts for their robustness, extrapolate inferences, and explore alternate outcomes (Bueno de Mesquita, 2011a).

Second, uncertainty comes about when analysts lack important information about agents involved in influencing policy outcomes, such as beliefs, values, or capabilities. According to Bueno de Mesquita (2011a), in this regard uncertainty can be "dealt with by attaching probabilities to player types and having nature—a nonstrategic actor—draw the player types in accordance with the explicitly assumed probability distribution" (p. 62). More specifically, based on SME analysis, analysts can assign conditional probabilities to agents where incomplete information exists. Leveraging Monte Carlo simulations, analysts can adjust input variables to simulate the impact of perfect or imperfect information on the path of the forecast.

Of course, this does not suggest that the EUM can explicitly account for or eliminate uncertainty altogether.[16] Clausewitz's (1976) caution that friction, chance, and luck, bring "about effects that cannot be measured" is valid (p. 119-120). The argument, rather, is to abandon the need to equate accurate forecasting with complete elimination of uncertainty. Moreover, the threshold levels of uncertainty remain typically far lower in the

[16] Bueno de Mesquita contends that in specific cases "uncertainty reduction" can lead to an increase in conflict rather than de-escalation. For example, U.S. policy forbids negotiations with terrorist organizations. Disgruntled groups who remain uncertain about negotiation prospects with the U.S. government over a specific policy issues may resort to terrorism to garner attention from the government (Bueno de Mesquita, 2011).

political domain than those emerging from the battlespace. ABRC models, specifically Bueno de Mesquita's EUM, are thus well suited to address the evolution of policies in order to assess, inform, and shape military strategies or influence campaigns in support of U.S. objectives (Larson, et al., 2009).

A. CRITICISM OF THE EUM

In the early 1980s, Bruce Bueno de Mesquita developed a methodological approach, based on expected utility theorems, for observing, assessing, and charting the evolution of political outcomes (Jesse, 2011). Borrowing concepts from the field of microeconomics, Bueno de Mesquita further developed the EUM to allow academic researchers track the complex dynamical interaction of agents' competing policy interests unfold over time. Presumably, forecasting the evolution of policies allowed analysts to identify points of contention and optimal strategies to engineer alternate favorable outcomes not achieved through traditional analysis (Kugler, Yesilada, & Efird, 2003; Mesquita, 1997).

The intellectual edifice for Bueno de Mesquita's EUM rests on the assumption that rigorous, logical, transparent, and systematic analysis should drive policy formulation, rather than sole reliance on SME or quantitative analysis.[17] For Bueno de Mesquita this meant turning to the field of mathematics; more precisely, game theory. Game theory forces "the analyst using formal methods to confront logical problems that" eloquence of verbal persuasion might very well miss (Bueno de Mesquita & Morrow, 2000). Further, game theory has the added benefit of forcing analysts to precisely define the problem-set, unlike verbal arguments, which leave room for a wide-range of interpretations and vague

[17]One of the most common methods for apprehending the trajectory of policies and their attendant consequences is reliance on subject matter experts (SME). In his extensive study analyzing the accuracy of SME prediction, Tetlock (2005) concluded that regardless of their antecedent qualifications, most were terrible at predictions and were no better off than the average individual. The point is not to denigrate SMEs, who dedicate immense hours of analysis to studying national security or military problem-sets, but rather highlight that there are existing tools available that can advance and increase their analysis and forecasting performance. Thus, as Tetlock (2005) observed: "If we want realistic odds on what will happen next, coupled to a willingness to admit mistakes, we are better off turning to experts who embody the intellectual traits of Isaiah Berlin's prototypical fox—those who 'know many little things,' draw from an eclectic array of traditions." (p. 2). The solution, then, is to capitalize "on the complementary strengths of full range of methods in the social science took kit" (p. 7), such as the EUM and SNA.

generalities (Niou & Ordershook, 2002). As Robert Powell (2000) rightly contends, game theory is a methodological approach for providing "a kind of 'accounting standard' that can help us think through some issues more carefully than ordinary language arguments" (p. 86). In this regard, the EUM is a unique form of an ABRC model with substantive utility in translating language into precise numeric formulae in studying the evolution of politics within the PFS.

To be sure, Bueno de Mesquita's EUM has its share of detractors. Ray and Russett (1996) acknowledge "many (but not all) of the forecasts were not publicly available before the predicted events occurred" (p. 450). The inherent secrecy of the software's algorithm understandably raise questions and doubts about the model's authenticity and practicality. There is also the enduring controversial debate concerning the utility of formalization (game theory), generally in security studies.[18] Stephen M. Walt (1999), for example, observed that formalization has "little to say about contemporary security issues" (p.8). John J. Mearsheimer uncharacteristically questioned the validity of the EUM, insisting that if Bueno de Mesquita "has a predictive model that in a sense provides the magic formula for understanding where the world is going, then why is it the United States, which is supposedly employing his model, doing so badly in its foreign policy?" (Asner & Gold, 2008). And in a *Washington Post* article titled "Scholars on the Sidelines," Joseph Nye (2009) perceived formalization as generally "methodologies or theories expressed in jargon that is unintelligible to policymakers."

However, any criticism of Bueno de Mesquita's EUM must consequently account for its success as well. While Ray and Russett (1996) previously acknowledge the EUM's shortcomings, they nonetheless laud its overall record of accomplishment for its accurate forecasts. They argue that the EUM not only delivers accurate policy forecasts and prescriptions, but that it has been rigorously and exhaustively tested on over "2,000 policy

[18] While outside the scope of this thesis, the debate surrounding formalization is a fascinating one. See Walt, M. S. (2000). Rigor or rigor mortis? In M. E. Brown, O. R. Coté, Jr., S. M. Lynn-Jones, & S. E. Miller (Eds.), *Rational choice and security studies: Stephan Walt and his critics* (pp.1–44). Cambridge, MA: The MIT Press. In summation, Stephen Walt criticizes the formal modeling community for their inability to generate novel theories in the field of security studies. Conversely, scholars of formalization argue that Stephen Walt, and his supporters, have failed to explain the evolution of global events using his own criteria: "precise, logically consistent, original, and empirically valid."

decisions and outcomes of political interactions taking place in over sixty countries" (p. 449). They point to notable predictions, to include forecasting Yuri Andropov's ascendency to the Soviet Union's General Secretary of the Central Committee, replacing Leonid Brezhnev in 1982 (the forecast was made while Andropov was still working for the KGB and well before SMEs pegged him a serious candidate); the downfall of the Italy's Spadolini government in 1982, only to be replaced by Fanfani, then eventually Craxi in 1983; the replacement of El Salvador's (1981) Duarte government by d'Aubisson regime in 1982, at the time when the U.S. press disagreed (Bueno de Mesquita, 1989); the rise of Hasheimi Rafsanjani to power in Iran, when most SMEs pointedly identified Ayatollah Montezari the next successor (Bueno de Mesquita 1984; 1993); and the defeat of the Sandinista government in the 1990s elections (Ray & Russett, 1996). Moreover, using data from the Correlates of War Project, Bueno de Mesquita demonstrated that the EUM predicted the Cold War would terminate on terms amenable to U.S. interests (Bueno de Mesquita, 2002).

Further, in 2008, Bueno de Mesquita not only accurately predicted Mahmoud Ahmadinejad's reelection as Iran's president but did so when "the results [were] inconsistent with polling and with reasonable statistical projection from the previous election" (Schouten, 2009, p. 11). The forecast produced two additional insights. First, the deteriorating relations between Iran's Supreme Leader Sayyid Ali Hosseini Khamenei and Ahmadinejad, and second, that Iran and the United States would eventually reach a mutual deal concerning Teheran's nuclear production development (Schouten, 2009, p. 11). Although the timing when the predicted negotiated settlement would occur was off by five years, an acknowledgement Bueno de Mesquita makes.

Perhaps, Bueno de Mesquita's most vocal supporter has been the political science analyst Stanley Feder. As career Central Intelligence Agency (CIA) officer, Feder (now retired) consistently used and defended the EUM since the late 1980s. Feder (1995) maintained that with the collection of parsimonious pieces of information, the EUM could generate accurate policy forecasts upward of ninety percent. When compared to forecasts produced by the CIA's SMEs, he concluded they were far less accurate than those generated by Bueno de Mesquita's own EUM. In fact, in testing the EUM in some-1200

complex policy issues in over seventy-five countries Feder (2002) concluded: "that the voting model alone was accurate almost 90% of the time" (p. 119). He further observed that "Forecasts and analysis using Policon [a version of the EUM] have proved to be significantly more precise and detailed than traditional analyses. Additionally, a number of predictions based on Policon have contradicted those made by the intelligence community, nearly always represented by the analysts who provided the input data. In every case, the Policon forecasts proved to be correct" (Bueno de Mesquita, 2004, p. 241). For Feder, the EUM proved a practical tool for analyzing complex policy issues and deriving powerful forecast inferences from the model's findings.

It is also noteworthy to address assumptions surrounding access to Bueno de Mesquita's data prior to the forecasted event. As Ray and Russett (1996) inveigh, numerous publications were made accessible to the public well in advance of the forecasted event.[19] Additionally, Bueno de Mesquita EUM's calculations have now been publicly available for scrutiny in numerous publications for twenty years.[20] Its forecasting success is reflected in several derivative versions developed over the last fifteen years. Senturion Ascertas,[21] a data analytics company, developed an in-house version of the EUM sometime in the early 2000s. Similarly, the RAND Corporation developed one as well in 2011 (Jesse, 2011).

While both EUM versions differ in sophistication, they nonetheless have generated accurate predictions. Senturion Ascertas, for example, forecasted accurately that the U.S.

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[19] Notable examples provided include: Bueno de Mesquita in "Forecasting Political Decisions"; "Multilateral Negotiations"; Bueno de Mesquita, Newman and Rabushka in Forecasting Political Events; Bueno de Mesquita and Kim in "Prospects for a New Regional Order"; and, James D. Morrow, Bruce Bueno de Mesquita and Samuel Wu in "Forecasting the Risks of Nuclear Proliferation: Taiwan as an Illustration of Method." Ray and Russett (1996) provide an exhaustive list of additional forecasts made publicly available prior to the emergence of the predicted event.

[20] See Bueno de Mesquita (1997) "A decision making model: Its structure and form." A more recent version of the model's overall calculations can be found in Bueno de Mesquita's (2011) "A new model for predicting policy choices." The real novel contribution to the updated model is the addition of the variable "resolve" in conjunction with the old model's clout, salience, and position variables. According to Bueno de Mesquita, "resolve" is indicative of capturing "the relative weight each stakeholder gives to resolving an issue compared to holding firm to its position" (p. 75).

[21] Senturion Ascertas provides Defense Intelligence Agency (DIA) testimonial asserting that: "Senturion yielded accurate predictions … and will drive a paradigm shift of existing analytic processes … predicting the intentions and probable courses of actions of human beings, either as individuals or as populations." See http://www.acertas-analytics.com/recent-press-and-testimonials/.

forces would achieve swift victory over Saddam Hussein's armed forces in 2003 during Operation Iraqi Freedom. Consequently, swift victory also meant deteriorating support for U.S. troops by Iraqis and the emergence of a protracted insurgency (Abdollahian et al., 2006). Eric Jesse (2011), then a Ph.D. student at Pardee RAND Graduate School, reengineered Bueno de Mesquita's EUM by combing through the published literature. His dissertation titled *Forecasting the Future of Iran: Implications for U.S. Strategy and Policy* accurately forecasted the future of Iran across 12 political, economic, national security and foreign policy issues.[22] Concerning the aim of this thesis, the EUM is thus very much the right tool to account and mitigate uncertainty within the PFS to manageable levels. It is the right tool for capturing the complex interaction of agents' interests concerning specific policies and the potential consequences it holds for U.S. military strategies (Larson et al., 2009). We now turn to a closer discussion of the expected utility model's composition and its components.

[22] Eric Jesse's (2011) EUM examined 26 of Bueno de Mesquita's publicly available data sets and achieved approximately "90 percent correlation with previously published issue outcomes and forecasts" (p.15). Additionally, "the mean absolute error (MAE or L1 Norm) between the model and published cases was around 0.1 and root mean squared error (RMSE or L2 Norm) was less than 0.025. The presented model thus compares very favorably, closely replicating the outcomes and predictions of numerous actual issues previously studied with expected utility models" (See pp. 43–50).

V. THE EXPECTED UTILITY MODEL: AN INTRODUCTION

> Students of international relations are concerned with the description, prediction, and control of the external behavior of states, particularly of their more violent types of behavior such as intervention, hostilities, and war. It is clear that mere description of a diplomatic or military event has little meaning by itself and that such an event can neither be predicted nor controlled unless account is taken of the circumstances which preceded it within each of the states involved.
>
> —James T. Russell and Quincy Wright[23]

The expected utility model (EUM) is an agent-based rational choice model constituted to capture decision-making evolving between agents within a bounded environment. Implicit in the EUM literature regarding the efficacy of political decision-making is the belief that analysts should be able understand, explain, and chart the most likely course of action and attendant consequences emanating from policies (Bueno de Mesquita 1997; Jesse, 2011; Kugler et al., 2000). For military strategists, understanding the path policies are likely to take affords them unique opportunities to anticipate outcomes; determine the feasibility, suitability, and the practical nature of current and future military strategies; and the limits of power projection. Furthermore, the EUM provides insights into the coalitions likely to emerge, either in support or in opposition to the policy, and agents likely to be coerced, negotiated, or perhaps, remain in conflict with. Derivatives of Bueno de Mesquita's EUM has been used by the Department of Defense (DOD),[24] academic institutions, such as the National Defense University,[25] the RAND

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[23] Russell, J., & Wright, Q. (1933). National Attitudes on the Far Eastern Controversy. *American Political Science Review*, *27*(4), 555-576. doi:10.2307/1947564.

[24] See Senturion Acertas testimonials at http://www.acertas-analytics.com/recent-press-and-testimonials/.

[25] Senturion software was used to provide forecasts on the reconstruction and stabilization phase of the Operation Iraqi Freedom. See Abdollahian, M., Baranick, M., Efird, B., & Kugler, J. J. (2006). Senturion: A predictive political simulation model. Washington, DC: Center for Technology and National Security Policy, National Defense University. Retrieved June 21, 2017, from http://scholarship.claremont.edu/cgi/viewcontent.cgi?article=1060&context=cgu_fac_pub.

Corporation, and various corporate entities.[26] With subject matter expert (SME) input, the EUM provides the means to explore assumptions and opportunities traditional analytical methods might otherwise miss (Bueno de Mesquita 1997; Jesse, 2011; Kugler et al., 2000).

A. THE EUM: THE LOGIC OF DECISION-MAKING

The EUM charts the evolution of policies by capturing the decisions of agents through the synthesis of game theory and theories on spatial decision-making (Larson, et al., 2009). As the game unfolds, agent interests are pitted against each other in a pair-wise contest. Coalitions form based on preference alignment. Inferences regarding negotiations and contestations can thus be extrapolated based on agent preference outcomes. Thus, the EUM (Figure 1) iterates the game under the following presumption:

Figure 1. Expected Utility Agent Decision-Making Outcomes

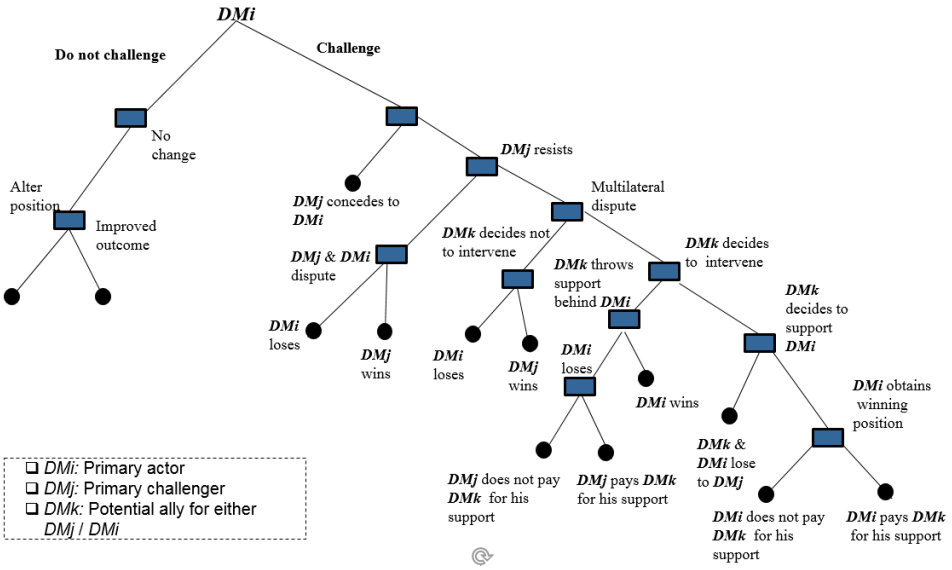
Expected Utility =	(Probability of Success * Utility of Success) -
	(Probability of Failure * Utility of Failure)
	+ (Net Expected Impact of Third Parties)

The logic of the EUM entails simulating agents endogenously assessing and weighing the prospects of positive and negative gains, based on the information they possess, however incomplete or inaccurate it is at the time decisions are rendered. Agents establishing the largest coalition around their policy preference through capability employment will undoubtedly influence the trajectory of policy in their favor. Conversely, failure to garner coalition support around a policy preference, to employ capabilities adroitly, or to seize the initiative to challenge an opposing agent will likely lead to defeat. Success ultimately translates to policy advances and impairing opposing agents (Bueno de Mesquita, 1985; Jesse, 2011; Kugler et al., 2000).

[26] See Thompson, C. (2009). Can game theory predict when Iran will get the bomb? *New York Times*. Retrieved July 5, 2017, from http://www.nytimes.com/2009/08/16/magazine/16Bruce-t.html.

The basic interaction between agents (decision-makers) DM_i, DM_j, & DM_k is displayed in Figure 2. This version of the decision-tree process presumes agents ultimately determine if contesting the policy outcome is necessary, and if so, who the opponents are, with whom to build coalitions, and who to influence to achieve a favorable outcome. The problem-set identifies DM_i as the focal actor. The range of possible choices and consequences DM_i will face within this bounded decision-tree game unfolds in Figure 2. The left side of the decision tree characterizes DM_i's gains of negative expected utility values for contesting the policy. Conversely, the right side of the decision tree characterizes DM_i's gains of positive expected values for contesting the policy (Kugler et al., 2000).

Figure 2. The Logical Flow of Agent Decision-Making Process.
Adapted from Kugler et al. (2000).



In this scenario, DM_i calculates and determines if challenging his rival, DM_j, is beneficial. The left side of the decision tree suggests DM_i's lack of salience to contest the policy. Consequently, two possible actions emerge. DM_i continues receiving benefits consistent with previous agreements. Alternatively, the new policy outcome translates gains into losses, depending on the actions or inactions of DM_i (Kugler et al., 2000).

The right side of the logical decision tree is suggestive of DM_i's willingness to challenge the policy outcome given the measurable positive expected utility gains that

could arise from doing so. Thus, DM_i challenges his rival's, DM_j, position on the policy. Multiple systematic outcomes and policy choices emerge from the interaction. DM_j can accept or mount resistance to DM_i's policy position. Should DM_j yield to DM_i, DM_i's experiences measurable positive gains in expected utility. Conversely, should DM_j reject DM_i*'s* proposal, the engagement could potentially reach resolution through the multilateral or bilateral engagement process (Kugler et al., 2000).

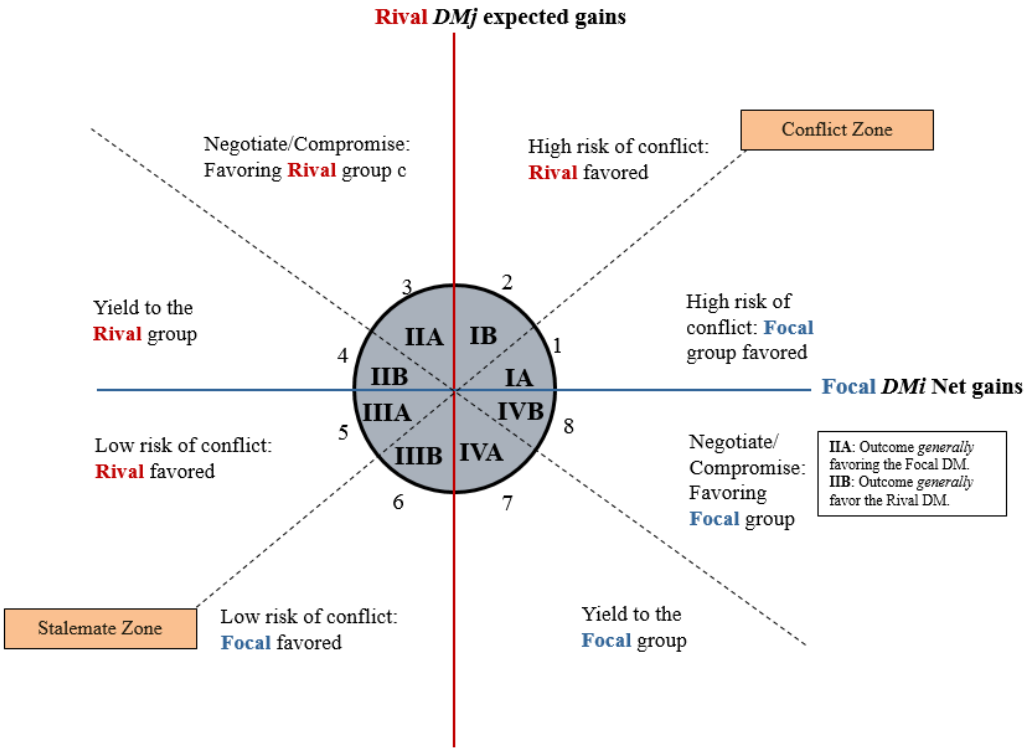
On the other hand, DM_i can unilaterally mount a powerful challenge to coerce (or influence) DM_j into adopting an alternate policy position, ideally one amenable to DM_i's preference. DM_i can also leverage coalitions (provided one exists) to mount an oppositional force to compel (or influence) DM_j to shift his policy preference (Kugler et al., 2000).

If DM_i ultimately chooses to form a coalition to engage in multilateral contestations with DM_j, the consequences for allying with other decision-makers should be considered. This, of course, includes potential rivals forging coalition support for DM_j. In political settings, decision-makers naturally form coalitions around policy preferences. The introduction of DM_k into the decision tree aptly simulates this phenomenon. Further, it provides a unique opportunity to briefly explore the possible avenues for favoring either DM_i or DM_j. In this scenario, DM_k can be assumed to throw its support to either DM_j or DM_i. If DM_i succeeds in enlisting DM_k's support, DM_j will either win or lose. Should DM_i lose to DM_j, DM_i's political capital will diminish, not just from challenging DM_j, but also from enlisting DM_k's support. If DM_i ultimately wins, then he achieves the policy gains initially sought (Kugler et al., 2000). Consequently, DM_i must decide how to reciprocate DM_k for the support rendered, whether through diplomatic, military, or economic assistance or other favors. Typically, compromises are not required if both agents agree on the policy issue. However, DM_i can alternatively choose to renege on prior promises to reciprocate DM_k, or outright compel him to embrace a policy outcome in the absence of favors. Of course, this approach is not without risks or consequences (Kugler et al., 2000; Jesse, 2011). Nevertheless, every agent cycles through this decision cycle.

B. THE EXPECTED UTILITY MODEL: THE CARTESIAN COORDINATE SYSTEM

One method for substantiating the likely interaction and outcome between agents is through the Cartesian coordinate system (Figure 3). The expected utility for agents DM_i and DM_j can, for example, profitably elucidate the types of emergent interaction likely to unfold from the perspective of the focal agent, be it negotiation, coercion, or confrontation (Jesse, 2011, Mesquita, 1985). In essence, the Cartesian coordinate system provides analysts a means to gain insights to future behavioral interaction emerging between agents based on policy preference outcomes. Ideally, a Cartesian coordinate system is generated for each agent, but analysts can subsequently observe the ones deemed most critical to the forecast analysis.

Figure 3. Agent Dynamical Expected Utility Interaction.



Adapted from Beck and Bueno de Mesquita (1985), Bueno de Mesquita, Newman, and Rabushka (1996), and Jesse (2011).

Continuing from the decision-tree example, consider the type of emergent behavior likely to evolve from DM_i's perspective as the focal agent, with DM_j, as the rival. Octants 1 and 2 convey that when both agents have a positive expected utility, confrontation is likely to unfold, with the agent possessing the largest expected utility likely to be the victor. Octants 7 and 8 instantiates DM_i as the dominant agent, but the type of action taken is largely determined by the relative difference in expected utilities. In Octant 7, for example, DM_j's expected utility less than DM_i, and is therefore expected to capitulate. Conversely, in Octant 8, DM_j's expected utility is closer to DM_i's and thus has wiggle room to bargain. Octants 5 and 6 convey that when both agents acquire negative expected utilities, they are expected to bluff (cheap talk), with confrontation remaining a low probability. Lastly, Octants 3 and 4 suggest DM_i has far less expected utility than DM_j. Consequently, DM_i will capitulate or bargain with the determining factor being the amount of expected utility the agent has. Octants 3 and 4 are essentially a reversal of Octants 7 and 8 (Beck & Bueno de Mesquita, 1985; Jesse, 2011).

C. THE EFFECTS OF RISK

Decision-making inherently embodies risk-taking with attendant consequences associated with policy selection (Figure 4). One of Bueno de Mesquita's (1997) significant theoretical contributions to the EUM is the risk-seeking categories associated with policy selection. Where agents fall along, the policy continuum categorically reflects their risk-seeking behavior. Agents typically fall into three risk camps: risk averse, risk acceptant, or risk neutral. Agents reluctant to embrace bold policy preferences are considered risk averse. Conversely, agents willing to embrace bold policy positions reflects a willingness to accept risk. Finally, agents content with the policy preference and have no desire to influence the outcome are considered risk neutral (Kugler et al., 2000).

Figure 4. Risk Propensity for Policy and Security Tradeoffs. Adapted from Kugler et al. (2000).

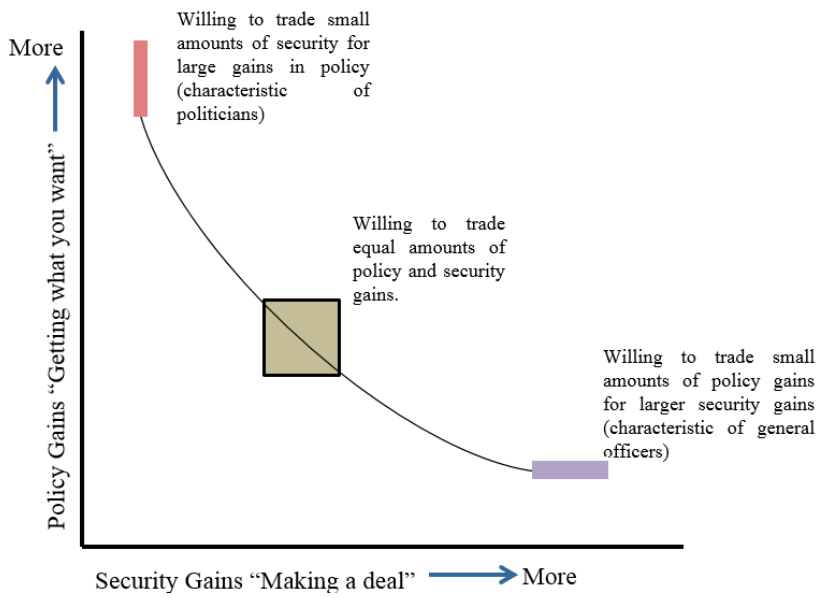


Figure 4 conveys the risk propensity agents encounter when determining what receives greater salience: successfully obtaining a favorable policy outcome or an increase in the security posture. For example, policymakers are typically risk acceptant. They typically prefer conceding security gains to accrue policy outcomes more aligned with their party's political objective. Conversely, general officers may concede on policy gains to achieve a more stable and secure environment. The U.S. president generally assumes the middle road, balancing security and policy gains. Nevertheless, capturing the risk component of the decision-making calculus remains significant because it substantiates each agent's willingness to embrace a certain policy outcome (Kugler et al., 2000).

D. THE EXPECTED UTILITY MODEL: THE GAME-THEORETIC CALCULATIONS

Unlike other decision-making computational models or theories, the uniqueness of the EUM is its emphasis in capturing agents' preferred outcomes for a given policy issue, and the extent agents remain committed to exerting influence to affect a policy's overall trajectory (Bueno de Mesquita 1994; 1996; & 1997; Kugler, Yesilada, & Efird, 2003). For military strategists, the EUM remains a prophetic tool. Although military strategists

leverage numerous intelligence assets to formulate strategies, the EUM remains a particularly powerful applied tool to assess the battlespace strategic environment as a direct consequence of U.S. policy choices. Because U.S. military strategy is indeed an extension of U.S. policy, the EUM makes it possible for strategists to ascertain the impact of policy on military strategies developed and employed. Additionally, the EUM can assist with illuminating consistencies and inconsistences between policy and military objectives. The purpose of this section is to provide a layout of the EUM's computations. However, because Bruce Bueno de Mesquita's EUM's game-theoretic calculations are extensively elaborated in a plethora of books and peer-reviewed journals, the subsequent section briefly addresses the model's foundational theories and computations.[27]

The EUM rests on theories extrapolated from micro-economics. It is grounded in Duncan Black's (1958) theory on the median voter, as articulated in *The Theory of Committees and Elections*. It is also grounded in Jeffrey Banks's (1990) theory on monotonicity, as conveyed in his work on crisis bargaining, concerning the relationship between agents' expected outcomes and the intensity over political disagreements. According to Bueno de Mesquita (1997), Duncan Black (1958), and Jeffrey Banks's (1990) theories yield a quasi-dynamic political model closely approximating the compromises and concessions likely to evolve for each agent contesting over some policy issue.

Nevertheless, Bueno de Mesquita (1995, 1997, & 2002) and Jesse (2011) identify two essential limitations for forecasting policies: (1) that political issues are represented on a unidimensional line segment and (2) that agent preference for policy outcomes diminish in favor the further it deviates in Euclidean distance from the initially stated policy preference. The implication for the limitations remains necessary for the evolution of Black (1958) median voter theorem that occurs. Duncan Black (1958) observed that as agents' competing interests unfold a Nash equilibrium emerges where a simple majority of agents corral around the policy preference preferred; this is referred to as the winning position. Granted Black's (1958) median voter theorem used votes to fundamentally prove his

[27] For those interested in an expanded mathematical explanation see Bueno de Mesquita, 1985; Bueno de Mesquita, Newman, and Rabushka, 1985; Bueno de Mesquita, 1994; Bueno de Mesquita, 1997; Bueno de Mesquita, 2002, Bueno de Mesquita, 2011; and Jesse, 2011.

hypothesis, in political discourse votes, as Bueno de Mesquita (1994) observes, are analogous to the exercise of power (Bueno de Mesquita, 1997).

E. THE EXPECTED UTILITY MODEL

Let N = {DM_1, DM_2, DM_3,....,n} represent the designated set of agents attempting to influence the direction of a given policy in a multilateral setting. In this thesis, agents comprise nation-states, illicit organizations, and super-empowered individuals (SE-I).

Let M = {a, b, c,...,m} represent the policy issues agents are interested in influencing its outcome, with R_a representing the uni-dimensional line segment ranging from 0 to 100 (or 0 to 1).

Let each DM_i, $i \epsilon N$ possess a preference for the policy issue *a* examined, with *x* symbolizing an agent's ideal resolution for the policy issue reflected on a bounded (R_a) line-segment (R_a, $0 \leq X_{ia}^* \leq 100$).

Every agent's preferred policy resolution is directly or indirectly affected by decisions of other agents. Thus, for an outcome on a given policy *a*, for example DM_k's proposal, DM_i's utility for DM_k, $u_{DMi}x_{DMk}$, represents the distance (in "decreasing function") between DM_i's ideal resolution and the actual proposal; hence, $u_{DMi}x_{DMk} = f|x_{DMk} - x_{DMi}^*|$.

In Bueno de Mesquita's EUM (1995, 1997, 2002, & 2011b), agents are empowered with three characteristics. First, each agent expresses a position for the policy issue examined. Second, each agent is endowed with finite capabilities that range the diplomatic, information, military, and economic (DIME) elements of national power to influence the direction of the policy. Thus, let C_{DMia} denote DM_i's total power that can be exerted to influence the outcome on a multilateral policy dispute (issue) *a*, relative to the sum total power of the other agents, equal 1. In this regard, DM_i's capabilities (denoted as C_{DMi}), represents his portion of power (capabilities) contribution to influence the overall policy outcome. Third, each agent attaches some level of fealty (salience) to the policy issue in question, when compared to other policy issues. For example, DM_i may attach greater salience for issue *a* when compared to DM_j or DM_k, and less salience to issue *b* when

compared to DM_j or DM_k. The salience for each actor is denoted as S_{DMia}. All agents are ascribed the value of $U_{DMixDMk}$ for DM_i, $k \epsilon N$, C_{DMi}, S_{DMi} for each issue, with $0 \leq S_{DMia} \leq 1$. For this thesis, agents identified with identical values across all three characteristics (position, capabilities, and salience) were aggregated into one agent.

As the evolution of game unfolds, agents' competing interests are pitted against one another in a pair-wise contest, taking into account the above-mentioned three variables. Consequently, coalitions naturally emerge in support of a policy position. Each agent "votes" for each policy proposal and is compared to the votes cast by every other agent. Irrespective of the ethical or moral implication of the policy, the largest coalition formed around a policy position is ultimately the victor. Thus, the total votes DM_i casts, when compared to DM_k or DM_j is equal to:

$$V\frac{DMjk}{ia} \mid x_{DMj,}x_{DMk}) = (c_{DMi})(s_{DMi})(u^{DMi}x_{DMj} - u^{DMi}x_{DMk}) \quad (1)$$

Equation (1) expresses the capabilities DM_i brings to bear to influence the policy outcome. When compared to DM_j and DM_k, this is equivalent to DM_i's capabilities, discounted by DM_i's salience for the policy issue, and the extent DM_i prefers DM_j's proposal over DM_k's ($u_{DMi}x_{DMj}$ - $u_{DMi}x_{DMk}$). According to Bueno de Mesquita (1997), this process occurs among agents inside the smoke-filled room prior to the public visible decision-making process (p. 239). Stated differently, public agreements reflect agreements reached privately.

Equation (2), however, reveals that policy proposals succeed to the extent they lead to the formation of the largest coalition support when compared to alternate policy options. This is determined by calculating the "votes" of every agent and compared to x_{DMj} and x_{DMk}. Algebraically, this is expressed as: v_{DMj} and v_{DMk}, with v_{DMjk}:

$$v^{DMsJK} = \sum_{i=1}^{n} v_i^{DMsjk} \quad (2)$$

Should the sum of v_{DMjDMk} be greater than zero, DM_j defeats DM_k, given that DM_j successfully corralled the majority of agents and votes. Conversely, should the sum of

v_{DMjDMk} be less than zero, DM_k wins. If, however, v_{DMjDMk} is zero (or < 0) agents ultimately remain indifferent (neutral) to DM_j and DM_k's policy proposals. However, competing interest among agents rarely evolve to several settlements. Nevertheless, absent any external reasons that would influence agents to shift position, Black's (1958) median voter identifies the winning position among all other policy preferences. However, as is the nature of politics, external influences do cause agents to shift positions, sometimes conceding to rival agents. These external influences, thus, can shift the median voter. Capturing the consequence of this occurrence remains significant to generating (dynamically) accurate forecasts.

The median voter can also shift when agents remain dissatisfied with the outcome. Determining the extent policy outcomes can be influenced based on agents adjusting their position or committing further resources to influence policy outcomes remains critical to the forecasting process. Dissatisfied agents are accorded four avenues for attempting to achieve an alternate favorable outcome. They can (1) increase or decrease their salience (S_{DMi}) for the issue; (2) shift their revealed position to a new position $(u^{DMi}x_{DMi}* \neq u^{DMi}x_{DMi})$; (3) compel agents conceding to the focal group to indirectly influence other agents to adjust their effort level (e.g., S_{DMk}); or (4) compel agents conceding to the focal group to indirectly influence other agents to adjust their revealed position on the policy issue $(u^{DMk}x_{DMk}* \neq u^{DMk}x_{DMk})$ .While the model explores all approaches, this thesis focuses on (4).

Agents focusing on achieving specific policy aims benefit immensely from approximating what other agents believe about the policy issue in question. For example, nation-state leaders commonly assess their counterpart's position on a given policy issue. They further make logical assumptions, however incomplete the information may be, about the agent's prospect for achieving specific policy aims and the potential consequences emerging from the decision.

Agents make these determinations by observing each agent's characteristics (i.e., $u_{DMi}x_{DMj}$, $j \epsilon N$, s_{DMi}, c_{DMi}) and assessing the likelihood agents can be expected to leverage their expected utility to contest or concede to the rival policy offer. The gains in expected utility rivals will likely be obtained from conceding or not contesting the policy offer. In this

thesis, and for all policy issues examined, it is assumed agents draw logical conclusions about the impact for supporting or contesting the policy to defeat the IS. Thus, the DM_i's expected utility for not contesting DM_j's (rival) position on the policy offer is reflected as $E^{DMi}u^{DMi}\Delta/\bar{d}$, with $\bar{d}$ instantiating that the rival policy offer will not be contested nor will an alternative proposal be proffered. Three options may occur. First DM_i assumes with a certain amount of probability (Q_{DMi}), DM_j does not renege or change policy preference DM_i could interpret a threat to his status quo during a specific time-period. Consequently, DM_i and his coalition can collect DM_j's $(u^{DMi}\Delta x_{DMj^{\circ}} \mid \bar{d})$ utility. Second, DM_i may logically assume DM_j will renege and adjust his policy preference because, from DM_i's perspective, the chance or opportunity (T^i) for improvement exists $(u^{DMi}\Delta x_{DMj^{+}} \mid \bar{d})$.On the other hand, the policies for DM_j may very well worsen $(u^{DMi}\Delta x_{DMj} \mid \bar{d})$ such that $(u^{DMi}\Delta x_{DMj^{-}} \mid \bar{d} > u^{DMi}\Delta x_{DMj^{\circ}} \mid \bar{d} > u^{DMi}\Delta x_{DMj^{-}} \mid \bar{d})$. DM_i's expected utility for failing to challenge DM_j's is determined as:

$$E^{DMi}u^{DMi}\Delta x_{DMj} \mid \bar{d} = Q^{DMi}u^{DMi}\Delta x_{DMj}^{\circ} \mid \bar{d} + (1-Q^{DMi})[T^{DMi}u^{DMi}\Delta x_{DMj}^{+} \mid \bar{d} + (1-T^{DMi})u^{DMi}\Delta x_{DM\bar{j}} \mid \bar{d} \quad (3)$$

However, DM_i can propose an attractive offer to DM_j's to adjust his position on the policy, although DM_j may care little about the issue ($1-s_{DMi}$). Conversely, DM_i might conclude DM_j will contest the issue, with the probability DM_j (P_{DMi}) will succeed or may not ($1-P_{DMi}$). If DM_i successfully persuades DM_j to adjust his policy preferences, he gains whatever utility DM_j brings with that policy adjustment. This is expressed as $u^{DMi}\Delta x_{DMj^{+}} \mid \bar{d}$ which equates to $u^{DMi}(x_{DMi-}\ x_{DMj})$. If DM_i fails to persuade DM_j to alter his policy position DM_i must consider altering the policy position in favor of DM_j's policy position, expressed as $u^{DMi}\Delta x_{DMj^{-}} \mid d = u^{DMi}(x_{DMj} - x_{DMi})$. The expected utility for contesting DM_j's policy proposal in a multilateral setting is expressed as:

$$E^{DMi}u^{DMi}\Delta x_{DMj} \mid d = s_{DMj}\left\{P^{DMi}[u^{DMi}\Delta x_{DMj}^{+} \mid d] + (1-P^{DMi})[u^{DMi}\Delta x_{DM\bar{j}} \mid d]\right\} + [1-s_{DMj}][u^{DMi}\Delta x_{DMj}^{+} \mid d] \quad (4)$$

Thus, DM_i's total expected utility, based on the extent DM_j can influence the policy proposal outcome, is expressed as follows:

$$\mathrm{E}^{DMi}\, u^{DMi}\, \Delta x_{DMj} = \mathrm{E}^{DMi}\, u^{DMi}\, \Delta x_{DMj} \mid d - \mathrm{E}^{DMi}\, u^{DMi}\, \Delta x_{DMj} \mid \bar{d} \quad (5)$$

The results from Equations (3) and (4) instantiates agents' attempt to forecast the consequences from selecting alternate approaches, with results from Equation (5) revealing the differences between the initial approaches (Bueno de Mesquita, 2002). Thus, the overall results from Equation (5) determines DM_i's willingness to make a proposal. Results greater than zero affords DM_i an opportunity to challenge DM_j because the option is superior to not challenging DM_j. Results less than zero deters DM_i from challenging DM_j. If the results equal zero DM_i remains neutral ("indifferent") to contesting or not contesting DM_j's policy proposal. Of course, each agent iterates through this process. Interestingly, as this process unfolds, each agent also makes logical inferences regarding expected actions emerging from third parties (P^i estimates). For example, DM_i is expected to pay close attention to reactions of third parties, resulting from his dispute with DM_j. DM_i intuitively breaks agents into three camps: those aligning with DM_i's coalitions, DM_j's coalition, and those remaining indifferent to either coalition. DM_j does the same, as does every agent ($k \epsilon N$). Because the components of Equation (5) unveil the subjective elements, such as utilities and probabilities for action or inaction, of all agents involved in the contestation over some policy issue, analysts can determine the possible negotiations, clashes, and capitulations likely to evolve within the PFS. Finally, Equation (5) is assessed from four vantages, with superscripts denoting the perspective associated with the agent assessing the policy issue.

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VI. APPLIED CASE STUDY: THE ISLAMIC STATE AS REVOLUTIONARY MOVEMENT

> The descent into disorder began years before the crisis, with whispers of the return of veterans from the previous war and the announcements from a political front representing a competing shadow government opposed to the incumbent. The murky deaths of political figures in the hinterlands are written off as banditry, local blood debts, and revenge killings unremarkable in a society long riven by internecine conflict. Seemingly random in pattern, the deaths soon become part of the rhythm of everyday life in the country, as unexplainable as they are inconsequential. The rising criminality in these areas soon block many government services in the area, a fact buried by the bureaucracy and invisible to the leaders of the state who believe that what they see in the capital is the reality of the state. Villages have no officials, taxes go uncollected, and schools have no teachers. By the time the state's police and military units lose the ability to operate in these same rural areas, the crisis has matured to an existential crisis for the state.
>
> —Craig Whiteside[28]

Before employing the expected utility model (EUM), we need to explore the substantive history of the Islamic State[29] (IS), which prompted the formation of a global

[28] Whiteside, C. (2016). The Islamic State and the return of revolutionary warfare. *Small Wars & Insurgencies, 27*(5), pp. 743-776.

[29] Since the movement's inception, the Islamic State (IS) has gone through various name changes. The founder, Abu Musab al-Zarqawi, first formed the group in Afghanistan, the *Jund al Sham* or "the Army of the Levant," while seeking Osama bin Laden's assistance in ousting Jordan's ruling party. The United States invasion of Iraq in 2002 prompted bin Landen to order Zarqawi to relocate his militant group to Iraq to campaign against the U.S. and coalition forces. Zarqawi thus rebranded the group *al Tawhid wa al Jihad* or "Monothesim and Jihad." In 2004, Zarqawi officially joined al-Qaeda, changing the movement's name to *Tanzim Qa-idat al-Jihad fi Bilad al-Rafidayn* or Al Qaeda in Iraq (AQI). After Zarqawi's death by U.S. and coalition forces, Abu Umar al-Baghdadi took over the organization and called it the *Islamic State of Iraq* (ISI). Around 2010, coalition forces killed Abu Umar al-Baghdadi. Abu Bakr al Baghdadi rose to become the movement's new leader. The movement took on the name the *Islamic State of Iraq and al Sham* (the Levant) (ISIS/ISIL). By this time, the ISI's relationship with al-Qaeda had fractured due to the increasing ideological schisms between the two movements. Further ISIS/ISIL's attempt to claim al-Nusrah Front as their own--which their leader Abu Muhammad al-Jawlani rejected—and their complete disregard for al-Qaeda's authority, prompted Ayman al-Zawahiri to denounce the movement in 2014. This officially terminated the group's affiliation with al-Qaeda. In June of 2014, following multiple blitzkrieg operations, resulting in large swaths of territorial gain, ISIS/ISIL declared the restoration of the Caliphate, with Abu Bakr al Baghdadi as its Caliph leader (Barrett, 2014). The movement is branded currently as the *Islamic State* (McCants, 2015). While unorthodox, I have chosen to refer to the movement as simply the Islamic State/IS. This unconventional approach avoids generating unnecessary confusion by continually changing the movement's name in attempting to stress other important ideas/concepts. Readers desiring a greater working knowledge of the IS movement will benefit from William McCants's (2015) *The ISIS apocalypse: The history, strategy, and doomsday vision of the Islamic State.*

coalition and the issuance of an agreed-upon policy to defeat the movement altogether. Afterward, a discussion of the data-collection process is provided. Following that section, the EUM is applied to forecast the future of the IS movement.

Starting in 2013, but especially in 2014, the IS seized control of large swaths of territory in Syria and Iraq. Its global expanse, to include affiliates, stretched across forty nations. While the group's headquarters laid in Syria, its origins laid in Iraq. As of late, the global coalition is currently executing joint military operations to defeat and to degrade the IS caliphate (Connable, Lander, & Jackson, 2017).

However, the rise of the Islamic State (IS) as a powerful adversarial contestant, worthy of influencing the policies of over sixty-eight nations to wage war against them, has stymied a consensus among analysts as how to properly label the movement. The IS has been referred to as a "transnational Sunni Islamist insurgent and terrorist group" (Blanchard & Humud, 2017, p. 1); a "transnational terrorist organizations" (AOC, 2014, p. 14); a "hybrid organization" (Barfi, 2016, p. 18), an "insurgent group" (Johnston, Shapiro, Shatz, et al., 2016, p. 11), a "hybrid insurgent-terrorist group" (Connable, Natasha, & Jackson, 2017, p. iii) and "an al Qaeda splinter group" (CNN, 2017). While each label possesses a grain of truth, understanding IS's ascendency as a powerful political agent within the PFS is best observed through a Maoist framework of revolutionary warfare for two reasons. First, analyzing IS's rise through the prism of any of the abovementioned labels habitually places greater emphasis on the violent and barbaric actions of the movement, while undermining the significance of its political aims. Viewing the movement through a Maoist framework of revolutionary warfare reverses that process, putting greater emphasis on the political, not military, action. Second, by combining the two elements together, we precisely arrive at Bernard B. Fall's (2015) definition of revolutionary warfare, which he aptly defined as "guerrilla warfare plus political action" (p.41). Viewing IS as a revolutionary movement "in toto," where political and military actions are interwoven, brings clarity to the movement's overall purpose and objective. It further explains how such a movement ascends to the PFS to influence the policies and actions of many nation-states.

This subject received its best treatment from Craig Whiteside's (2016a, 2016b) in-depth analysis on IS's ascension as revolutionary movement. Relying on extensive archival and field reports from military operations, Whiteside cogently articulates the evolution of IS through Mao's three phases of revolutionary warfare. This chapter adopts that framework.

A. MAO'S THREE PHASES OF REVOLUTIONARY WARFARE

Charting IS's rise as an effective Salafi–jihadi revolutionary movement, however, requires a brief overview of Mao's three-stages of revolutionary warfare. Like Clausewitz, Mao passionately professed the inherent relationship between politics and war. For Mao, revolutionary warfare embodied "political action" meant to propel societies forward toward progress by unshackling "civilization deadlocks fueled by interests" (Singh, 2013, p. 562). War, as Mao argued, served to resolve "contradictions, when they have developed a certain stage, between classes, nations, states, or political groups, and it has existed ever since the emergence of private property and of classes" (Singh, 2013, p. 562). Revolutionary warfare, Mao argued, is the highest expression of class struggle (Singh, 2013). As such, the mobilization of populations remained a crucial step to establishing a revolutionary movement.

Mao's revolutionary warfare campaign is predicated on a three-phase mobile warfare strategy supported by a guerrilla force (Singh, 2013). The three phases include: (1) organizational development and preservation, (2) expansion of troops, material resources, intelligence collection, and attacks on the adversary, and (3) decisive (destruction) action against the adversary (Staudenmaier, 1977). Three features drive the evolution to each phase. First, revolutionary movements require adequate training and discipline to evolve effectively from executing small hit-and-run tactics toward sophisticated and complex military and intelligence operations. Second, each phase is condition-based. Because a nation-state's military apparatus, civilian manpower, intelligence, and other resources far exceed those of guerrilla movements, remaining fluid and expecting to return to a previous stage in the face of defeat—as was the case for IS—is critical. And third, as previously mentioned elsewhere in the thesis, a movement requires revolutionary leaders (emerging

super-empowered individuals [SE-I]) to effectivity leverage and propagate powerful influence campaigns (propaganda) and narratives (1) to raise their movement from the social fabric space to the PFS, (2) to undermine the legitimacy of the government and its ruling elites, and (3) to preserve the political will of the people during the protracted engagement. These simple evolutionary stages remain necessary for the revolutionary movement to mature into a powerful conventional force able to contest the very sovereignty of the ruling nation-state.

B. IS'S POLITICAL AIMS

According to Whiteside (2016a), unlike conventional forces, where political and military objectives run parallel to one another, and where policy influences the outset of strategy and war termination, revolutionary warfare interweaves political aims with military operations. Analysis of IS's use of truck bombings, improvised-explosive device (IED) attacks, and beheadings support the findings in this thesis. Instigating Iraq's sectarian civil war between Sunnis and Shias and between Syria's government and the oppositional forces speak to this effect as well.

IS's political aims are inextricably linked to the movement's broader narrative. According to Will McCants (2015), the IS narrative of Abu Musab al- Zarqawi's Salafi–jihadi vision is subsumed with the promise of "the return of God's Kingdom on earth, the reestablishment of the early Islamic empire, the empowerment of Sunni Muslims around the world. That the reestablished caliphate will eventually take over the entire globe" (Kirk, 2016). In 2006, Zarqawi made this pronouncement abundantly clear, broadcasting worldwide his intentions to establish an "Islamic State in which the word of God will reign supreme" (Kirk, 2016). In essence, an IS caliphate would replace Iraq's current government and expand globally to rule over all Muslims (Whiteside, 2016a). Every violent and brutal action Zarqawi and Abu Bakr al-Baghdadi executed aimed to convey this very message. Fulfilling this requirement required IS to structure itself organizationally into an agile, mobile, guerrilla force dedicated to Salafi–jihadi revolutionary warfare.

C. PHASE 1: ORGANIZATIONAL DEVELOPMENT AND PRESERVATION: CREATING THE ISLAMIC STATE (2002–2005)

During the development phase, the oppositional movement's primary purpose is recruiting a small group of loyalists and foot soldiers, projecting a powerful narrative, and accruing capabilities necessary to execute military operations and to expand the organization. Emerging SE-Is, like Zarqawi, understand conscripting a small group of dedicated followers, which Bueno de Mesquita, Alastair, Siverson, and Morrow (2005) refer to as the "winning coalition,[30]" remain of utmost importance to generating critical mass for the revolutionary movement to gain traction. These small groups of ardent loyalists comprise of the SE-I's powerbase, as no SE-I rises to power unilaterally. Nonetheless, Zarqawi filled IS's core leadership with men affiliated with the Salafi organization, which existed underground during Saddam Hussein's regime (Whiteside, 2016b). They included Abu Muhammad al Lubnani, al Adnani, Abu Anas al Shami, and Abu Umar al Baghdadi (Whiteside, 2016b), and whose ideological version of Salafi–jihadism took on an "extremist and minoritarian reading of the Islamic scripture that is also textually rigorous, deeply rooted in a premodern theological tradition" (Bunzel, 2015, p. 7). Zarqawi recruited a group of followers whose unwavering commitment to the movement's revolution remained unquestioned.

In recruiting from the masses, Zarqawi looked to exploit the consequences that emerged from the issuance of Coalition Provincial Authority (CPA) Order Number 1, enacted shortly after U.S. troops achieved quick victory over Saddam Hussein's forces in 2003[31]. Paul Bremer, then overseeing the reconstruction efforts, issued CPA No. 1, which led to (1) the de-Baathification of government employees previously associated with the Saddam's regime, and (2) the dissolution of the Iraqi Army with the expressed intent of

30 While the term conventionally describes the selection of leaders to government power and the necessary activities required to maintain power, it can be expanded to equally apply to emerging SE-Is.

31 Among other forecasts, in 2003 the National Defense University employed the Senturion software, a derivative of the EUM. It not only forecasted accurately the end of Saddam Hussein's regime, but equally crucial, the emergence of a protracted sectarian insurgency centered on disaffected Sunni populations. See M. Abdollahian, M. Baranick, B. Efird, and J. Kugler. "Senturion: Predictive Political Simulation Model" (2006), Defense and Technology Paper, 32, Center for Technology and National Security Policy, National Defense University, and may be found at http://scholarship.claremont.edu/cgi/viewcontent.cgi?article=1060&context=cgu_fac_pub.

rebuilding a new one from scratch (Kirk, 2016; Pfiffner, 2010). As Pfiffner (2010) observes, Bremer's decision laid the foundation for an insurgency by (1) disabling Iraqis from generating financial means to support families, (2) removing government and academic employees with the experiential and intellectual expertise necessary to keep the day-to-day government functioning, and (3) removing critical security needs (such as police) necessary to preserve order. Consequently, as Filkins (2015) conveys, "Overnight, at least two hundred and fifty thousand Iraqi men—armed, angry, and with military training—were suddenly humiliated and out of work." The CPA order was nothing short of a gift for Zarqawi. The seeds for Zarqawi's recruitment and insurgency was thus planted as Sunnis without work and movements sympathetic to Zarqawi's revolution joined the movement.

Developing powerful ideological narratives that garner the SE-I and their revolutionary movement notoriety is critical for revolutionary movements. The synergistic interface between political aims and military strategy is the narrative. The narrative imposes an authentic appeal on the masses to unify as a revolutionary body necessary to fulfill the SE-I's political objectives, irrespective of cruelty and violence. Moreover, the narrative garners the movement legitimacy, which acts as a contagion for recruitment and resource allocation.

For Zarqawi, propagating a narrative seeking to return the Middle East to the governing principles of the Prophet in the seventh century proved effective. As Wright (2006) observed, many people like Zarqawi believe the "world is divided between 'sons of light' and 'sons of darkness,' and that a fight to the end is the will of God." Violence, thus, remained a justified and legitimate means of bringing order to disorder and extracting compliance. The bombings of UN headquarters, Jordanian Embassy, and the destruction of Shia Imam Ali Mosque in Najaf (Barrett, 2014) not only fueled that narrative, but also delivered Zarqawi accolades among anti-U.S. movements. The broadcast beheading[32] of Nicholas Berg (Filkins, 2004) further propelled Zarqawi to national and international

[32] While appalling to Westerners, Zech and Kelly (2015) argue beheadings remain a potent "recruiting too" that "attracts a more devout and impressionable type of recruits," specifically "young recruits" (p.86) See https://jtr.st-andrews.ac.uk/articles/10.15664/jtr.1157/.

prominence. The $25 million price tag the United States issued for Zarqawi's arrest (Weaver, 2016) further burnished his reputational standing. As such, Zarqawi and his revolutionary movement was rapidly ascending to the PFS as a powerful contestant in the international arena. The Salifi-jihadi narrative projected proved an effective facilitative factor.

However, a central component of the Mao's building phase is securing sufficient capabilities necessary to sustain and evolve the revolutionary movement. Capabilities, as Vittori[33] (2009) observed, allow movements to "transform its available resources into political violence" (p. 449). While Zarqawi's recruitment efforts prospered, the financial and material capabilities lagged behind. To address this shortfall, Zarqawi reluctantly joined bin Laden's al-Qaeda, despite diverging political aims between the two movements (Whiteside, 2016b). Zarqawi believed leveraging bin Laden's reputation and resources would enable his revolutionary movement to expand.

D. PHASE 2: EXPANSION OF TROOPS, RESOURCES, AND ESCALATORY ATTACKS (2005–2007)

During the second phase—the expansion phase—the focus for the revolutionary movement is ideally continuing expending efforts to recruit, accrue further resources, and execute escalatory sophisticated attacks, such as terrorism, assassinations, and sabotage (Staudenmaier, 1977). The aim is continually to sap the adversary's military strength to degrade the nation-state's ability to recover, and to sow psychological doubt and discord among populations regarding the government's inability to govern and provide safety and security.

In addition to merging with numerous Sunni-militant organizations (Whiteside, 2016b), Zarqawi's approach to expanding his revolutionary movement called for strategically setting in motion conditions for exacerbating existing historical tensions between the Sunnis and Shias that seemed destined to collide. Specifically, Zarqawi sought to ignite a sectarian civil war between the two major ethnic groups (Council on Foreign

[33] While Vittori (2009) explicitly refers to terrorist, this statement applies to guerrilla and insurgent movements.

Relations, 2014). As Zarqawi intoned in a letter to bin Laden, "As the decisive moment approaches, we feel that our body has begun to spread into the security vacuum. ... If we succeed in dragging them [Shias] into the arena of sectarian war, it will become possible to awaken the inattentive Sunnis" (Kirk, 2016). Zarqawi, thus, focused on initiating "unprecedented unrestrained violence against the Shia" community (Kirk, 2016) to generate and project a narrative of IS as the sole central protectors of the Sunni community. Like a heap of straws skillfully assembled, Zarqawi understood a series of attacks would trigger a civil war. Truck bombings, torture cells, suicides, and assassinations proved potent deliverables. Among Iraqis Zarqawi gained the moniker "the sheikh of the slaughterers" (Kirk, 2016). The interim Iraqi government's inability to bring order to disorder was becoming palpable with each attack.

By 2006, Zarqawi's reputation had begun eclipsing bin Laden's al-Qaeda for two reasons. First, Zarqawi's "media empire," which included video production capabilities, enlarged to incorporate provinces (Whiteside, 2016b). Zarqawi understood the potent effects of communication on IS's overall strategy. As he observed in a letter to bin Laden, "We are in a battle, and more than half of this battle is taking place in the battlefield of the media. And that we are in a media battle in a race for the hearts and minds of our Ummah," thus the "media occupies the greater portion of the battle today" (Klausen, 2015, p.3). And second, the ideological schism between bin Laden and al-Qaeda increased. For example, bin Laden disapproved of Zarqawi's mass killings of Shias and the destruction of holy sites. In a sharp rebuke, his second in command, Ayman al-Zawahiri, asserted[34]

> Many of your Muslim admirers are wondering about your attacks on the Shia. The sharpness of this questioning increases when the attacks are on one of their mosques and it increases more when the attacks are on the mausoleum of Imam Ali Bin Abi Talib, may God honor him. My opinion is that this matter won't be acceptable to the Muslim populace however much you have tried to explain it, and aversion to this will continue. (Aaron, 2008)

[34] In 2013, Ayman al-Zawahiri publicly served ties with the IS state asserting: "[ISIS] is not a branch of the al-Qaeda group … does not have an organizational relationship with it and [al-Qaeda] is not the group responsible for their action." (Seftel, 2016).

The sheikh of the slaughterers responded by demolishing the Gold Dome in Samarra, the Shia's largest and most respected shrine in Iraq, intensifying the sectarian conflict between the two ethnic groups (Kirk, 2016). Shortly thereafter, however, U.S. forces eliminated Zarqawi with an airstrike (Burns, 2008). Consequently, three simultaneous events would force Zarqawi's movement underground and return to phase one of revolutionary warfare. First, the death of Zarqawi dealt a lethal reputational blow to the movement. The absence of an SE-I-led movement accelerated the entropy of IS's narrative, which contributed to the loss of recruitment and resources necessary to preserve and evolve the movement. Second, U.S. forces adroitly seized the initiative and deployed five brigades (roughly 30,000 soldiers) in a surge, which ended the brutal sectarian vicious cycle (Gabrielsen, 2013). And third, and related to the second, the brutal mass killings by Zarqawi and his revolutionary movement prompted adversarial resistance groups who previously worked for IS to turn against them in the form of the Sunni Awakening (Whiteside, 2016b). In tandem, as Biddle, Friedman, and Shapiro (2012) observe, the awakening, the surge, the ground conditions, and the decision by the Bush Administration to support counterinsurgency efforts achieved the intended effect of drastically reducing the sectarian war between the Shias and the Sunnis. To avoid complete annihilation, remnants of IS absconded to Iraq's rural areas (Whiteside, 2016b). The IS was in a state of preservation. As such, the movement disappeared from public eye for three years (Kirk, 2016).

E. PHASE 1: ORGANIZATIONAL DEVELOPMENT AND RECONSTITUTION (2008–2011)

As the surge unfolded and as success of the awakening strategy was being replicated elsewhere in Iraq, remnant IS's strongholds were purged by U.S. and Iraqi forces. Desertion of IS fighters, coupled with their inability to infiltrate the Iraqi government effectively, and Muqtada al-Sadr's decision to avoid confrontation with U.S. forces, forced the movement to return to the *organizing*, *building*, and *preservation* phase (Whiteside, 2016b). In essence, a combination of multiple events led to a temporary relative peace. However, the disappearance of IS did not suggest their total and complete annihilation. On the contrary, new leadership was elected and lessons were learned from

Zarqawi's mistakes. The first step in rebuilding IS began by electing the revolutionary movement's next leader, Abu Bakr al-Baghdadi. Baghdadi obtained a Ph.D. in Quranic Studies from Baghdad. As a religious scholar, he espoused the use of violence to impose Islamic Law (McCants, 2015). As Baghdadi aptly observed: "Degradation cannot be erased except by sacrificing souls and lives, spilling blood, scattering carnage, skulls, martyrs and injured all along the way" (Kirk, 2016). He shared Zarqawi susceptibilities; he was, in essence, Zarqawi reincarnated.

Secluded in northern Iraq, Baghdadi began rebuilding the movement through four primary approaches. First, Baghdadi intensified targeted executions of Sahwa sheikhs believed to be responsible for the Sunni Awakening (Whiteside, 2016a). For IS, self-preservation equated to eliminating Sunni defectors with brutal violence. Brutality had an attendant potent purpose: deterring further defections. Second, understanding the complex power dynamics of Sunni tribes, Baghdadi skillfully began reincorporating Sunni tribes back into IS movement through sheer manipulation, coercion, and negotiations. As David Ignatius (2014) wrote of Baghdadi's persona: "The ISIS leader, in sum, is a clever, disciplined, violent and charismatic man—with an eye for manipulating Muslim public opinion." Those that disobeyed were swiftly eliminated. Third, IS orchestrated numerous prison breaks to bolster their depleted ranks of fighters (Mohney, 2015; Whiteside, 2016a). Many of these prisoners served in U.S. prisons during its occupation in Iraq. These prisons, commonly referred to as "jihadi universities," proved effective breeding grounds for creating and expanding underground networks for IS loyalists (Kirk, 2016). From his time in prison, Baghdadi understood prisoners were not just fodder for recruitment but also critical nodes connected to major jihadi organizations, resources, and manpower to be absorbed into IS revolutionary movement.[35]

Finally, during the last phase, Baghdadi brought order and discipline to the movement. The core IS leadership ensured subordinates obeyed and remained devoted to IS cause. Borrowing the managerial framework from al-Qaeda the IS further "refined its vertically integrated, centrally managed structure with functional bureaus in order to

[35] As Whiteside (2016a) observes, it is no surprise that a decent percentage of IS leadership comes from the same 20,000 prisoners paroled or granted amnesty between the years 2008 and 2010.

effectively control territory" (Whiteside, 2016b, p.13). The IS was thus postured to expand and evolve to the next phase of revolutionary warfare, and like the phoenix, rise again to the PFS as a critical contender for establishing a caliphate.

F. PHASE 2: IS REDUX—EXPANSION OF TROOPS, RESOURCES, AND ESCALATORY ATTACKS (2011–2013)

The reboot success of IS is largely attributed to the savvy use of resources and manpower the movement amassed since 2008; the IS's organizational structure, thus, matured in scope and complexity. However, the redux expansion phase of IS fundamentally went into overdrive because of Baghdadi's impending desire to establish a caliphate as quickly as possible. As such, three multi-nodal facilitative factors aided Baghdadi in fulfilling this objective. First, Baghdadi continually sought to supplant and erode public trust in the Iraqi government's ability to deliver safety and security. Increased insurgent attacks on Iraqi military forces and dense population centers supported this narrative. Whiteside (2016b), for example, identified that by 2011 "attacks in Mosul were three times higher than in Diyala province and 50% more than all of Anbar province" (p.14). Further, decapitation campaign efforts to undermine tribal power escalated, especially of Sahwa sheikhs deemed antagonistic toward the IS. Second, while the causes of IS's resurgence are as numerous and complex as the Middle East they set aflame, the United States' departure from Iraq allowed the movement greater flexibility and freedom of movement for their increasingly larger forces to operate unabated by U.S. ground and air operations (Whiteside, 2016b).

Third, Baghdadi adopted Zarqawi's method for fomenting civil wars by searching for a country fraught with social and political upheaval. The brewing tensions in Syria fit the criteria perfectly. In March 2011, several teenagers in the city of Dara'a were caught painting the anti-government slogan, "The people want to topple the regime" and were publicly tortured by Bashar al-Assad's security forces (Freedman, 206, p. 14). Publication of the incident sparked mass-protest movements, which were countered with brutal force by Assad's military (Rodgers, Gritten, Offer, & Asare, 2016). As protest movements proliferated elsewhere in Syria, and Assad's military response intensified, terrorist groups from around the world joined the conflict (Freedman, 2016). Capitalizing on the unrest,

Baghdadi dispatched several agents to Damascus to assist with accelerating the evolution of the protest movements into an all-out civil war (Kirk, 2016). As Hoffman observed, "The wave of car bombings that convulsed Damascus showed that tactics that had been successfully employed in Iraq had now been exported to Syria" (Kirk, 2016). Baghdadi realized the Syrian crisis afforded IS unique opportunities not unlike the ones Zarqawi capitalized on in the early 2000s. In essence, Baghdadi was gaining access to a wellspring of arms, foreign fighters, and other terrorist organizations. In effect, during this phase IS had evolved into a healthy revolutionary movement.

G. PHASE 3: THE DECISIVE, DESTRUCTIVE ACTION AGAINST THE ADVERSARY (2013–2016)

IS metamorphosed into Mao's decisive phase when it began amassing and controlling Syrian territory (Whiteside, 2016b). In 2014, Baghdadi seized Raqqa, establishing their headquarters. In Raqqa, IS declared Abu Bakr al Baghdadi "the Caliph of all Muslims and the Prince of the Believers" (Wood, 2014). That proclamation prompted numerous foreign fighters to join the movement. As Soufan observed,

> The civil war in Syria gave him an opportunity. The civil war in Syria gave them a platform. Now it's not a few dozens hiding in the western desert; now there's thousands and thousands of foreign fighters that is coming from everywhere. 5,000 from Western Europe, 6,000 from Tunisia, almost 5,000 from the former Soviet Union, people coming from everywhere. (Kirk, 2016)

The IS had effectively fulfilled Zarqawi's dream of establishing a caliphate.

That same year in Iraq, the IS captured Ramadi, Fallujah, and Mosul. A number of inferences may be extrapolated to explain their successful blitzkrieg military operations. First, Nouri al-Maliki, Iraq's prime minster, and a Shia, had for the better part of 2014 assaulted numerous Sunni peaceful protests. According to Human Rights Watch (2014), "The government responded to largely peaceful demonstrations with violence and to worsening security with draconian counterterrorism measures" (p. 1). The torture, abuse, and the "mass arrest campaigns in Sunni regions" (Human Rights Watch, 2014, p.1) prompted Sunnis to intensify protests against the dominant Shia government. In looking for a protector, Sunnis looked to the IS. As Rich Clarke, a counter-terrorism expert aptly

opined, “Where have the Sunnis to go? There’s only one place they can go. It is that residual of the insurgency that is now run by al-Baghdadi” (Kirk, 2016). And second, the Iraqi army largely abandoned their post prior to IS assault “as soldiers dropped their weapons, shed their uniforms for civilian clothes and blended in with the fleeing masses” (Al-Salhy & Arango, 2014). Consequently, the IS accrued $25 billion in U.S. weapons, equipment, and vehicles (Fahim & Al-Salhy, 2014).

Capabilities-wise, IS amassed a fortune few terrorist organizations in recent history could match. According to Clarke et al. (2017), the IS generated a whopping $1 billion to $2.4 billion in oil revenue and taxation. In 2015 alone, the seizure of oilfields enabled IS to “outperform at least 30 countries in the world in gross domestic product” (Whiteside, 2016b, p. 15). By seizing Iraq and Syria’s oilfields, critical roads, and imposing fear and violence in large city centers, IS skillfully extracted the financial assets necessary to execute domestic and foreign terrorist operations. Additionally, IS benefited from the inadvertent effects of globalization, including access to a diversification of resources, such as global recruitment, intelligence sharing, and leveraging technical expertise from other illicit networks, like the Islamic State of West Africa (formerly Boko Haram). For its role, the Information Age afforded IS unique opportunities to leverage virtual sanctuaries in the absence of a safe haven, to carry out operations, and to increase the movement’s longevity.

H. THE FORMATION OF A GLOBAL COALITION: IS MEETS THE THRESHOLD FOR A GLOBAL COALITION RESPONSE

After Mosul, Iraq’s second largest city, fell President Barack Obama announced the formation of an international global coalition to degrade and ultimately defeat the IS. The global campaign resulted in over sixty partner-nations committed to organizing along five lines of effort (McInnis, 2016). The United States and Iraq focused on capacity building, such as training Iraq Security Forces. Turkey and the Netherlands combined their efforts to halt the spread of foreign terrorist fighters. The Kingdom of Saudi Arabia, Italy, and the United States worked to block IS access to funds and finances. The United Arab Emirates and Germany facilitated humanitarian relief and crisis. And in combating IS’s narrative, the United States, the United Kingdom, and the United Arab Emirates sought to expose the

true nature of the movement (McInnis, 2016). Essentially, as a global coalition, each nation contributed what it could to the fight (McInnis, 2016).

Since the formation of a global coalition, progress to regain lost territory, degrade, defeat, and deny IS freedom of movement, funds, and recruitment has generated significant gains (Hudson, 2014). For example, cooperation between the Kurdish Peshmerga and the Iraqi military prevented the massacre of the Yazidis people trapped in Mount Sinjar; the city of Erbil in Kurdistan was thus preserved. The Iraqi city of Ramadi was finally liberated in 2016. Fallujah, the birthplace of IS, was returned to Iraq in 2016 with support from anti-IS and "U.S.-trained troops and pro-Shiite militias sympathetic to Iran" (Bremmer, 2016). And, recently, Mosul and Raqqa were liberated. These efforts have been so effective that by early 2016, the IS's annual revenue dropped significantly, between $250 million and $365 million (Clarke et al., 2017). In effect, as the proceeding forecasts demonstrate, the IS will be forced to return to Mao's first phase of revolutionary warfare (preservation/building).

VII. ISLAMIC STATE DATA ELICITATION PROCESS

Forecasting the future state of the Islamic State (IS) affords political and military analysts unique opportunities to 1) generate robust predictions regarding the most likely course of action emerging from agent interaction; 2) identify alternate outcomes, if necessary, to best ensure expectations and strategies developed accurately align with U.S. interests; and 3) demonstrate the utility of game theory when combined with computing freeware, such as *R*, to capture the complex exchange of competing interests among nation-states, militias, and super-empowered individuals (SE-I) involved in influencing a policy outcome. Here we outline the data-elicitation process used to generate the three relevant forecasts concerning the future state of IS. Of note, the forecasts for each of the policy issues were generated and refined throughout the month of June 2017. However, absent the third forecast,[36] no updates to the data were provided for the sake of maintaining integrity of the expected utility model (EUM) process.

A. IDENTIFYING POLICY ISSUES OF CONCERN

The data collection process begins by examining an issue of particular interest to U.S. policy and military decision-makers, the policy connected to issue, and the agents seeking to influence the trajectory of the policy. Subject matter experts (SME) remain central to this process, as they are most familiar with enduring regional or country issues. As such, three policy issues regarding the future of the Islamic State were examined:

1. What is the prospect that the global coalition and other relevant stakeholders (Russia, Iran, and Syria) will degrade and ultimately defeat the IS caliphate in Iraq?

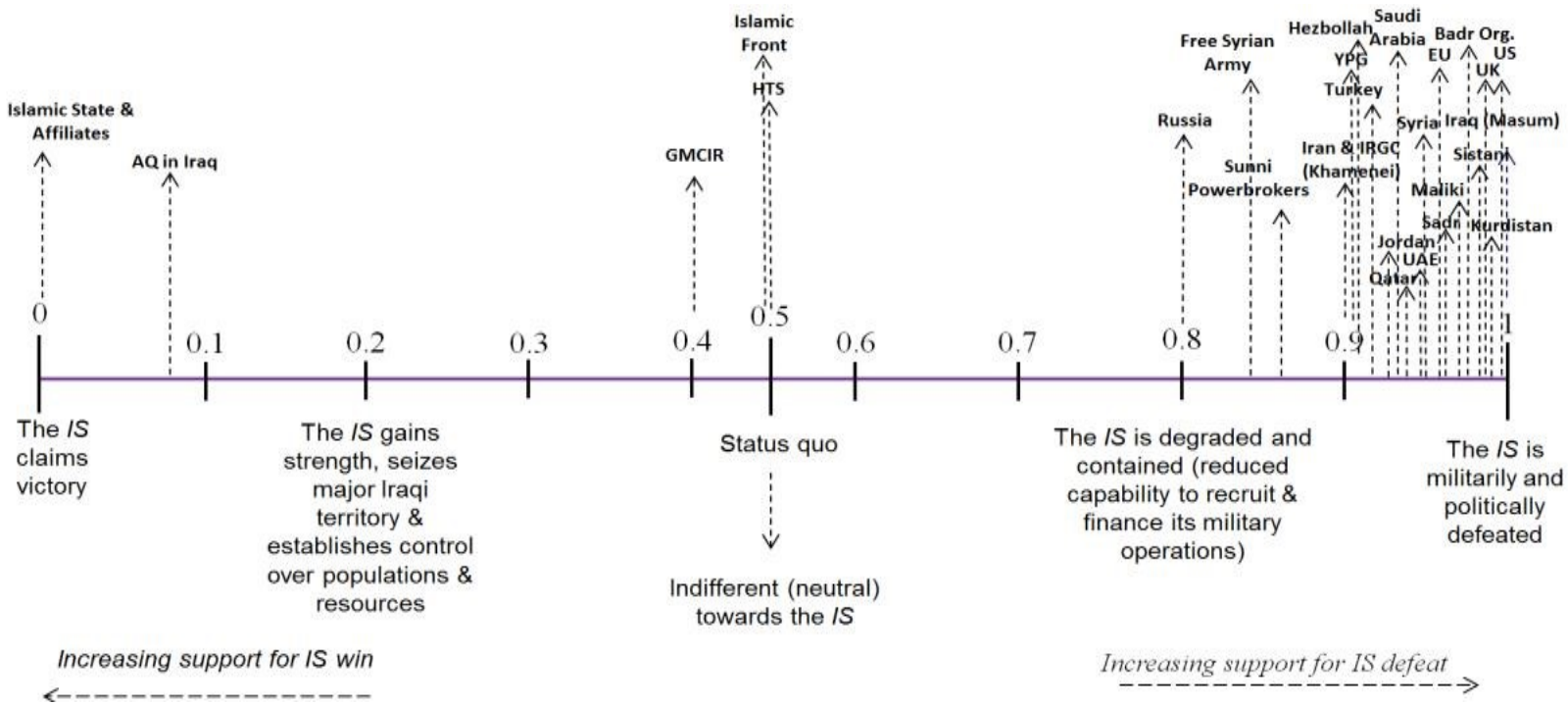
[36] The third policy forecast captures the current appetite of relevant Iraqi agents and relevant external agents to partition Iraq along Shi'a, Sunni, and Kurdish ethnic lines as sub-states to the Iraqi government. That data set was updated to reflect Israel's support for Kurdistan's recent referendum to partition. The overall forecast, however, did not change. In great measure, Israel's shift on the subject was not supported by an increase in their capability contribution or salience to act on this new policy preference.

2. Should IS be defeated militarily, what is the prospect that the movement will endure as an insurgency?

3. What are the policy preferences of the Iraqi national political organizations, ranging from partitioning Iraq into separate Shi'a, Sunni, and Kurdish states, to various forms of unified states, in which local governorates remain subordinate to the government of Iraq?

Each policy question is a stratum aimed to build a common picture of the narrative likely to evolve from the strategic interaction between agents. As such, on a uni-dimensional scale, agents were placed according to their professed preference on the policy issue (Figure 5).

Figure 5. Policy Preference Scale



B. DATA STRUCTURE: AGENT IDENTIFICATION

Data for the policy forecasts were obtained primarily from two SME sources. The first data set was provided by Howard Shatz, a senior economist at the RAND Corporation. The second data set was procured from the primary SME, Craig Whiteside, an IS expert, and a professor of National Security Affairs for the Naval War College. In addition to the two data sets, I generated my own raw data set for all three policy issues, achieving close approximations in most areas, with varied degrees in other areas. Where divergence existed between data sets, the average of the three estimations were taken or they were resolved through discussion with the primary SME. Data collection for the three-policy issue forecast began by determining the relevant agents vested in influencing the outcome concerning IS conflict. Approximately one-hundred sixty-six were identified: sixty-eight global coalition members, seven influential political and religious actors internal to Iraq, eighteen external state and militant actors, and seventy-three para-military or militia groups, which included the some fifty militias comprising of the Popular Mobilization Force (PMF). With assistance from the SMEs, the list was reduced to twenty-six agents. Leveraging the PFS metaphor, the ultimate goal of analysis was identifying relevant agents who could in essence influence (warp) the space in support of specific policy outcomes. A careful analysis of each agent was crucial to the process to avoid potentially skewing the forecast.

For each agent, a capability (diplomatic, information, military, and economic), position and salience rating was assigned (Figure 6). Social media, blogs, newspapers, and publicly stated statements, expressed through either radio or television, proved useful in establishing a profile for each agent. Using the open-source programming language of *R*, the profiles were compiled and coded to provide a holistic and robust forecast for the policy issue examined. While agent type and number differ for each policy forecast, the process remained the same.

Of note, the EUM presented in this thesis is the exact model RAND developed in 2011 (Jesse, 2011). All of the model's formulations closely adhere to those published by Bueno de Mesquita with one caveat. While RAND's EUM replicates Bruce Bueno de

Mesquita static model based on his published works (1994, 1996, 1997, & 2002), the dynamic portion of the model suffers minutely, if only because it is not as well cogently conveyed in scholarly publications as the static model. Nevertheless, across 20 cases analyzed, RAND achieved a high replication rate (90 percent correlation) when compared to the data sets generated by Bueno de Mesquita's own EUM, and thus does not suffer significantly in its forecasting powers (Jesse, 2011).

Figure 6. Data Structure (Sample): Agent Identification

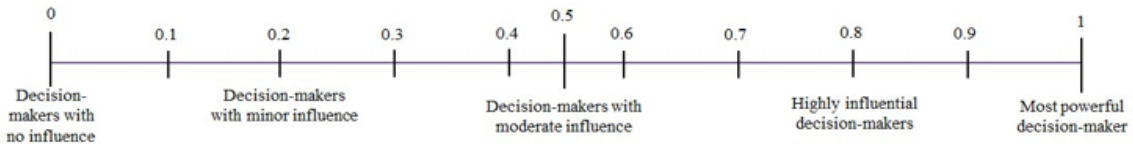
Agents	Capabilities	Position	Salience
Iraq	0.9	1	0.99
Kurdistan	0.89	0.99	0.97
IS	0.88	0	0.99
Sistani	0.75	0.87	0.87
Sadr	0.71	0.86	0.86
Maliki	0.66	0.85	0.85
IRGC	0.7	0.82	0.8
GMCIR	0.52	0.4	0.38
Sunni PBRKs	0.47	0.8	0.7
US	0.73	0.9	0.9
EU	0.65	0.9	0.7
UK	0.61	0.9	0.72
Turkey	0.52	0.75	0.75
SA	0.65	0.84	0.78
UAE	0.61	0.9	0.72
Jordan	0.58	0.9	0.78
Qatar	0.53	0.88	0.76
Hezbollah	0.41	0.85	0.53
Syria	0.62	0.9	0.83
IF	0.11	0.49	0.62
YPG	0.17	0.84	0.88
HTS	0.11	0.5	0.3
FSA	0.12	0.85	0.61
Badr	0.3	0.86	0.9
AQI	0.2	0.08	0.18
Russia	0.14	0.8	0.38

C. AGENT CAPABILITY RATINGS

A critical measure for translating policy preference into success is an agent's access to capabilities. "Capabilities" is defined as those diplomatic, information, military, and economic (DIME) levers agents wish to expend to influence policy outcomes. Of course, each agent manages finite resources in such a way to address other policy issues attaining a higher priority. Finally, a crucial component of the capabilities' variable is clout, or influence. Readers will notice certain agents, such as Sistani, do not possess a plethora of

material or economic resources, yet rank higher than agents who do, such as the United States or the United Kingdom (Figure 7). While clout remains immaterial, certain leaders possess the requisite charisma or influence that can be leveraged to generate the production of resources. Religious and political leaders, as they often do, leverage their credentials to churn out or compel other agents to support a given policy position. Therefore, clout remains an essential component of the EUM data collection process. As such, the capabilities' ratings measure an agent's total contribution (across the sub-categories), affecting a policy outcome. The scale ranges from 0 to 1, or 0 to 100.

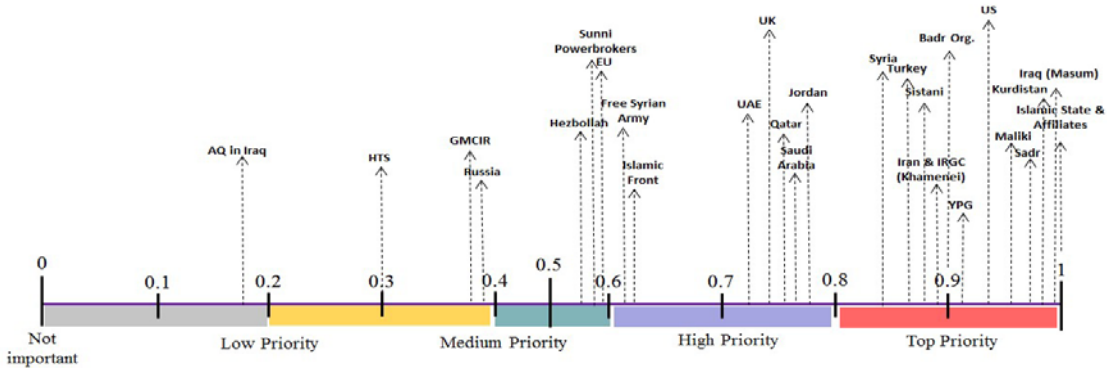
Figure 7. Agent Capability Rating. Adapted from Jesse (2011).



D. AGENT SALIENCE

All agents attach specific levels of salience for each policy issue examined (Figure 8). Salience reflects how important influencing the outcome of the policy issue is to each agent. It correlates to the application of capabilities. As with the capabilities ratings, the scale ranges from 0 to 1 or 0 to 100. Agents with a salience rating of 1 or 100 suggests the policy issue remains the utmost important to them. Conversely, agents with a salience of 0.1 suggests policy issue remains of little significance. This variable reflects a percentage of the agent's total dedication to expend capabilities to influence a policy outcome.

Figure 8. Agent Salience Rating. Adapted from Jesse (2011).



The following adapted salience metric (Figure 9) typifies agent willingness to expend effort, resources, and time to influence the issue.

Figure 9. Salience Category Rating. Adapted from Abdollahian et al. (2006) and Jesse (2011).

Salience Categories	
90-100	This is the most important issue to agents. Agents will drop whatever they are doing to immediately address the issue.
70-80	The issue remains important to the agents. Agents are expected to prioritize this issue and reschedule addressing of other issues to accommodate this one.
50-60	This issue continues to be one of several important issues. Other issues are more critical. This issue would be dropped if a more critical issue arose; however, the agent is expected to focus on this issue otherwise.
30-40	The agent cares about this issue but it is not important; there are many more pertinent issues to address. Therefore, if this issue arose, the agent is not expected to address it.
Oct-40	This issue is of minor concern. The agent rarely pays attention to it and will not expend much effort to address it.
Less	The agent does not care about the issue.

The preceding data allow political and military analysts to work within a logical and transparent framework to precisely identify the extent agents desire to influence a political outcome. Indeed, working through this process has the added benefit of forcing analysts to thoroughly understand the policy issue, the agents who are deeply concerned

about its outcome, the coalitions that emerge, and whether policy choices agents make will likely take the path of negotiation or contestation (Bueno de Mesquita, 1984). In essence, the EUM allows analysts to discern patterns within the noise generated by chaos, fog, and friction evolving within the PFS, to bring about reliable predictions emanating from political decisions. We now proceed to forecasting and analyzing the future of the IS as a caliphate and as an insurgency, and the current appetite for partitioning Iraq along the three major ethnic tribes, while remaining subordinate to the government of Iraq.

VIII. FORECASTING THE FUTURE OF THE ISLAMIC STATE

Political pundits, policymakers, and security experts did not shy from prognosticating the Islamic State (IS) future. Firas Abi Ali, for example, asserted in 2016 that IS would "probably have been defeated by late 2017" (Reiss, 2017). Mironova and & Sergatskova (2017) remarked that the IS's hold on Mosul would eventually deteriorate and its impending collapse was just around the corner. Rosen (2017), who visited Mosul, sensed "defeat of the militants seemed imminent." Even President Barack Obama appeared to intuit IS's demise, asserting they "inevitably [were] going to be defeated" (Jaffe, Nakamura, & Branigin, 2016).

Equally unsurprising were corollary predictions that largely proved inaccurate. Then Chief of Staff of the Army, General (Ret.) Raymond Odierno, asserted in 2016 that the U.S. Army needed to deploy approximately 50,000 troops to Iraq "to destroy the Islamic State" (Francis, 2016). However, in partnership with Kurdistan's Peshmerga forces, Iraq's Popular Mobilization Forces (PMF), and the Iraqi Security Forces (ISF), only a fraction of the 6,000 U.S. ground forces deployed to both Syria and Iraq theaters of operations were necessary to topple the IS caliphate. In the fight against the IS caliphate, many U.S. officials acknowledged that while the organization may suffer significant setbacks "it will be almost impossible to totally dismantle it" (Wright, 2016). Recently, the previous Secretary of Defense Ash Carter (2017) remarked that "the liberation of Mosul and the inevitable, approaching liberation of Raqqa in Syria will not be the end of the Islamic State and its evil ideology" despite the humiliating destruction of the movement's "pretense to having an actual 'state.'" The commonly accepted belief regarding the future status of IS weaved between certainty and doubt, depending on how the individual toed the definitional line between victory and defeat.[37]

[37] For the purpose of this thesis, I define defeat of the IS as the inability to corral the necessary population support, the requisite material, financial, and recruiting resources, and freedom to maneuver to carry out sustained conventional military operations. This includes the loss of territories held, and the inability to seize hold new territory. This criterion aligns with Mao Tse-tung's third phase revolutionary warfare. See Tse-tung, M. (2000). *On Guerrilla Warfare*. Translated by Samuel B. Griffith II. Urbana, IL: University of Illinois Press. See also: Whiteside (2016a).

The abovementioned political and expert extracts capture a common trend among similar types of predictions: vague generalities and lack of transparent, replicable, and data-driven analysis. While policy and subject matter expert (SME) analysis may contain rich and informative content, the tools used to derive analysis from facts they present vary. Inferences, thus, are bound to differ with each individual expert providing an idiosyncratic perspective on the subject examined (Bueno de Mesquita, 2011a). Because precision and logical consistency remain important virtues of game theory, language and precision matter. Using game theory logic, coupled with SMEs, analysis shifts from vague generalities like "probably" or "I believe" statements, intuition, or gut-feeling assumptions, to grounded systematic and transparent process. Analysis driven through the fusion of regional or SME and data analysis has the potential to provide powerful, accurate, and transparent results. It helps analysts minimize forecasting errors typical of solely relying on SME analysis.

The section proceeds as follows. First, the policy issue is introduced, followed by the range of agent preference for the issue. Second, the capability rating for each agent to affect the policy's outcome is identified. Similarly, this is done for the agent preference and salience rating. Third, as addressed in Chapter VII, a risk and static assessment, followed by a dynamic forecast, is provided. Fourth, a perceptual analysis for relevant agents are generated to extrapolate inferences and implications for the issue's outcome. Fifth, a sensitive analysis is conducted. Following that discussion, policy recommendations are provided. This same process unfolds for the second and third policy issues. Note, while outside the scope of this thesis, ideally policy recommendations would be reassessed for their feasibility and practicality using the EUM.

A. POLICY ISSUE ONE

What is the prospect that the global coalition and other relevant stakeholders (Russia, Iran, and Syria) will degrade and ultimately defeat the Islamic State caliphate in Iraq?

1. Issue One Forecast Range of Agent Preferences

The range of preference for policy issue one is reflected in Figure 10.

Figure 10. Issue One: Agent Preference

Numerical Value	Agent Preference Scale
1	The global coalition, and other relevant agents, unite to defeat the IS, militarily and politically, as a state (caliphate).
0.8	The IS is degraded to levels where it remains unable to recruit and finance its military operations.
0.5	Agents remain indifferent to the defeat of the IS.
0.2	The IS gains strength (militarily and politically), seizes major Iraqi territory, and establishes control over populations and resources.
0	The IS claims victory over the global coalition and establishes a caliphate in Iraq.

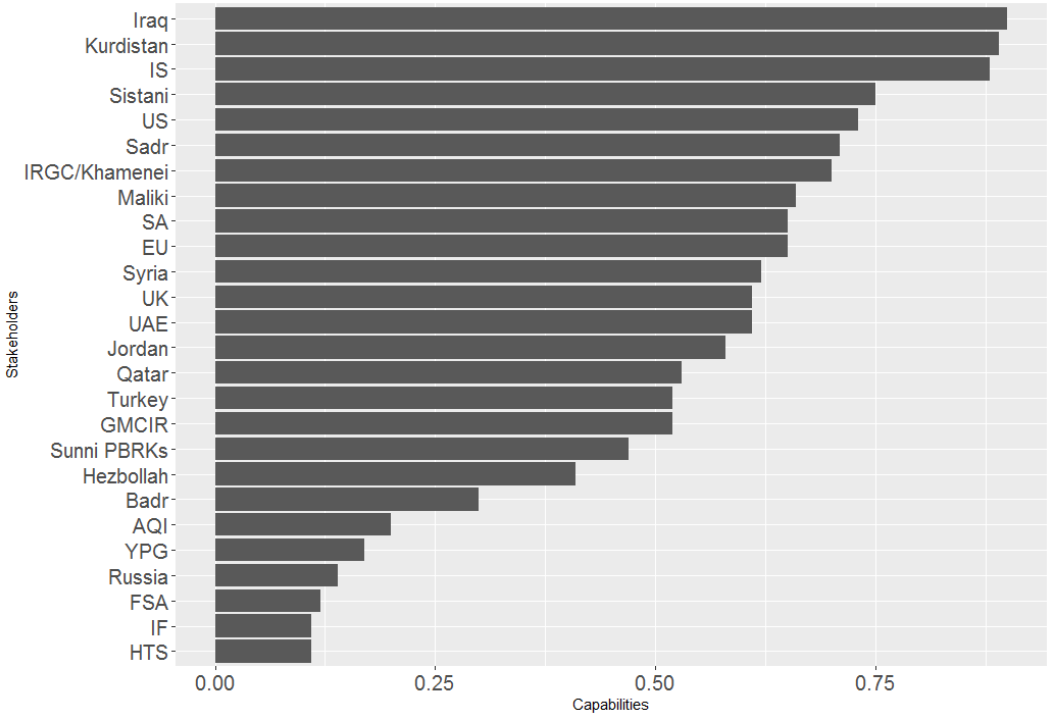
2. Agent Capability Rating

Overall, the capabilities (Figure 11) score suggests Iraq, Kurdistan, and IS provide the bulk of either all or a combination of the diplomatic, information, military, and economic (DIME) means to influence the policy's issue. For the global coalition, the capabilities ratings mirror the public rhetoric reflected in newspapers, social media, and the press. The capability contribution reflects the global coalition's willingness to transfer and/or provide military, logistical, and economic support to degrade and ultimately defeat IS as a caliphate.

One might wonder why the Grand Ayatollah Ali al-Sistani ranks higher than the United States, given he retains and contributes little to no military capabilities or financial assets. A particularly noteworthy feature of the EUM is clout, the invisible intangible influence actors can exert to shape political outcomes (Bueno de Mesquita, 1997, 2009; Jesse, 2011). Sistani is arguably Iraq's most influential Shia cleric. After IS proclaimed itself a caliphate and posed a direct threat to Iraq's sovereignty, Sistani issued a fatwa (*wajib al-kifai*) through Abdul Mehdi el-Karbalai, one of his highest-ranking Shia representatives (Mansour & Jabar, 2017). The fatwa led to the conscription of tens of thousands of Iraqis in the Popular Mobilization Forces (PMF) in 2014. Thus, it is not enough to account for material, economic support, or military force contribution. An

actor's potential influence to affect outcomes must be considered a crucial step in the capabilities analysis.

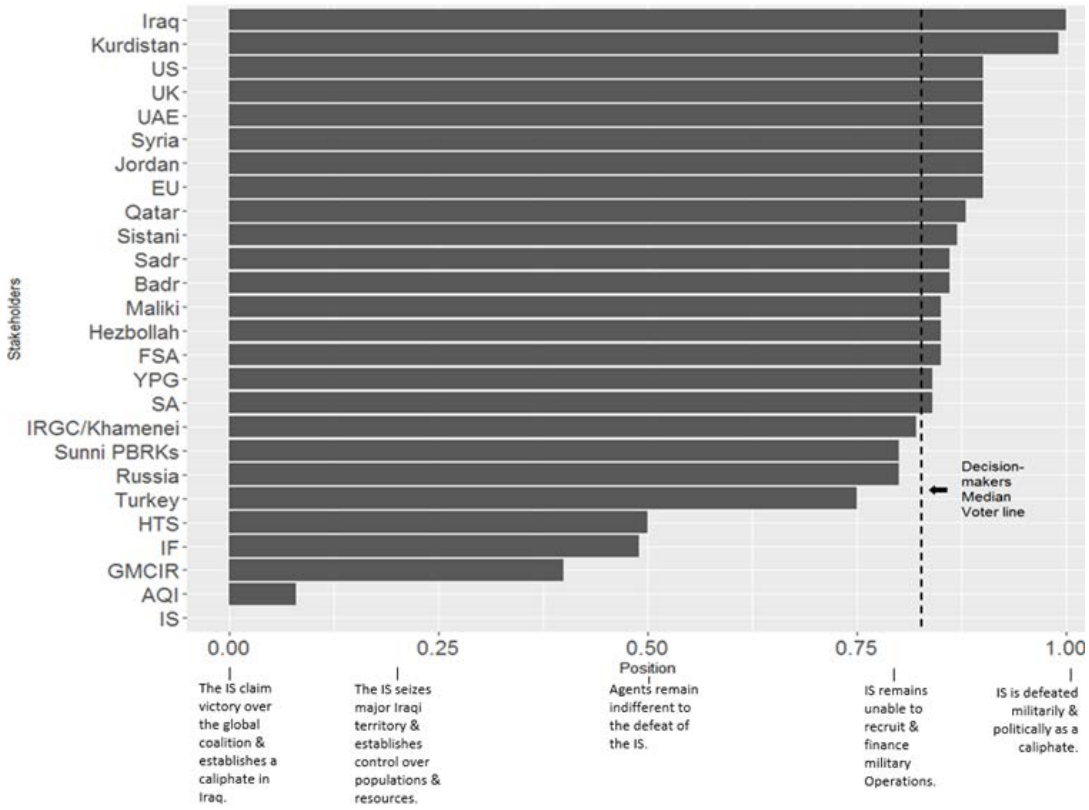
Figure 11. Issue One: Agent Capability Rating



3. Agent Preference Rating

Figure 12 makes apparent the minimal disagreement among the 68-member coalition to eliminate IS caliphate. Despite a divergence of interests among the global coalition and other agents involved in the IS conflict, the majority occupy a position preference instantiating the defeat for the IS caliphate. This commitment reflects the immediate attention this policy issue has received by nation-state leaders. Insofar as the majority of agents continue perceiving IS a threat, their position on this issue is unlikely to change. Thus, the EUM's median voter crosses at approximately the 0.8 threshold, indicating an aggressive policy position posture by agents for defeating IS caliphate.

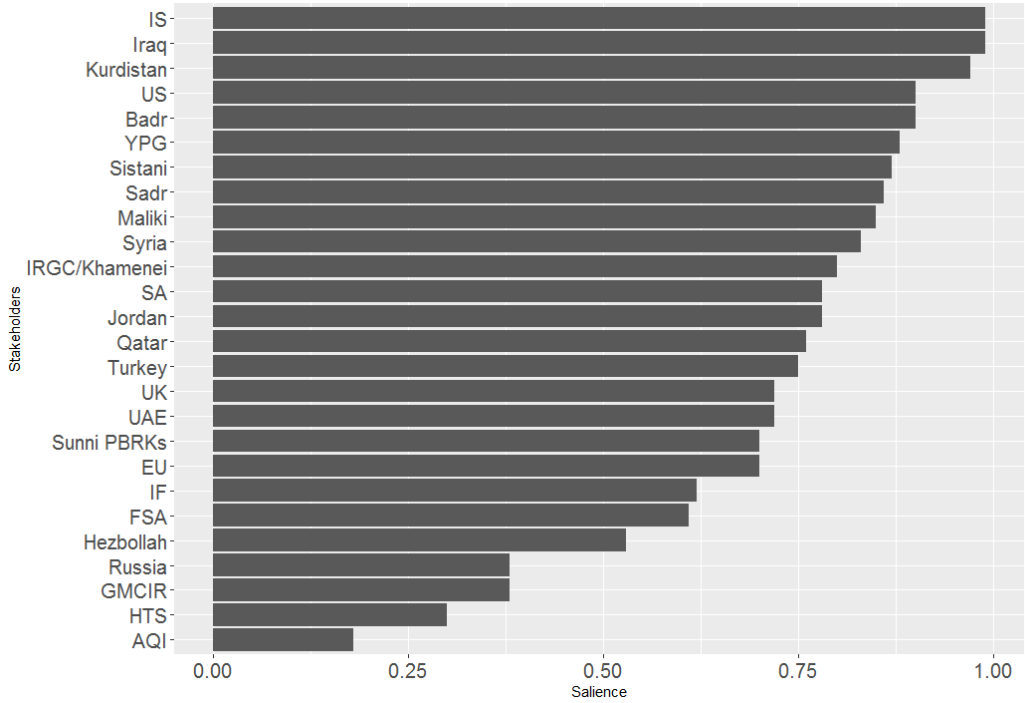
Figure 12. Issue One: Agent Position Rating



4. Agent Salience Rating

While it is understandable that Iraq, Kurdistan, and the United States remain committed to defeating IS, this issue nonetheless remains of significance to virtually every agent involved in the conflict, from the EU to Iran's IRGC to the majority of the Middle East nations (Figure 13). Conversely, Hay'at Tahrir al-Sham (HTS) and General Military Council for Iraqi Revolutionaries (GMCIR) hold a less-than-neutral position for the outcome, exhibiting low salience for the policy's outcome. This is expected given their opposition to the policy and generally the Iraqi army, Popular Mobilization Force (PMF), and the Badr Organization.

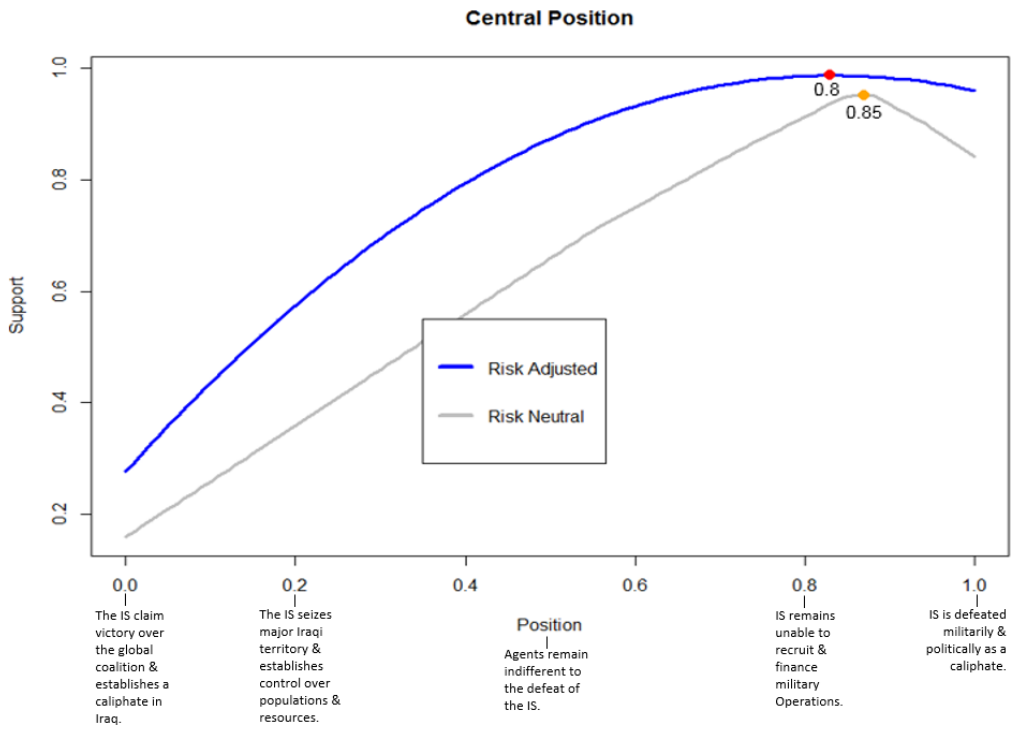
Figure 13. Issue One: Agent Salience Rating



5. Risk Static and Risk Neutral

The static risk-neutral and risk-adjusted forecast (Figure 14) ranges between 0.8 and 0.85 positions. The static forecast is slightly to the right of the risk adjusted, indicating the variable preference varies slightly. The risk neutral projects a forecast, indicating a stronger shift toward the complete elimination of IS caliphate. The risk-adjusted forecast projects a much stricter forecast within the framework of the current policy implementation.

Figure 14. Issue One: Risk-Neutral & Risk-Adjusted Results

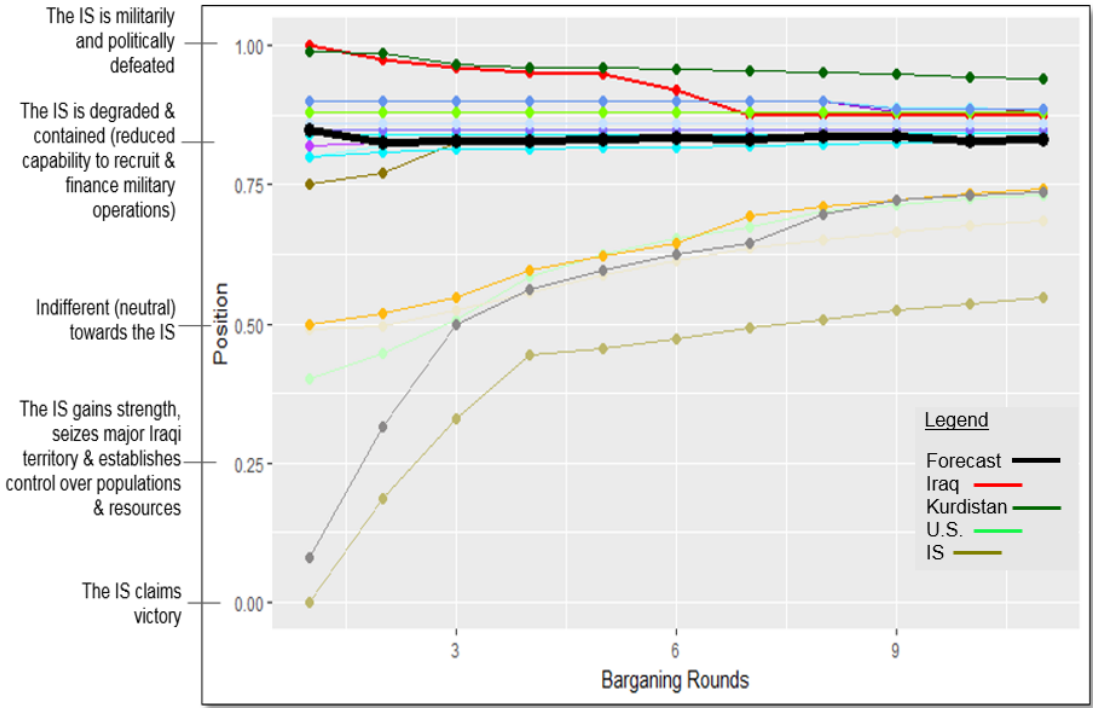


6. Dynamic Forecast

The dynamic forecast (Figure 15) provides details regarding the resolution of agent interaction on the policy to defeat IS. After the evolution of considerable interaction and pair-wise contests between agents, the dynamic forecast produces an equilibrium of 0.85. This instantiates that the global coalition, and the bulk of individuals and state and non-state agents, are expected to unify as an enterprise to degrade and ultimately defeat the IS caliphate, despite animosities existing between high-profile nation-state actors such as Iran and the United States. As the policy issues evolves, the pull-and-tug agent interaction compels IS to begin shifting from its original preferred position toward one that more closely aligns with the preponderance of the agents involved. This is indicative of the sheer gravitational pull agents exert on the policy issue. However, because IS begins to plateau after the third bargaining round, the dynamic forecast instantiates that the movement remains unwilling to be coerced or negotiated with. Failure of the IS to converge at the equilibrium forecast point suggests the movement will continue fighting despite the poor prospects for victory. Given its devotion to salafi-jihadism, this is no surprise. The forecast

implies that negotiation with the IS remains unrealistic. Thus, the current U.S. policy effort to eliminate the IS caliphate altogether remains the most effective course of action.

Figure 15. Issue One: Dynamic Forecast

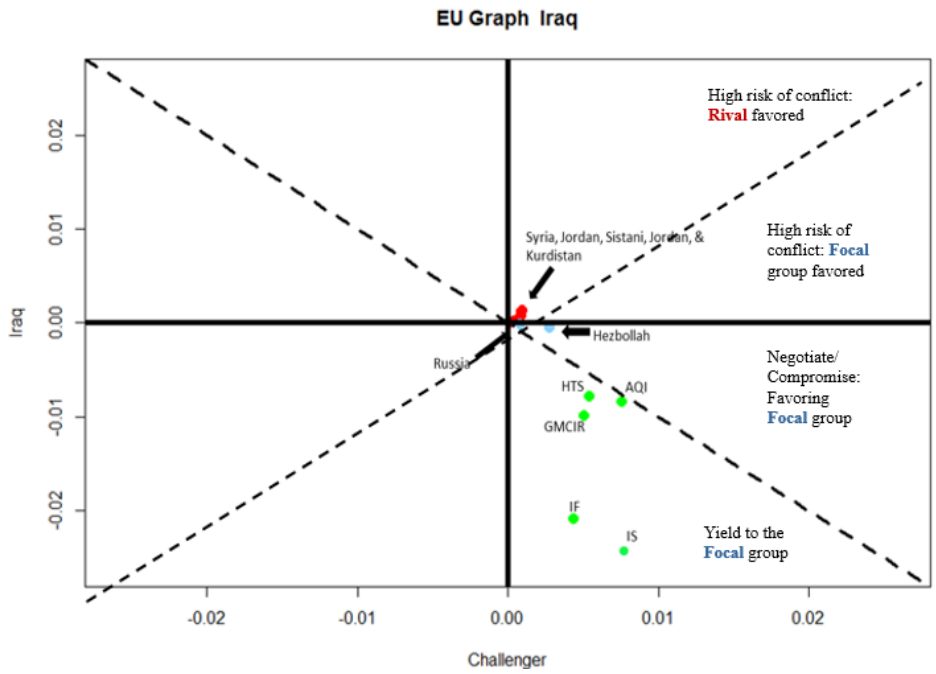


7. Perceptual View

The perceptual analysis provides a snapshot of where agents lie on the policy issue continuum, with respect to their own position. It provides insights into the types of coalitions likely to emerge and coalesce from the dynamic forecast, the agents likely to be coerced (either through bargaining or negotiation), and the agents likely to contest the policy issue. Equally important, the perceptual analysis highlights those agents likely to exert influence on the policy issue in order to alter the outcome. Ideally, a perceptual graph is generated for every agent involved in the conflict. For the purposes of this policy issue,

however, we are concerned with two of the following agents: the government of Iraq[38] (Figure 16) and the IS (Figure 17).

Figure 16. Issue One: Iraq's Perceptual View

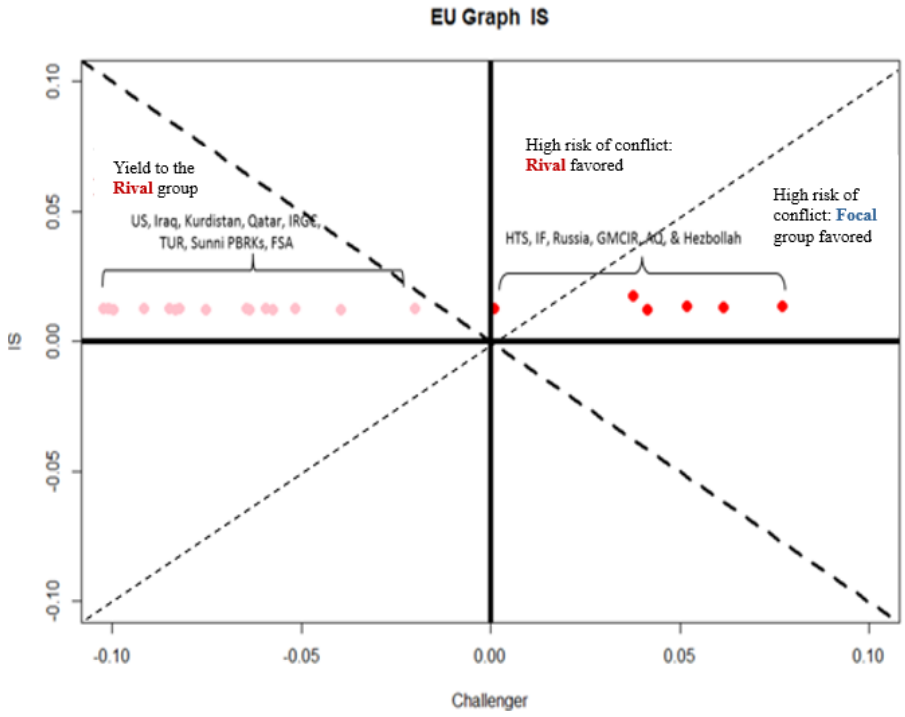


The expected utility values for Iraq's government in relation to the other agents is shown in Figure 16. While Syria, Jordan, Sistani, and Kurdistan fall in Octant 2, indicative of confrontation, with the advantage going to the rival, the probability of contestation is miniscule and unlikely, as they barely deviate from the center. Contestation between the agents is thus likely evolve into minor rhetorical disagreements. Iraq will continue to either directly or indirectly receive support from the majority of agents invested in defeating IS. For its part, the Syrian government is focused on internal systemic problems and thus remains unlikely to interact or expend influence to alter the policy outcome of IS conflict in Iraq.

[38] The perceptual graph for the United States is not reflected in this analysis, given that it achieved almost the exact same perceptual results as the government of Iraq.

More interesting is the contestation evolving in Octant 7. Illicit organizations such as al-Qaeda in Iraq (AQI), Hayat Tahrir al-Sham (HTS), General Military Council for Iraqi Revolutionaries (GMCIR), Islamic Front (IF), and IS fall in either Octants 7 or 8. This suggests that through compellence, coercion, or negotiations, the agents are expected to fold. Interestingly, Octants 7 and 8 provide an additional insight: Agents falling in these two octants believe with a high degree of certainty that they stand to lose to the focal actor (Iraq's government). For IS this is telling. As efforts to retake Mosul escalated, analysts correctly hypothesized that IS had formulated an exit strategy. According to U.S. Army MAJ General Gary Volesky, IS leadership secretly absconded from Mosul, exposing its foreign fighters to face off with Kurdistan's Peshmerga Forces and Iraqi Security Forces (Borger, Hawramy & Shaheen, 2016). This makes sense given IS had just three options: (1) stay and fight until defeated, (2) dissolve the caliphate altogether and decentralize the movement into nimble networks, where they could operate in the shadows until an opportune moment arose for resurgence, or (3) escape to a pro-IS affiliate and begin the seeding process for growing new recruits, returning to Mao's first phase of revolutionary warfare. Based on Figure 17, we can infer IS leadership believed their demise as a caliphate in Iraq was imminent.

Figure 17. Issue One: IS's Perceptual View



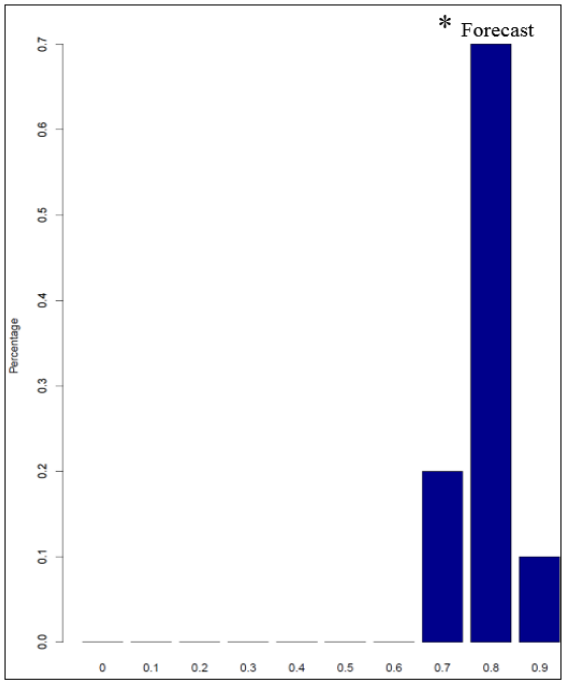
The expected utility values for IS in relation to other agents is conveyed in Figure 17. Both IS and it rivals (Russia,[39] HTS, IF, Hezbollah, GMCIR, and al-Qaeda in Iraq), remain at high risk of conflict with the focal actor. Therefore, no agent stands to make significant gains through negotiations because the incentive structure remains unlikely to be significant enough to satisfy everyone. Both Octants 1 and 2 remain unhinged and highly quarrelsome, as they reflect what Kugler et al. (2000) call the crisis zone. As such, IS is expected to challenge its rivals upon contact, and vice versa. Nevertheless, IS stands to lose significantly against the global coalition and other agents. In Iraq, the outlook for IS's caliphate remains unfavorable.

[39] Recall that the game takes into account the capability contribution to the current policy issue. In Iraq, Russia's contribution has been miniscule. Thus, it is natural that they would appear in Octant 2. However, should Russia increase its capability contribution and adjust its resolve to defeat the IS, calculations would altogether differ and would be reflected respectively in the EU graph.

8. Sensitivity Analysis

Because complexity and uncertainty permeate the PFS, and because analysts are prone to error, it remains critical to leverage modern computing power and software advances to explore the robustness of the dynamic forecast generated using *R* freeware. Sensitivity analysis accounts for uncertainty and political volatility that may evolve from randomness or outlier eventualities. As such, the sensitivity analysis takes the three input variables (capabilities, position, and salience) and varies the data by approximately plus or minus 10 percent (Jesse, 2011). The expected utility model reruns the simulations in 100 modified instances. No appreciable differences in the forecasts generated by the sensitivity analysis exists when compared to the dynamic forecast, as demonstrated in Figure 18. Thus, we can remain fairly certain the forecast is robust.

Figure 18. Issue One: Sensitivity Analysis



9. Recommendations

The analysis derived from this policy issue supports the global coalition strategy President Obama initiated in 2014. Resourcing the primary Middle East agents invested in fighting IS adequately proved a prudent strategic route to empowerment and ownership. Military, economic, and diplomatic support by the global coalition, to include those provided by Iran's own IRGC, allowed Iraq and Kurdistan to own the problem, develop military campaigns, and execute effective decapitation campaigns and counterterrorism operations to dismantle IS caliphate on their terms.

Nevertheless, three recommendations can be extrapolated from the forecast. First, the global coalition should sustain Iraq's counterterrorism efforts to eliminate the IS, even after the movement is expected to devolve into an insurgency. Dismantling and defeating the caliphate in Mosul this past year validates that the strategic imperatives put in place achieved the intended effects. Indeed, the caliphate's ability to capture territory, finance complex conventional military operations, and recruit new members via social media is significantly diminished. However, as IS's organizational structures shifts from centralization to decentralization (an insurgency), resource allocation to export violence is expected to range from drug smuggling, human trafficking, extorting local industries, and receiving donations from sympathetic local and foreign agents. While the global coalition may naturally be inclined to equate the defeat of the caliphate to the absence of an existential threat, it should not diminish its overall operational tempo to eliminate the movement as an insurgency. Otherwise, it risks aiding in the preservation of the movement and providing opportunity for its resurgence.

Second, and related to the first point, the global coalition should maintain the robust partnerships it worked so hard to secure. For its part, the Iraqi government and Kurdistan's regional government should continue strengthening its collaboration with the global coalition and vice versa. After all, the global coalition enterprise facilitated the flow of vital intelligence sharing and collaborated on military operations between nations. Finally, the global coalition should maintain its military and economic commitment to Iraq and other relevant Middle East agents fighting IS. Military and economic contribution will help stave off an IS resurgence.

B. POLICY ISSUE TWO

Should IS be defeated militarily, what is the prospect that the movement will endure as an insurgency?

1. Introduction

With recent factors favoring a global coalition victory over IS caliphate in Iraq, it remains intuitive to inquire what the prospect holds for the movement's survival rate as an insurgency. Indeed, Mosul, previously a large city bastion for IS with almost 700,000 Iraqi residents, was recently liberated in July 2017 (BBC, 2017). As of this writing, only the towns of Hawija and al-Qaim, near the Syrian border, remain under IS control (BBC, 2017). Efforts by the global coalition to roll back IS gains have been extremely successful. The West Point's National Counterterrorism Center estimated that IS's substantial territorial gain at its height in 2014 was around 81,000 square miles of territory, the size of Britain (Milton & al Ubaydi, 2017). By 2017 those territorial gains were truncated by approximately two thirds (Milton & al Ubaydi, 2017) or roughly sixty-two percent (Fanusie & Entz, 2017). According to Brett McGurk, a member of the U.S. Special Presidential Envoy for the Global coalition to Counter IS, the United States and its allies "has cleared 70,000 square km and freed 5 million people under ISIS control" (Tucker, 2017,). By all accounts, this remains an astonishing achievement.

However, one should be leery about jumping to conclusions that IS's complete demise as an insurgency is just around the corner. As Clarke and Whiteside (2017) point out, the IS adroitly exacerbated significant political tensions within the ranks of Iraqi Sunni and Shia communities, and took advantage of the Syrian civil war "to resuscitate its organization and evolve into a truly global threat." The current political volatility within Iraqi Sunni, Shia, and Kurdish political ranks, compounded by tensions emanating from Turkey and Iran, mirrors a similar political environment not unlike the one the world witnessed in 2014 when IS came to power (Clarke & Whiteside, 2017).

Clarke and Whiteside's (2017) assertion is supported by RAND's own research on insurgencies. From 1945 to 2010, RAND examined 71 insurgencies across 24 COIN

Concepts[40] (Paul, Clarke, Grill, & Dunigan., 2013). Of the 24 concepts they found tangible support, commitment and motivation, and flexibility and adaptability, to be some of the most significant factors in gauging the longevity of insurgent groups.[41] The Iraqi and Syrian governments struggle to address these factors adequately. As much as the global coalition would like to declare victory officially over IS, an unfortunate insight extrapolated from this policy forecast suggests any celebration to be short lived. The global coalition's projected reduction of capability contribution to fighting the IS, the reprioritization of policy preferences among nation-state leaders, coupled with an overall reduced salience, is expected to contribute indirectly to the movement's preservation as an insurgency. Thus, effectively defeating IS movement as an insurgency requires a similar rate of sustained efforts the global coalition employed throughout 2017 to defeat IS as a caliphate.

2. Range of Agent Preferences

The range of preference for issue two forecast is as follows:

Figure 19. Issue Two: Agent Preference

Numerical Value	Agent Preference Scale
1	The Islamic State remains a significant powerbroker/insurgency.
0.5	The Islamic Sate fractures/splinters into smaller Salafi-jihadist organizations.
0	The Islamic State insurgency diffuses or eventually burns itself out.

3. Agent Capability Rating

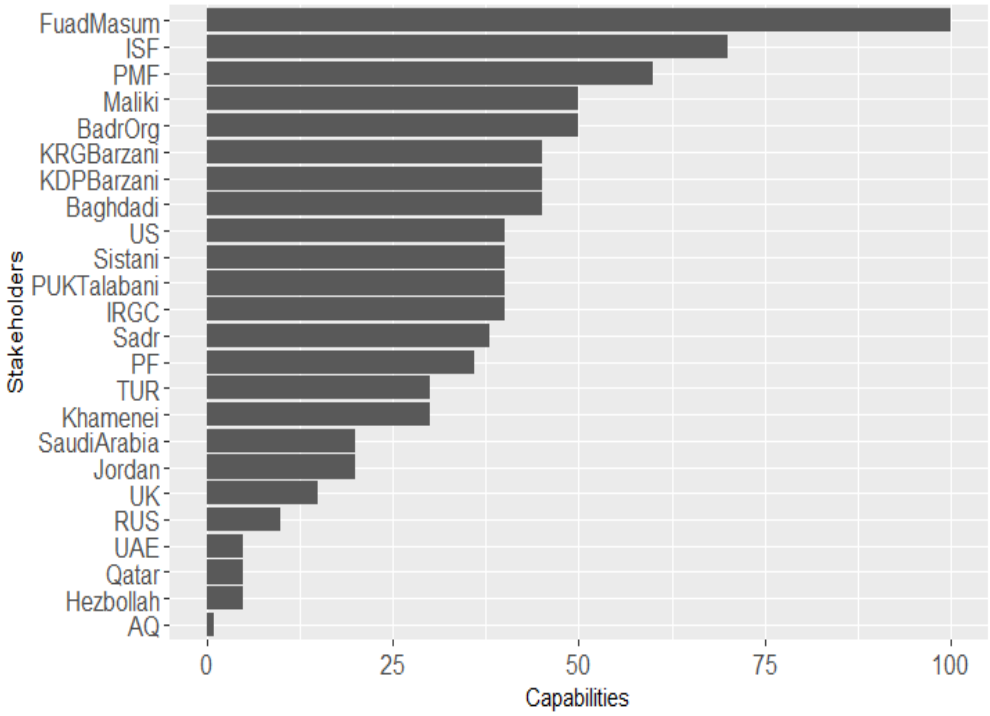
The capabilities ratings (Figure 20) suggest that the Iraqi government is expected to contribute the bulk of the military and economic efforts to eliminate IS insurgency. Not surprisingly, this is followed by the Iraqi Security Forces (ISF), the Popular Mobilization

[40] Chapter IV has an expansive explanation of the 24 factors. See Paul et al. (2013).

[41] Tangible support refers to those necessary requirements, such as material, economic, sanctuary, and recruiting resources, insurgent movements need to survive. Commitment and motivation refers to the commitment of the government to defeat the insurgency, rather than focusing on personal or political interests. And flexibility and adaptability reflects the aptitude of the setting government to adapt to strategies employed by the insurgents. See Paul et al. (2013).

Force (PMF), and eventually Kurdistan's Peshmerga. In this regard, influential political and military agents within Iraq continue prioritizing capability contribution toward efforts to eliminate IS insurgency. However, a close comparison of the capability factor between the first and second policy issue suggests a projected decrease in resource contribution predominantly by the global coalition. Thus, the bulk of agents invested in eliminating IS are expected to pull back and redistribute resources to address domestic or international priorities elsewhere.

Figure 20. Issue Two: Agent Capability Ratings

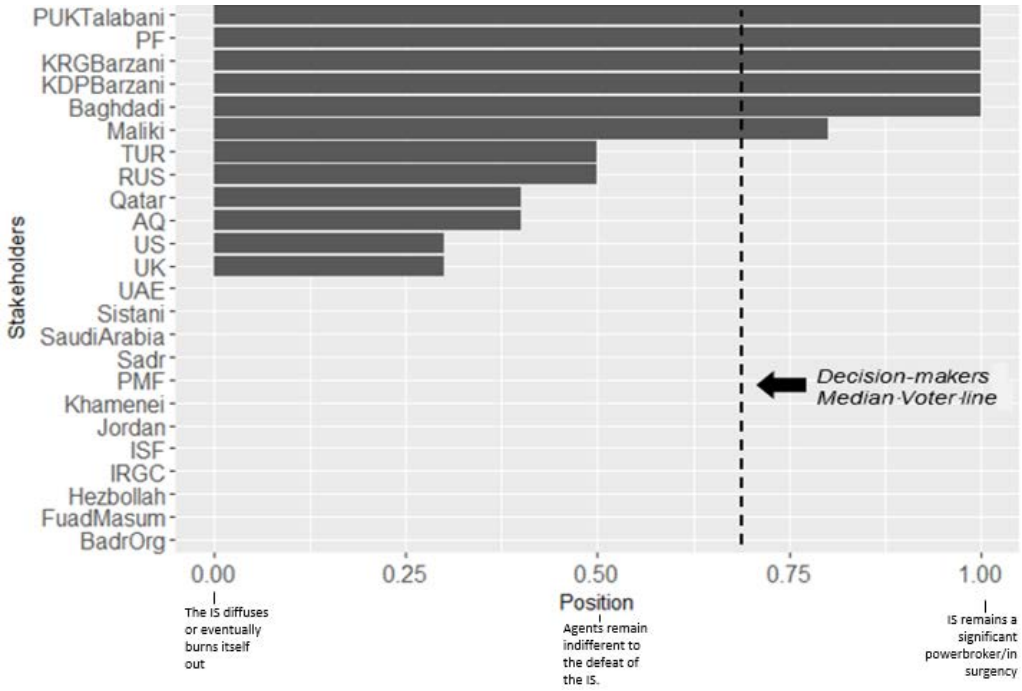


4. Agent Preference Rating

The preference rating conveys agents' belief about the longevity of IS insurgency. As conveyed in Figure 21, the static position of 0.7 suggests that quite a few agents believe the IS will endure as an insurgency. Interestingly, Kurdistan's prominent political parties occupy a position contrary to the rest of the global coalition. Kurdistan's position of 1.00 reflects a belief that IS will endure as an insurgency for quite some time. Conversely, the

global coalition predominantly holds an approximate position of 0.3, believing IS will diffuse, degrade, and ultimately be defeated militarily and politically.

Figure 21. Issue Two: Agent Preference Rating

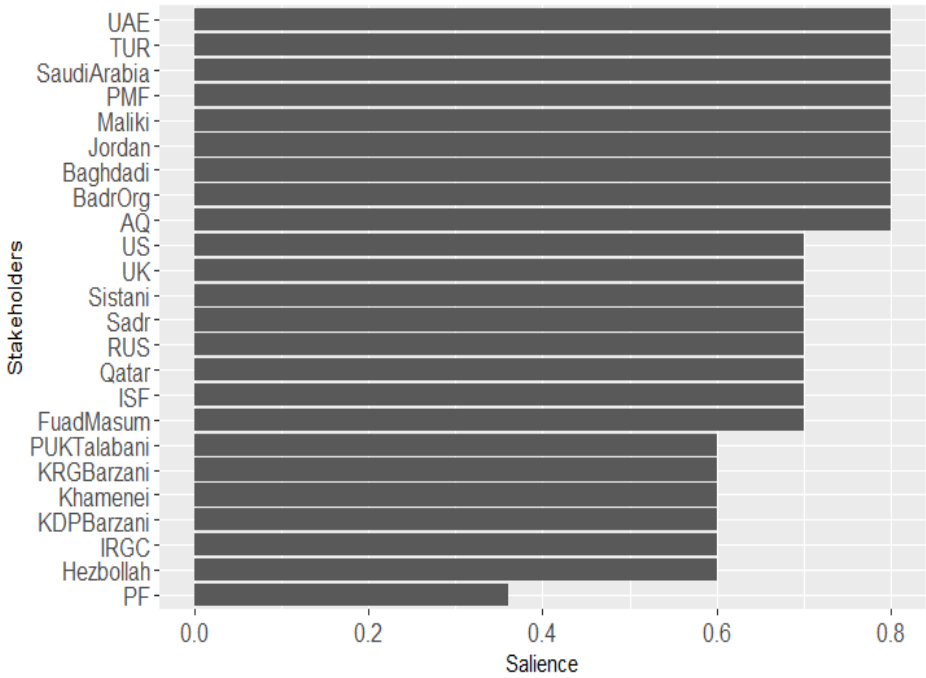


5. Agent Salience Rating

The salience ratings (Figure 22) convey a mixed bag of significance among the agents for this policy issue. While the United Arab Emirates, Turkey, and Saudi Arabia occupy the top three positions, the United States, the United Kingdom, Qatar, and Fuad Masum occupy a neutral to 0 position. Interestingly, no agent displayed a salience rating greater than 0.8. As with the capabilities' ratings, much conjecture and hypothesizing loom over such disparity. Nevertheless, there may be three reasons for this occurrence. First, agents may conclude the threat threshold of an IS insurgency (or resurgence) remains low enough that the movement is perceived of little threat to Iraq's sovereignty or the international community. Specifically, an IS insurgency may no longer be perceived an existential threat. Second, a commitment of what Paul et al. (2013) label "tangible support" to eliminate an IS insurgency may very well diminish. Defeating insurgencies puts a

significant strain on a government's material, economic, and manpower resources. And third, agents may very well shift priorities toward maximizing the welfare of their political party. Quite simply, eliminating IS as an insurgency is expected to no longer be a top priority for many agents, which includes the global coalition.

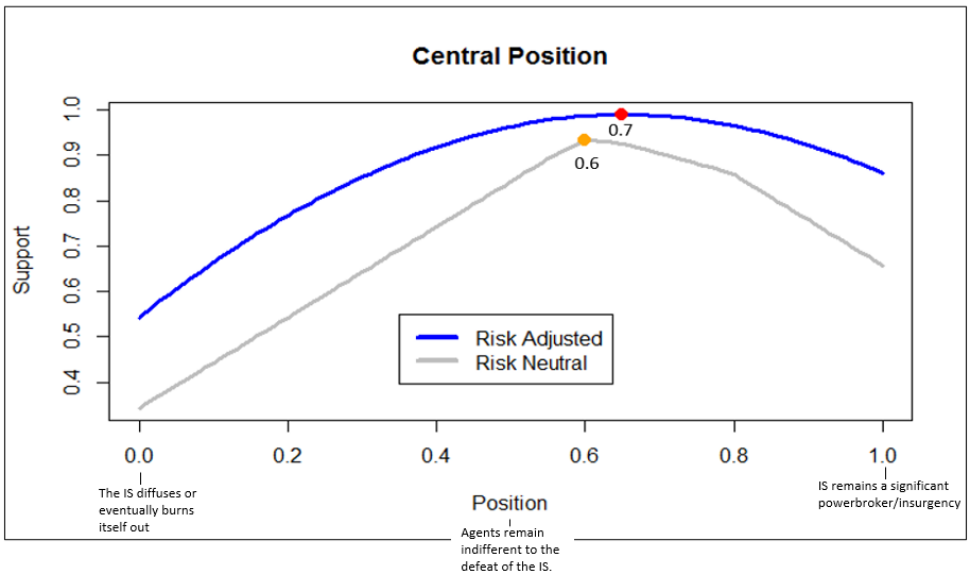
Figure 22. Issue Two: Agent Salience Rating



6. Risk Static and Risk Neutral

The risk-neutral and risk-adjusted forecast (Figure 23) ranges between 0.6 and 0.7 positions. The risk static instantiates a closer position toward the center of the one-dimensional line segment, which is more inclined to favor the splinter of IS. Conversely, the risk-adjusted forecast instantiates a position closer toward IS remaining an intact and enduring insurgency, which supports the literature on the longevity of insurgent movements.

Figure 23. Issue Two: Risk-Neutral & Risk-Adjusted Results

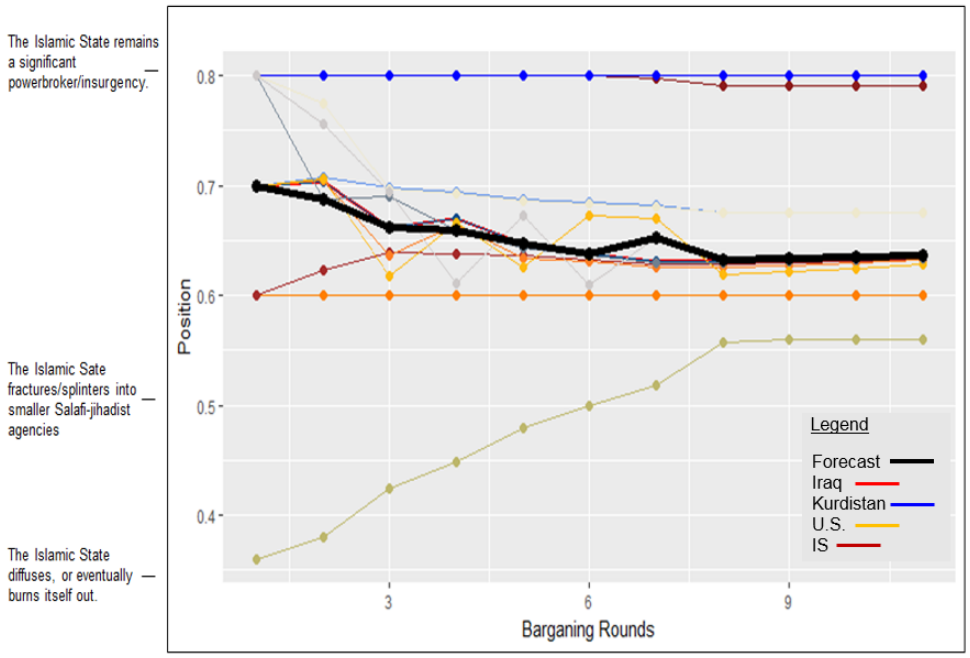


7. Dynamic Forecast

The dynamic forecast (Figure 24) provides details regarding the resolution over the future status of IS insurgency. Of the possible range of options extending from the dissolution of IS movement altogether to the preservation of movement as an insurgency, the dynamic forecast produces an equilibrium of approximately 0.65. The outcome demonstrates that despite the global coalition's success to eradicate IS caliphate from Mosul, the IS is nonetheless expected to devolve into nimbly diffused networks and endure as an insurgency for quite some time. Even after the global coalition reclaims the city of Hawijah from the Islamic State (El-Ghobashy, Warrick, & Salim, 2017), the last stronghold of IS in Iraq, the movement is expected to continue employing less spectacular attacks such as "hit-and-run attacks (including suicide operations), assassinations and sniper attacks" (Whiteside & Clarke, 2017). The IS movement is thus expected to devolve back into the first phase of revolutionary warfare: the survival phase (Masi, 2004; Whiteside, 2016). During this phase the IS is expected to regroup, restart recruiting initiatives, increase propaganda efforts to blanket perceptions of impending defeat, and execute small-scale attacks until they can recoup and move on to the second and third phase. Thus, while IS remains fragile, it is expected to endure as an insurgency for some time.

Interestingly, the dynamic forecast sheds light on an attendant inference extrapolated from the forecast. A factor owing to the IS's longevity as an insurgent movement can partly be attributed to the expectation that the global coalition will reduce its overall material (military, logistical, and economic) contribution to degrading and defeating the IS insurgency. Moreover, efforts across counterterrorism operations, counter-finance operations, and counter-IS propaganda are expected to decline. The resultant contrast between the capability, position, and salience from the first to the second policy issue bear this out. Across all three factors, the majority of the global coalition's commitment to eliminating IS insurgency is expected to deflate.

Figure 24. Issue Two: Dynamic Forecast

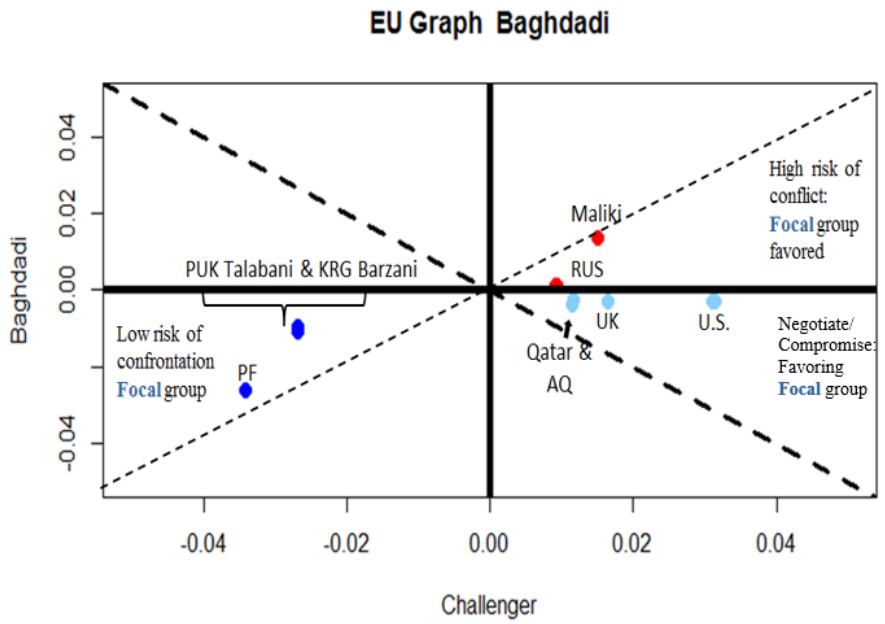


8. Perceptual View

Consequently, the reduced commitment by the global coalition will inevitably aid Abu Bakr al-Baghdadi in surviving military defeat as a caliphate while preserving IS as an insurgency. The perceptual analysis (Figure 25) suggests every agent—whether it is Russia and Maliki (Octant 2), the United Kingdom, the United States, Qatar, or al-Qaeda (Octant

8), Iraq's Popular Mobilization Force (PF), and Kurdistan's two rival political parties, Barzani and Talabani (Octant 5)—stands to lose to Abu Bakr al-Baghdadi. The expected diminution across the three factors (capabilities, position, and salience) stand to potentially fracture and weaken the global coalition's ability to coalesce as an enterprise to defeat IS insurgency permanently. Insofar as the Abu Bakr al-Baghdadi's movement survives, whether through an affiliate or splinter organization, or somewhere absconded in a safe haven, so too will the movement's lifespan endure.

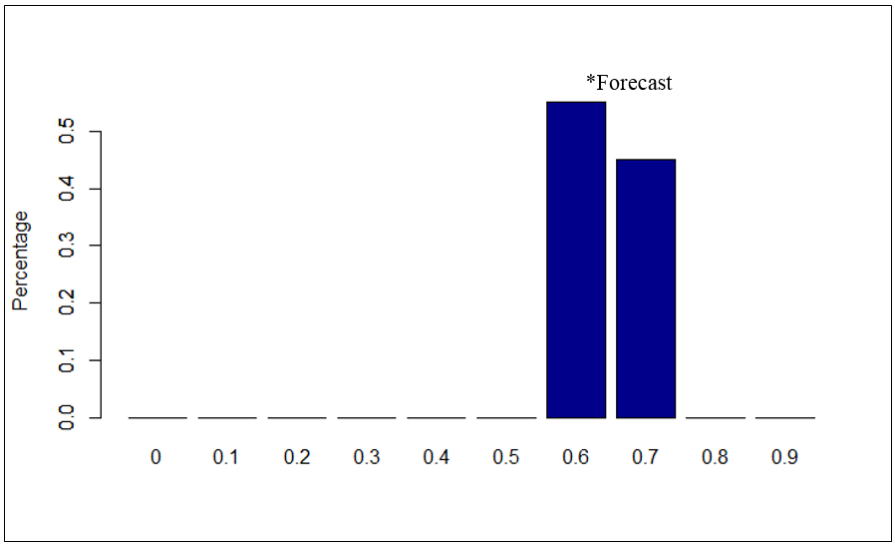
Figure 25. Issue Two: Baghdadi's Perceptual View



9. Sensitivity Analysis

The resultant sensitivity analysis (Figure 26) suggests the policy forecast remains stable. As shown in Figure 26, the majority forecasts generated similar conclusions drawn out by the dynamic forecast. Taking into account analysts' errors and the uncertainty of the political environment, the sensitivity analysis generated a 0.6 score, with minor deviation to the left and right.

Figure 26. Issue Two: Sensitivity Analysis



10. Recommendations

Recommendations for this policy issue are framed within Paul et al.'s (2013) work on determining the longevity of insurgencies: tangible support, commitment and motivation, and flexibility and adaptability. While certainly these three factors are part of a much broader analysis on insurgencies, they remain, nonetheless, instructive in formulating recommendations.

11. Tangible Support

Tangible support reflects the necessary resource capabilities the IS insurgency requires to survive. These include the ability to recruit new followers, foot soldiers, generate capital, establish a robust intelligence apparatus, and ensure the flow of adequate material and weapons support. In her excellent research on longevity of terrorist organizations Jodi Vittori (2009) demonstrated that "as the capabilities of terrorist organizations rise, so too does their average lifespan" (p. 457). Thus, the first recommendation rests with the need for the global coalition to persistently employ strategies and methods that curtail IS's ability to acquire the necessary resources that would enable the movement to evolve along Mao's three-phase revolutionary warfare continuum.

On par with the first recommendation is the need for the anti-IS global enterprise to continually chip away at the IS's narrative. The IS tangible support extends to the virtual space, where most of its narrative and propaganda efforts are developed and released. Battlefield footage, online blogs or magazines, or nasheed [chant] music videos (Lakomy, 2017) remain rich fodder for recruiting local and foreign fighters. SE-Is like al-Baghdadi leverage the narrative to recruit, inspire, and steer the movement toward achieving their political objectives. For SE-Is, the narrative is the center of gravity; and it has greater value than bullets. Thus, a main objective of the global coalition has to be increasing the entropy of the IS's narrative. Continued efforts to deny the IS access to radical leveling technologies (Snow, 2015), such as the Internet and social media, will aid in this endeavor immensely. Partnerships with Middle East nations will undoubtedly accelerate the narrative's entropy by chipping away at the underlying ideology that is so potent as to recruit and inspire local and foreign fighters to carry out heinous acts of violence.

12. Commitment and Motivation

Commitment and motivation reflects the willingness of the host government to defeat the insurgency, rather than focus on accruing "personal wealth and power, bilking external supporters by extending the conflict, or avoiding (or fleeing) combat" (Paul, et al., 2013, p. xxiv). Based on empirical evidence, the authors demonstrate that when the host government and its military force suffer from diminished commitment and willingness to see their mission through to the very end, the insurgent remained the victor in all cases analyzed. Because the analysis generated from the dynamic forecast prognosticates a diminished commitment to eliminate IS as an insurgency, the second recommendation should focus on the global coalition's affirming their commitment to the original mission of degrading and defeating IS, politically and militarily. More specifically, the same political and military commitment the global coalition expended to defeat the IS caliphate, is required to defeat the movement as an insurgency.

13. Flexibility and Adaptability

Flexibility and adaptability simply implies the willingness of the host-government to adjust and adapt to perturbations brought on by insurgents' innovative employment of

tactics and strategy (Paul et al., 2013, p. xxiv). Successfully eliminating the IS movement altogether requires the global coalition to remain proactive and anticipate future threats. Foundational to the flexibility and adaptability factor is preserving the anti-IS global partnerships. The anti-IS global coalition should maintain strong partnerships with the Middle East nations that remain the lynchpin in responding to and securing the territory IS resides within. The last several years witnessed the formation of robust partnerships between 68 partner nations, including Iraq, Saudi Arabia, Qatar, Jordan, the United States, and the United Kingdom. The anti-IS global enterprise coordinated effective complex counterinsurgency efforts that led to the toppling of the IS caliphate. This partnership will remain crucial to adapting to novel strategies the IS is likely to employ in an effort to regain strength and resurge. Realistically, none of the recommendations alone will completely defeat IS insurgency. Therefore, defeating the IS will require a multi-pronged and multi-cooperative approach. Regional and international partnerships are thus necessary to prevent the IS insurgency from becoming what the Army Operating Concept (2014) refer to as "the harbingers of future conflict" (p. 12).

C. POLICY ISSUE THREE

What are the policy preferences of the Iraqi national political organizations, ranging from partitioning Iraq into separate Shi'a, Sunni, and Kurdish states, to various forms of unified states, in which local governorates remain subordinate to the government of Iraq?

1. Introduction

The contestation over territorial partition as a means to ameliorate or prevent the outbreak of civil wars is not only a politically charged topic but also an enduring one (Sambanis & Schulhofer-Wohl, 2009). During the civil war in Iraq, from 2006 to 2007, distrust fomenting between such groups as the Kurds, Sunni, and Shiite led U.S. policymakers to revisit the subject as a potential practical solution to the unending ethnic violence (Sambanis & Schulhofer-Wohl, 2009). With Kurdistan Regional Government's recent referendum for independence in September 2017 (Frantzman, 2017; Norland & Zucchino, 2017; Tharoor, 2017), this topic is expected to resurface within international security debates more often.

Proponents of partition (Chapman & Roeder, 2007; Downes, 2001; Kaufmann, 1996 & 1998; Mearsheimer, 2000) insist conflict leads to the hardening of ethnic identities thereby making interethnic cooperation difficult to achieve (Sambanis & Schulhofer-Wohl, 2009, p. 82). They argue ethnic groups feel compelled to seize control of the state they reside within to preserve identity and guarantee survival (Downes, 2001). Consequently, the byproduct is generating distrust and discontent between rival ethnic groups. Thus, according to Downes (2001), notional ideas of "negotiated solutions to ethnic wars that preserve a single multiethnic state, including power sharing, regional autonomy, and federalism" remain irrelevant because warring groups have no appetite for cooperation (p. 115). Therefore, as Donald Horowitz (1985) observed, "separating the antagonists—partition—is an option increasingly recommended for consideration where groups are territorially concentrated" (p. 589). Effective implementation of partition inevitably leads to the lessening of "both incentives and opportunity for further combat" and eliminates "both reasons and chances for ethnic cleanings of civilians" (Kaufmann, 1996, p. 137). In this respect, completely separating oppositional groups and dividing territory diminishes the threat threshold likely to emanate from each opposing ethnic group (Sambanis & Schulhofer-Wohl, 2009, p. 82).

Chapman and Roeder (2007) proffered considerable statistical validity for this argument by examining 72 civil wars that emerged between 1945–2002, discovering that: "only 14% of the parties to de jure partition experienced a resumption of violence within 2 years, but this frequency rose to 50% for the parties to a de facto separation, 63% for the parties bound in a unitary state, and 67% for the parties to an autonomy arrangement" (p. 689). It appears partitioning territory along ethnic and tribal lines decreases the probability of conflict escalation. In this regard, as Chapman and Roeder (2007) contend, partitioning remains a viable approach to lasting peace in the Middle East.

Detractors of partition, however, warn that such approaches fail to deliver the pacifying effects it promises to deliver (Sambanis & Schulhofer-Wohl, 2009). According to the authors, modifying borders, even after physically separating ethnic groups, remains virtually unsuccessful in the scaling down of conflict relapse. Donald Horowitz (1985) argues that a cursory observation of partitioned states, such as India and Palestine, remain

evidence for persistent conflict, not peace. Horowitz contends that historically, interactions among partitioned states have been characterized by tensions and threats, and in certain instances conflict. Partitioning, it is argued, invites future interstate warfare in the form of retaliatory acts of violence (Schaeffer, 1990). In the first large-N quantitative analysis on the effects of partitioning, Nicholas Sambanis (2000) bore this out, concluding a positive though not significant correlation existed between partitioning and revanchism of ethnic wars. Stated differently, the enmity between warring ethnic groups did not halt with the onset of partition, but rather rose "in tandem with the human toll of the previous war" and when war termination failed to yield mutually agreed-upon outcomes between warring ethnic groups (Sambanis, 2000, p. 480).

The debate over territorial partition is likely to gain traction with Kurdistan's recent referendum for independence. The defeat of Saddam Hussein in 2003 by U.S. forces provided Kurdistan unique opportunities to leverage its natural resources, predominantly oil, to begin establishing institutions necessary for a functioning state (Tharoor, 2017). Indeed, Kurdistan has its own flag and militia (the Peshmerga military forces). Moreover, it has its own constitution, parliament, and a representative in Washington, DC, (Abbasi, 2008). Consequently, given its current significant contribution in dismantling IS caliphate, the Kurdistan Regional Government seized the opportunity to hold a referendum and call for Kurdistan's independence from Iraq. As such, in 2017 Kurdistan overwhelmingly voted in favor of independence (Frantzman, 2017).

A call for independence, however, is a call for partition. The Iraqi government, its most senior Shia clerics, and the international community, predominantly Turkey, Russia, and the United States, voiced opposition to Kurdistan's referendum. Iraq's prime minster, Haider al-Abadi, asserted that, if necessary, he will mobilize the Iraqi Security Forces (ISF) to respond to any outbreak of violence (Ensor, 2017). Turkey responded by conducting large-scale military exercises near Kurdistan's borders (Ensor, 2017), threatened to block its oil exports (Tharoor, 2017), and recently asserted that the Kurds would "starve with economic sanctions and border closures" (Aldroubi, 2017). The UN Secretary General António Guterres voiced his opposition as well, insisting that the referendum could potentially lead to destabilizing effects (Tharoor, 2017). And U.S. Secretary of State Rex

Tillerson objected to Kurdistan's referendum, maintaining "the vote and the results lack legitimacy" (Nordland & Zucchino, 2017). In all, as this forecast policy demonstrates, for the moment the majority of the agents do not support partitioning Iraq, which may in the end prove to be a prescription for internal conflict. However, as the dynamic forecast instantiates, the appetite for a hybrid between soft partition and autonomy may become more appealing in the future, when conditions remain ideal for such institutional arrangements to occur.

2. Range of Agent Preferences

The range of preference for the issue three forecast is shown in Figure 27.

Figure 27. Issue Three: Agent Preference

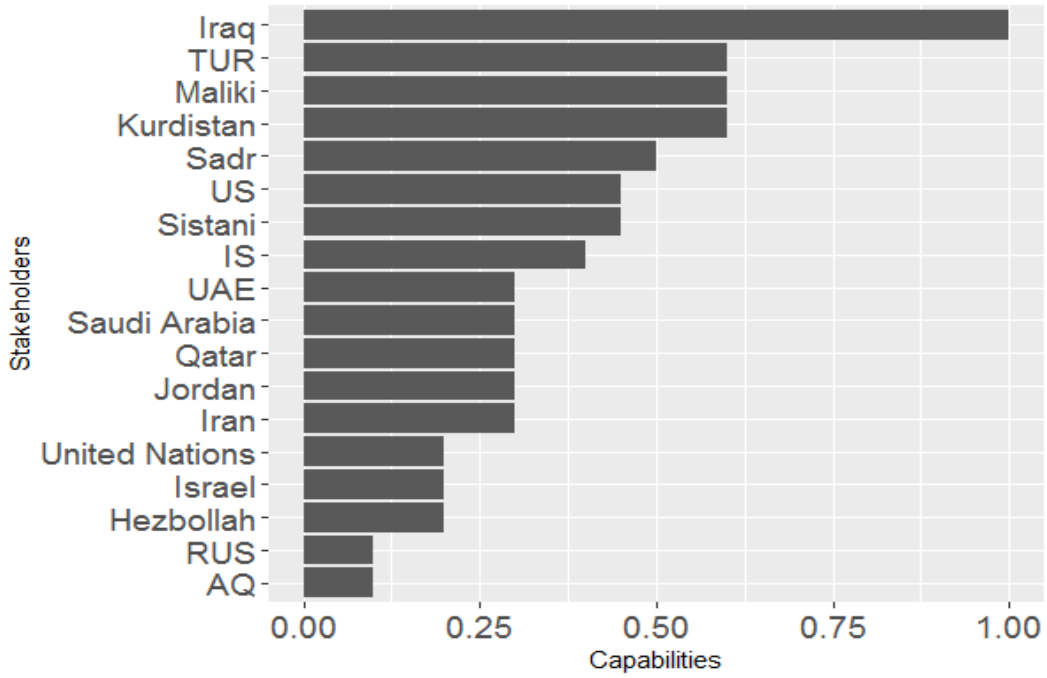
Numerical Value	Agent Preference Scale
1	Iraq should remain a unified sovereign state.
0.5	Iraq is partitioned into three states (with representative governors), yet subordinate to the government of Iraq
0	Iraq should be partitioned into separate Shi'a, Sunni, Kurdish states

3. Agent Capability Rating

Figure 28 illustrates the capabilities rating for each agent. Iraq is identified as the country likely to contribute the bulk of its resources to thwart efforts of partition. Unsurprisingly, this is followed by Turkey, which has engaged in a decades-long conflict with Kurdish separatists. The prevailing view of Turkey's government is that Kurdish separatists, particularly Kurdistan Workers' Party (PKK) and the People's Protection Units (YPG), are attempting to establish their own state in northern Syria, a move the government remains dedicated to prevent (Almukhtar & Wallace, 2015). From a capabilities' perspective, Turkey remains influential because it is the strategic lynchpin that allows Kurdistan to plug its oil into the global market. Should Kurdistan partition from Iraq, Turkey's President, Tayyip Erdogan, emphatically "threatened to choke off Kurdistan's lifeline" (Winkler, 2017). The repercussions for Kurdistan, thus, could be quite significant. The remainder of agents is expected to minimally contribute material resources to influence

the outcome of the policy. Thus, we can extrapolate that this issue remains most important to agents residing in Iraq, those in the immediate geographical periphery, and those agents maintaining close partnerships with agents residing in Iraq, such as the United States and the United Kingdom.

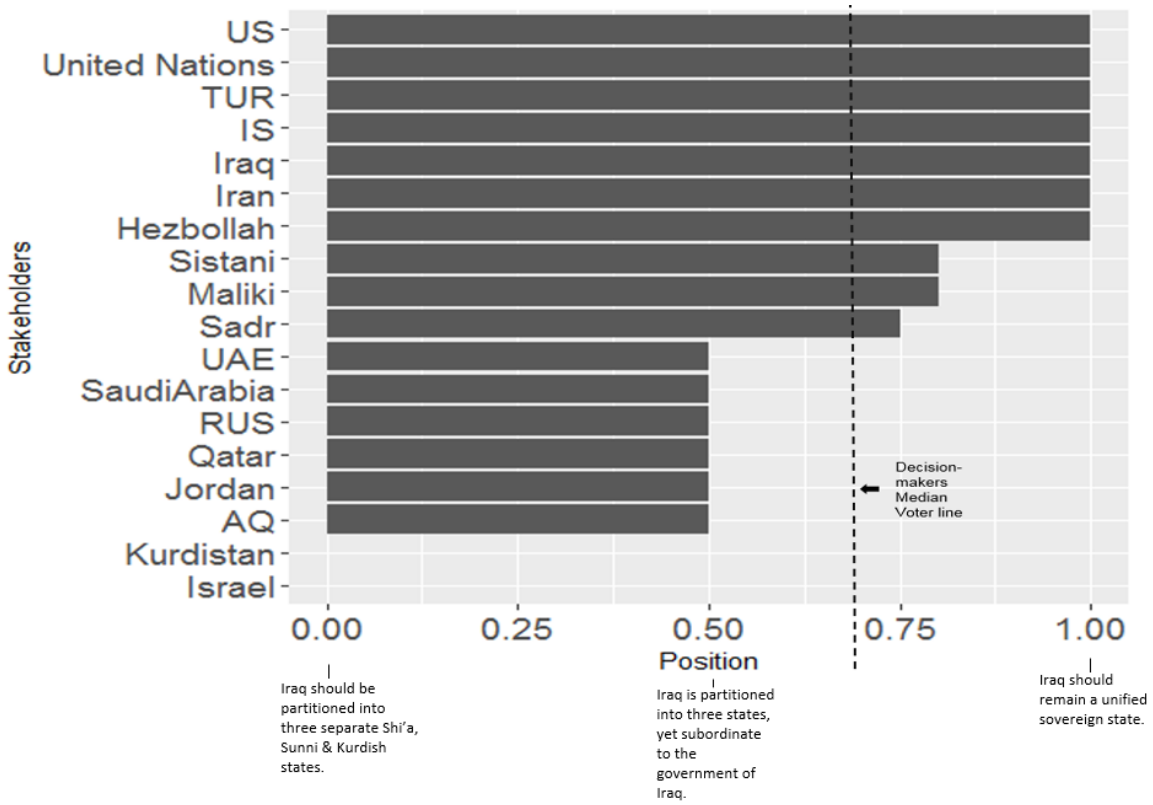
Figure 28. Issue Three: Agent Capability Rating



4. Agent Preference Rating

The bulk of agents prefer Iraq to remain a unified nation-state, as shown in Figure 29. While the United States, U.N., Turkey, and Iraq occupied a position of 1.00, indicating a strong preference for a unified Iraq, Israel and Kurdistan occupied a position of 0, supportive of partition. Among the majority of agents, the prevailing view is that partitioning the Middle East could, as Hezbollah's Hassan Nasrallah observed, lead to internal wars (Al Jazeera, 2017).

Figure 29. Issue Three: Agent Position Rating

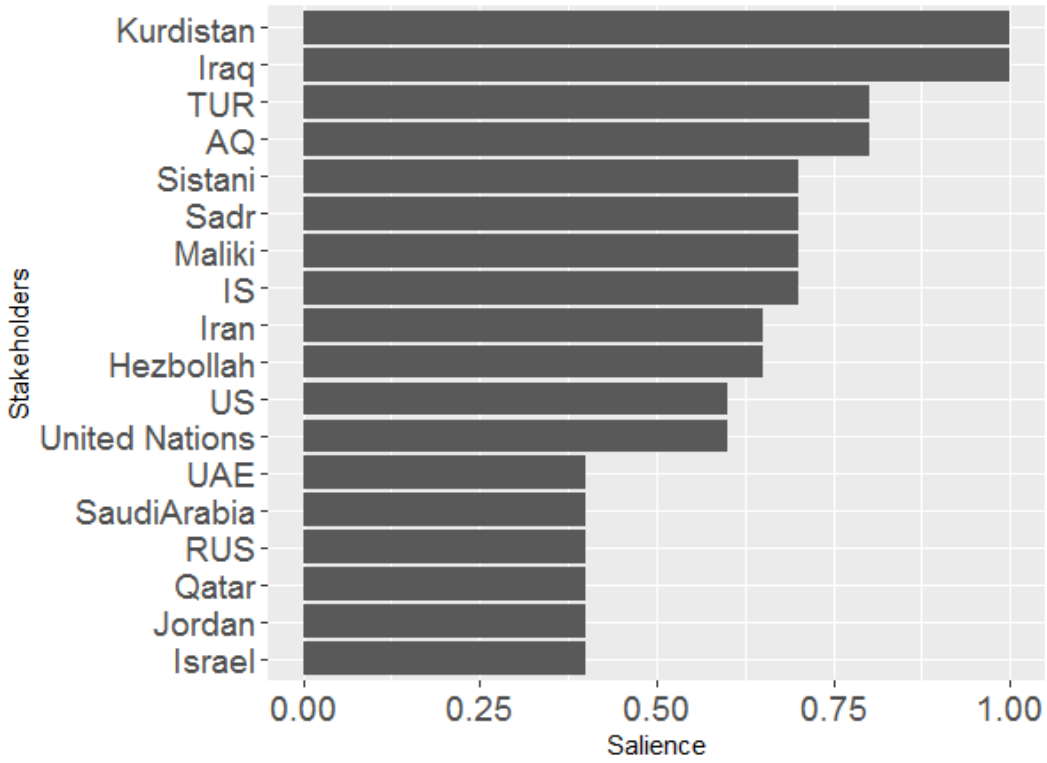


5. Agent Salience Rating

The profile ratings for each agent's salience (Figure 30) suggests the subject of partition remains an extremely important issue for most Middle East agents, to include certain foreign countries. For Iraq and Turkey, this issue remains critical, as any partition would likely destabilize and shift the balance of power elsewhere; perhaps, to third-party contestants. Yet, Kurdistan's salience preference reflects an overdue desire to partition from Iraq. As Kurdistan's regional president, Masoud Barzani, stated, "No one should blame the Kurds for the partition of Iraq" (Goran, 2017), after all, "it's time to accept that this model [unified Iraq] is not working. Iraq is already practically divided, and this vote will reflect what has already taken place. This referendum will be binding. It will give us a mandate to negotiate a peaceful settlement with Baghdad on terms that recognize the legitimate aspirations of our people" (Chulov, 2017). For the UN and the United States, this issue remains most likely critical because it could potentially thwart ongoing military

campaigns and deteriorate partnerships with Middle East countries that remain vital to defeating IS. As Colonel Robert Manning, the Pentagon spokesman, asserted, “We hope that it does not become a distraction and take away the focus on destroying ISIS (Islamic State) and beyond that obviously this (is) an issue for Iraq, you know, they are going to have to sort that out” (Chmaytelli & Georgy, 2017). Based on the salience ratings, for most agents this topic rated as a significant issue.

Figure 30. Issue Three: Agent Salience Rating

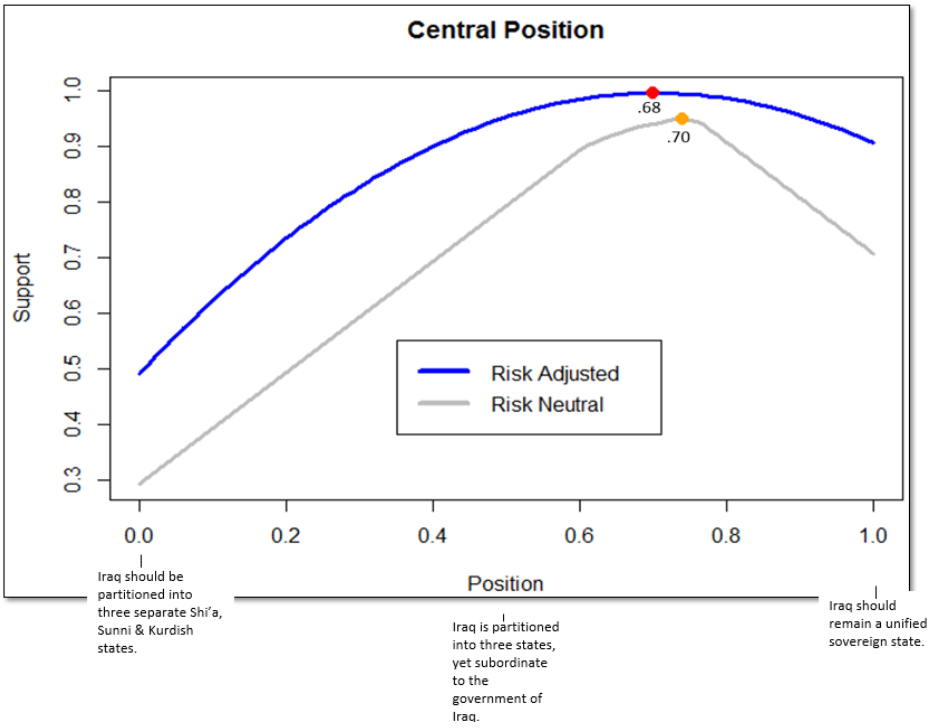


6. Risk Static and Risk Neutral

The static risk-neutral and risk-adjusted forecast (Figure 31) ranges between 0.68 and 0.70 positions. The static forecast is slightly to the right of the risk adjusted, indicating a variable preference for a unified state. The risk-neutral forecast indicates a stronger shift toward the partition of Iraq. The risk-adjusted forecast projects a much stricter forecast

within the framework of the current policy implementation. Nevertheless, the static forecast instantiates Iraq as likely to remain a unified nation-state.

Figure 31. Issue Three: Risk-Neutral & Risk-Adjusted Results



7. Dynamic Forecast

The dynamic forecast (Figure 32) provides details regarding agents' preferences for partitioning Iraq. Based on the evolution of the interaction among agents, the dynamic forecast achieves an equilibrium of approximately 0.68. This instantiates that partition advocates are expected to experience difficulty gaining wide acceptance. The ebb and flow of the forecast conveys just how complex and contentious this subject is. For example, Kurdistan is expected to find itself in a no-win situation despite its much-touted referendum for independence victory, even with Israel's support. Given Turkey's threat to blockade Kurdistan's oil exports, pressure emanating from Iraq's political party, and the international community's disproval of partition generally, Kurdistan will most likely pay

lip service to the referendum, and will unlikely separate from Iraq within the foreseeable future.

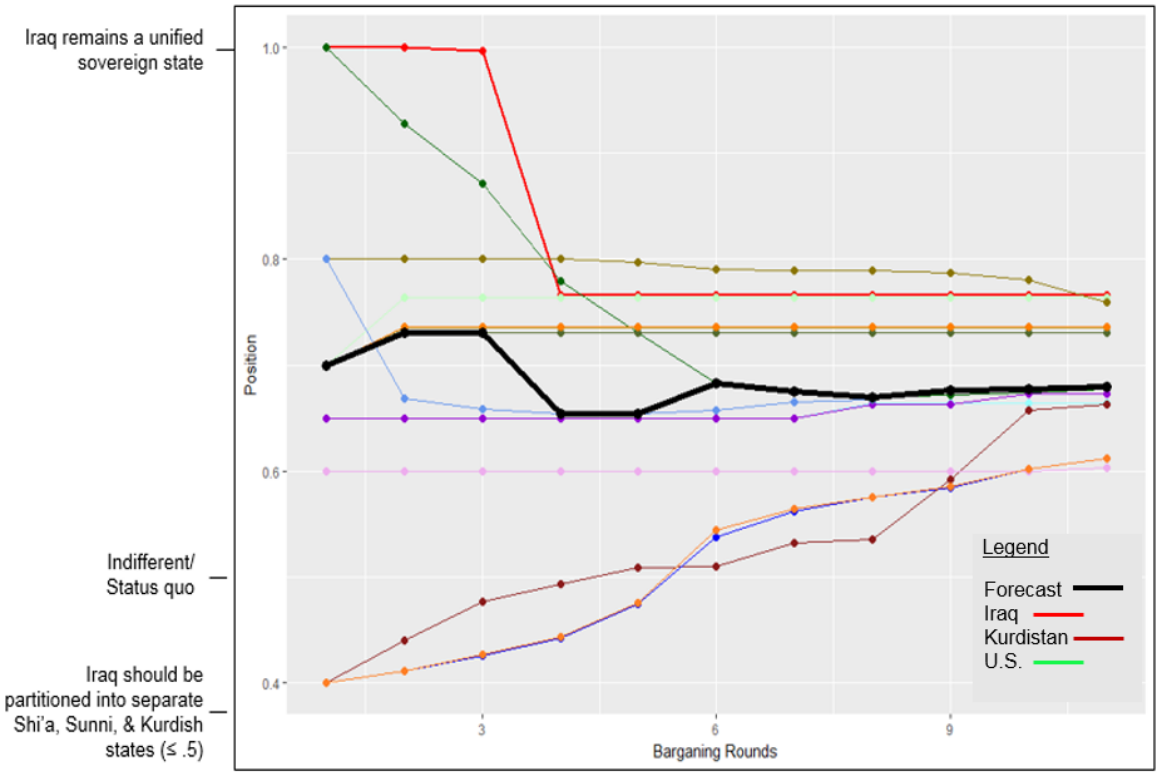
An additional inference that can be extrapolated from the dynamic forecast is that the majority of agents have no appetite for democratic power distribution. A critical factor in partitioning is the push-factor of power to ethnic groups desiring to become legitimate states. The dynamic forecast demonstrates that bulk of the Middle East agents absolutely and explicitly convey little desire or appetite to support such institutional arrangements. For example, in commenting on Kurdistan's desire for independence, Ayatollah Ali al-Sistani asserted: "Any individual steps toward division and separation and the attempt of making this thing reality will lead to internal and external reaction and bad consequences that would damage our dear Kurdish citizens in the first place and maybe lead to what is more dangerous than that, God forbid, and will give way for many regional and international sides to intervene in Iraqi affairs" (Nordland & Zucchnio, 2017). In this regard, partition remains an unattractive option for the moment.

However, the dynamic forecast yields an interesting attendant finding. While there is a lack of convergence on the forecasted (equilibrium) outcome, Kurdistan nonetheless moves sharply in that direction. This suggests Kurdistan is likely to fall in line and support Iraq's political preference for a unified Iraq. On the other hand, the forecast does imply that partitioning the major ethnic groups into three states subordinate to the government of Iraq could in the future become an attractive proposition for a decent percentage of the Middle East agents. The closest framework that best fits this description is a blend between what Joseph and O'Hanlon (2007) call a soft partition and what Chapman and Roeder (2007) refers to as autonomy.

Soft partition would entail each of the major Iraqi tribes to (1) assume responsibility for governance; (2) assist people who voluntarily desire relocation; (3) equitably distribute resources; (4) establish boundaries and security checkpoints for each ethnic state; and (5) plug Iraqis into the job market Joseph & O'Hanlon (2007). Unlike the original definition of soft partition, it would not call for a partition from Iraq's central government. On the contrary, Iraq's centralized government powers would be preserved, but with the caveat that it grants autonomy (self-governance) to the three major tribes.

Of course, Joseph and O'Hanlon (2007) rightly concede that such operations would be extensive, risky, and require international support. It could also fail outright, especially if "Iraqis simply refuse to consider it or change their minds after they have initially decided to adopt it. It could fail through poor implementation, with violence accelerating as populations start to relocate" (p. 30). It only works, they argue, when the Iraqis make the choice and conscientiously follow through on their word. Nevertheless, the dynamic forecast suggests that the time for this approach may very well be closer than previously anticipated.

Figure 32. Issue Three: Dynamic Forecast

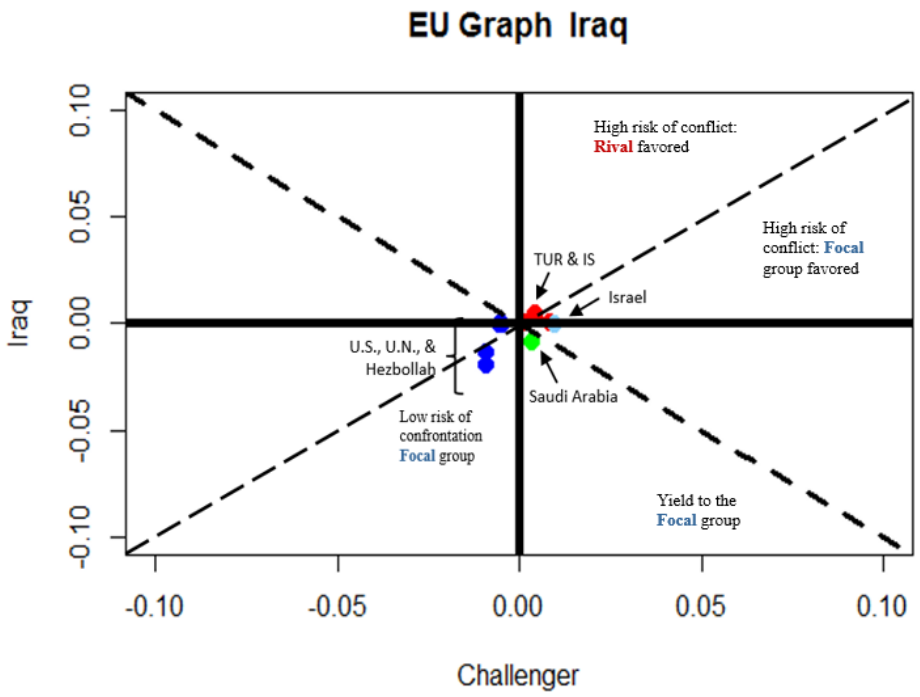


8. Perceptual View

For this policy issue we will be concerned with only two agents: the Iraqi government (Figure 33) and the Kurdistan Regional Government (Figure 34). The results of Iraq's Cartesian coordinate system (Figure 33) seem to outline a lack of support for a

unified Iraq in favor of partition. However, quite the opposite is true. Agents identified in the conflict zone (Octants 1 and 2) hardly deviate from the center, which suggests minor rhetorical squabbles at best. Thus, there is little resolution for engaging in conflict or altering support that runs contrary to Iraq's. While the United States and the UN (Octant 6) appear to be in conflict, they nonetheless are expected to favor whatever position Iraq chooses on this particular issue. At the moment, the United States and the UN remain concerned with ameliorating any policies that interrupt or may adversely thwart efforts to dismantle and defeat IS, such as Kurdistan's referendum for independence.

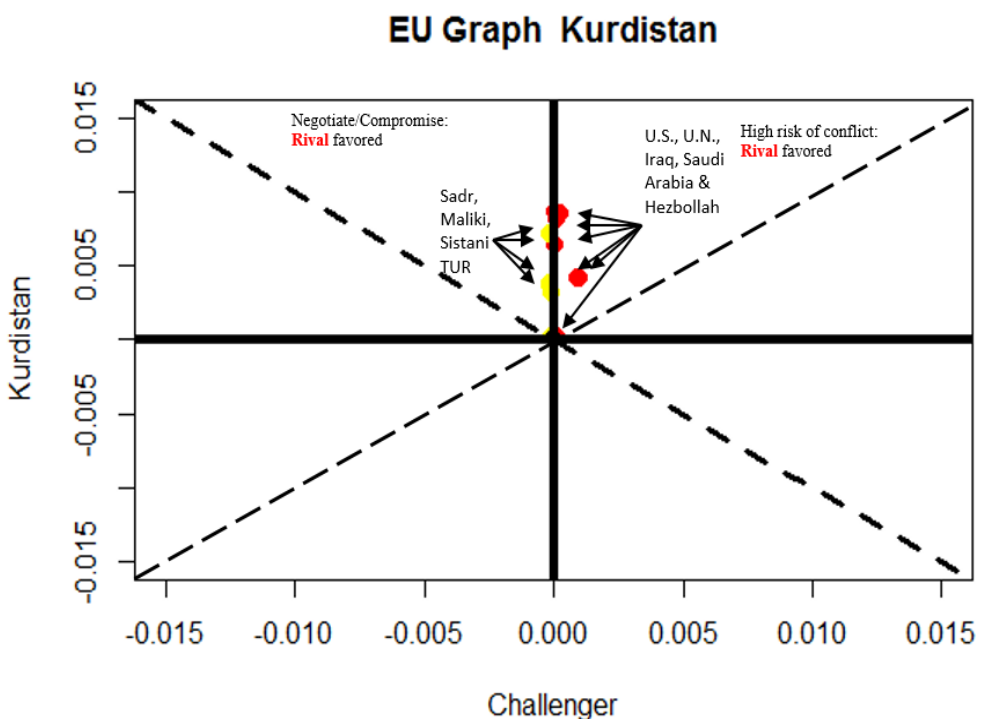
Figure 33. Issue Three: Iraq's Perceptual View



The expected utility values for the Kurdistan Regional Government in relation to other agents are conveyed in Figure 4. The United States, UN, Iraq, Saudi Arabia, and Hezbollah are at high risk of conflict with the focal actor, the Kurdistan Regional Government. As previously mentioned, agents in this octant stand to accrue little gain through negotiations; the incentive structure remains inadequate. As such, Octant 2 remains unhinged and highly quarrelsome. Thus, we can expect that should the Kurdistan Regional

Government pursue partition, they will face resistance from agents, such as Iraq and Turkey, identified in Octant 2. Intensifying rhetoric and violence is likely to emerge from partition and may lead to civil war. Consequently, this may adversely affect the global coalition campaign against the IS. In this regard, the Kurdistan Regional Government stands to lose significantly. As such, the Kurdistan Regional Government will most likely pay lip service to the referendum, and will unlikely partition from Iraq in the near term.

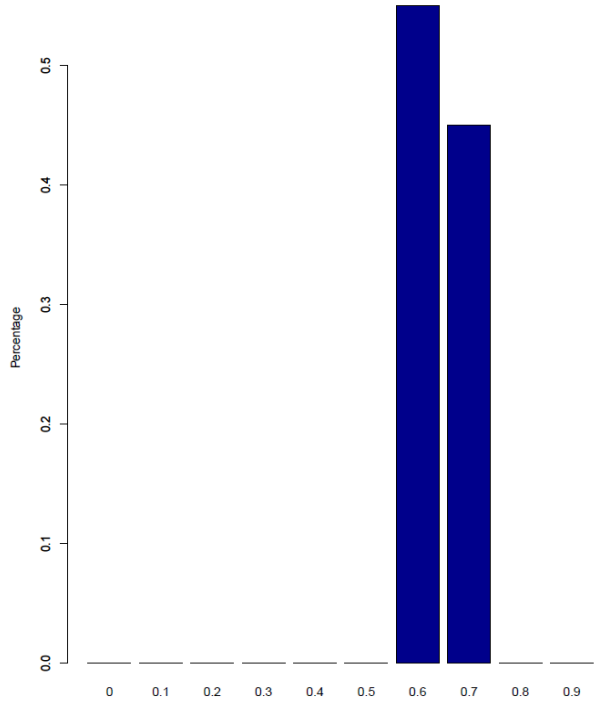
Figure 34. Issue Three: Kurdistan's Perceptual View



9. Sensitivity Analysis

Sensitivity analysis (Figure 35) demonstrates that the majority of the agents invested in this policy issue support a unified Iraq. Fifty-five percent of agents demonstrated a preference leaning toward soft-partition and regional autonomy. Conversely, 45 percent of agents demonstrated a preference leaning in disfavor of partition. In all, sensitivity analysis supports the dynamic forecast (0.68) outcome, indicative of its overall robustness.

Figure 35. Issue Three: Sensitivity Analysis



10. Recommendations

As previously stated, there has been significant comprehensive data on the pros and cons of partition in general. Nevertheless, partitioning Iraq based along Shi'a, Sunni, and Kurdish tribal lines, while remaining subordinate to the government of Iraq, remains an unappealing and impractical solution for the moment for four reasons. First, as noted by Sambanis & Schulhofer-Wohl (2009), Horowitz (1985), and Nicholas Sambanis (2000), partition more often leads to increased tensions among opposing ethnic groups. It is not a farfetched assumption to presume the emergence of conflict between Kurdistan, Turkey, and Iraq's central government should Kurdistan secede from Iraq. Second, the appetite to yield governmental powers to the three major ethnic groups remains an unattractive prospect. Perhaps a great concern by Iraq's central government would be an all-out internal conflict among contenders vying for political power. Third, partitioning would entail distribution of Iraq's natural resources. Here, too, Iraq's government provides little evidence for entertaining the thought of distributing oil and other natural resources equally

among the major tribes. And lastly, partitioning amid IS conflict could potentially degrade the Middle East partnerships the global coalition fought so hard to solidify over the last several years. It would degrade the ongoing joint military operations between the multi-partnered militias and nations invested in the conflict. And it would surely increase the longevity of IS insurgency. Thus, until the IS insurgency is completely dismantled and defeated, it is prudent to revisit the partition issue later when conditions might improve. However, as the dynamic forecast demonstrates, a combination of soft partition and autonomy remains an attractive option to revisit in a post-IS defeat environment. Revisiting the issue in several years or so, and exploring the implications for a blend of the two approaches, does remain an ideal route worth pursuing.

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IX. CONTRIBUTIONS OF SOCIAL NETWORK ANALYSIS IN SUPPORT OF IS CASE STUDY

A. INTRODUCTION

The purpose of this chapter is to demonstrate social network analysis's (SNA) contribution to the overall analysis by illuminating the underlying relationship between the 162 agents used to generate the expected utility model (EUM) forecasts, with a particular focus on the relationship between Iran and the Popular Mobilization Force (PMF). While leveraging game theory to forecast the future state of the Islamic State (IS) affords analysts a means to draw inferences for future U.S. policy and military strategy, SNA provides the means to conduct in-depth explorations to determine the types of relationships that bind agents together not readily observed through sole reliance on the EUM. In this regard, SNA should be viewed a complementary tool to the EUM. Implicit in the analysis about the efficacy of SNA is the assumption that reversing Iran's influence entails accounting for and understanding who the relevant agents enmeshed in the IS conflict are. This chapter proceeds as follows. The first section defines SNA, which includes a brief history and relevant terms used for the thesis. The second section expands on the data collection process, the SNA network boundary, and the two one-mode asymmetric directional networks assessed. The third section departs briefly from the SNA topic to explore potential reasons for Iran's increased presence in Iraq. This is followed by a brief overview of the PMF. Finally, the fourth section involves interpreting the SNA results followed by three non-lethal recommendations to begin rolling back Iran's influence in Iraq.

B. WHAT IS SNA?

SNA is best viewed as a means to analyze existing relationships between individuals, groups, and organizations (henceforth, agents). Everton (2012) observed that SNA leverages a range of theoretical and methodological approaches for analyzing behavioral interactions that profoundly "affects what we do, say, and believe" (p. 5). Behavior, then, is a byproduct of relational processes. Visualizing relations between agents had its inception in the 1930s with the work of Joseph Moreno (1934), who argued that the

evolution of group behavior can best be tracked by identifying and analyzing the issue that bind agents together.[42] Moreno developed the first spatial visual sociogram to demonstrate this phenomenon (Fredericks & Durand, 2005). The authors observed that by the 1950s, social researchers such as Frank Harary and Dorwin Cartwright integrated mathematical mixed-methods approach with Moreno's work on sociograms, leading to the current discipline of graph theory. By assigning mathematical values to lines, they found that researchers could identify with precision the strength, direction, and value of a tie (positive or negative relationships) to apprehend the social network dynamics, and extrapolate powerful inferences about the relational variables that bind agents (influence) together.

From 1927 to 1932, Elton Mayo, in conjunction with other social researchers, used sociograms to map the governing dynamics of social group behavior in a bank wiring room. Paul Lunt and W. Lloyd Warner similarly analyzed one of New England's cities and identified the naturally occurring formation of intimate sub-groups, or cliques, within the broader community in the 1940s. However, by 1970s the advent of computers allowed for a synthesis between sociograms and computer-based analysis. Thus, from the 1970s through the 2000s, new techniques were developed. Fredericks and Durand (2005) highlight the developmental work on matrixes methods by Luce and Perry (1949); Festinger (1949) Bavelas's (1948) innovative use of applying math modeling to analyze group dynamics; Lorrain and White (1971) and Borgatti's (1990) synthesis of graph theory and mathematics to derive new ideas about group relationships; and, of course, Borgatta and Lindzey's (1954) novel expansion on such concepts as centrality, cliques, and isolates. The development of SNA is really then a convergence of eclectic concepts and methodologies brought together to analyze how social networks form, interact, and how agents influence each other's behavior within a network.

[42] Pages 30-54 of Moreno's work provide a profound first example of sociometric diagrams cogently explaining the evolution of the Riverdale school population's interaction between boys and girls, from Kindergarten through the eighth grade.

1. Relevant SNA Terminologies

Relevant to this thesis's usage of SNA are foundational concepts of centrality scores. Centrality scores remain indicative of an agent's level of importance within a bounded network. It is calculated by determining the agent's total number of ties it shares with other agents (Everton, 2012). Betweenness centrality calculates the shortest path between agents, while closeness centrality calculates the agent's geodesic (shortest) distance to every agent within the bounded network. Finally, eigenvector centrality assumes a network's most central agents are more important than agents lying at the periphery (Everton, 2012). However, Philip Bonacich (1987) proposed a variant of centrality that calculates each agent's connections, weighted by his or her total centrality scores. Nevertheless, centrality scores imply that certain agents will inevitably have an advantage over other agents in accessing information, other agents, and even obtaining resources. Thus, agents displaying high centrality scores typically occupy positions of immense influence and power.[43]

2. Data Collection

I acknowledge the data collection for the one hundred sixty-two agents invested in the IS fight will most likely be incomplete. Open-source data and various social media

[43] Directly related to an agent's influence within a network are bridges, brokers, and brokerage potential. According to Long, Cunningham, and Braithwaite (2013), bridges and brokers ensure the movement, or transaction, of information or material between agents and networks. Bridges, thus, preserve networks. Eliminating a bridge leads to the severing of a network into constitutive sub-components (Everton, 2012). Conceptually, the idea of brokerage had its inception with the Mark Granovetter's substantial work on "weak ties" (Everton, 2012). Granovetter largely concluded that existing weak ties (relations) between agents served to bridge densely connected networks. Weak ties, when compared to strong ties, he argued, simply led to more job hiring. However, as Everton observed, "while not all weak ties are necessarily bridges, all bridges are weak ties" (Everton, 2012, p. 181). Ronald Burt (1992) expanded on Granovetter's research and shifted focus from weak ties to gaps, or what he termed "structural holes" within networks. He defines structural holes as "a relationship of nonredundancy between two contacts" (p. 65). And as such, Burt (1992) argues that brokers, regardless of tie strength, who occupy structural gaps, are in position of influence. Essentially brokers have the potential to facilitate the expansion of social networks, through either economic, social, or logistics support. Brokers can even act as manipulators and barriers within a social network (Sozen & Sagsan, 2010). Blocking access to vital information or resources could prove detrimental to an agent's organizations. Brokers can thus influence an agent's behavior. Agents who act as brokers in structural holes "benefit from having direct and immediate access to a wider range of resources than those in other positions" (Sipro, Acton, & Butts, 2013, p. 131). For Burt, weak ties were not as important as agents' connections that spanned structural holes. Burt develops the constraint measure to determine the brokerage potential of agents within a network.

websites, newspapers, and academic journals provide a plethora of information, some of which may be inaccurate. Further, developing effective non-lethal recommendations based on incomplete information can be a daunting and risky task. It is daunting with respect to time and energy expended for what may turn out to be of little gain in the grand scheme of analysis. It is risky because developing effective analysis to inform U.S. policy and military strategies based on faulty information can lead to adverse unintended consequences. Nevertheless, where possible, information on agents was collected from such reputable websites as the Rawabet Center for Research and Strategic Studies, Stanford University's Mapping of Militant Organizations, the Global Coalition against Daesh, and the Jihad Intel.[44] Additionally, multiple one-off sites proved useful in either filling gaps or expanding on the limited information provided from one of the primary web sources. As no intelligence report ever contains perfect information, sources used to develop the social network diagram remains a powerful enough indicator to shed light on (1) agents with the most influence on the network and (2) recommendations worth considering.

3. Network Boundaries

Similar to Han and Schloesser's (2013) research on the "Study of Islamic Charities in the UK and US," I take the nominalist approach, imposing a network boundary on the problem-set contingent on the following criteria. Data used contains two individual one-mode networks that capture two significant relationships: military resource and training support and trust (or loyalty). The one-mode networks are directional and asymmetric, which means ties are not necessarily reciprocal. For example, just because a certain Popular Mobilization Force (PMF) militia remains loyal to Iran, it does not imply or suggest it will be reciprocated or take the form of enhanced military assistance (financial, arms support, training, etc.).

[44] Jihad Intel: http://jihadintel.meforum.org/; Global Coalition against Daesh: http://theglobalcoalition.org/en/home/; Stanford University's Mapping Militant Organizations: http://web.stanford.edu/group/mappingmilitants/cgi-bin/; Rawabet Center for Research and Strategic Studies: http://rawabetcenter.com/en/

4. Military Resource and Training Support, Trust and Loyalty Asymmetric Networks

Military resource and training support (Figure 35) is defined as assistance provided to militias or armies for the sole purpose of supporting or defeating IS. Routine or annual military or advisory training provided by foreign nations were ignored. The mutual military support the United States continues to provision the nation of Jordan to counter-IS activities and address ongoing security challenges (DoS, 2017) is such an example. While U.S. support may indirectly assist Jordan to stave off IS threats, it nonetheless does not directly contribute to defeating IS in Iraq. Conversely, Iran's IRGC (al-Jaffal, 2017) and the U.S.'s Special Operations Forces (Turse, 2017) currently provide Iraq and various foreign and domestic militias with direct military and financial assistance to defeat IS. These agents are included in the network. The one-mode asymmetric network for loyalty (Figure 36) is defined as confidence and loyalty expressed for a specific agent. For example, a decent percentage of the PMF places tremendous faith and trust in the IRGC's military training and Iran's continual material and economic support in their mission to defeat IS.

Figure 36. Material and Training Support Network

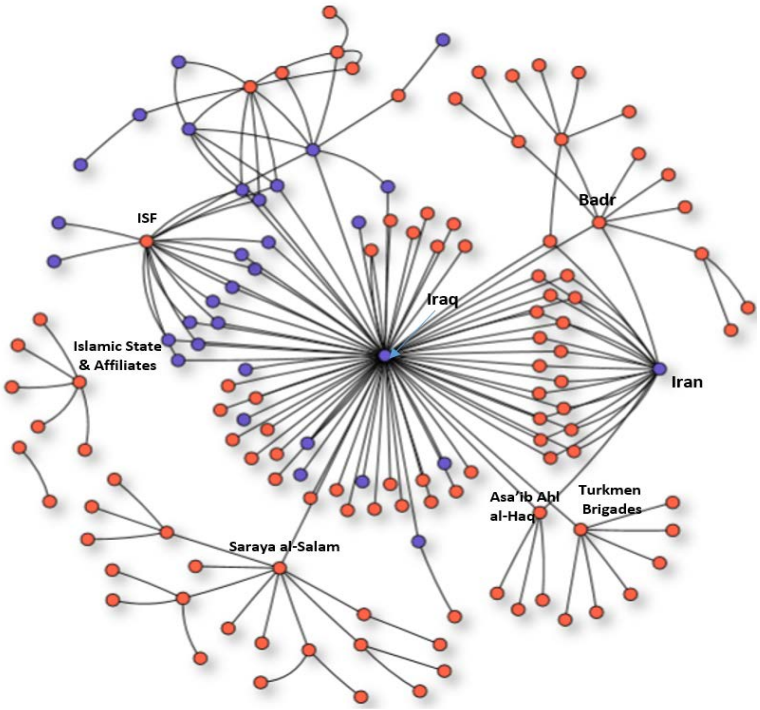
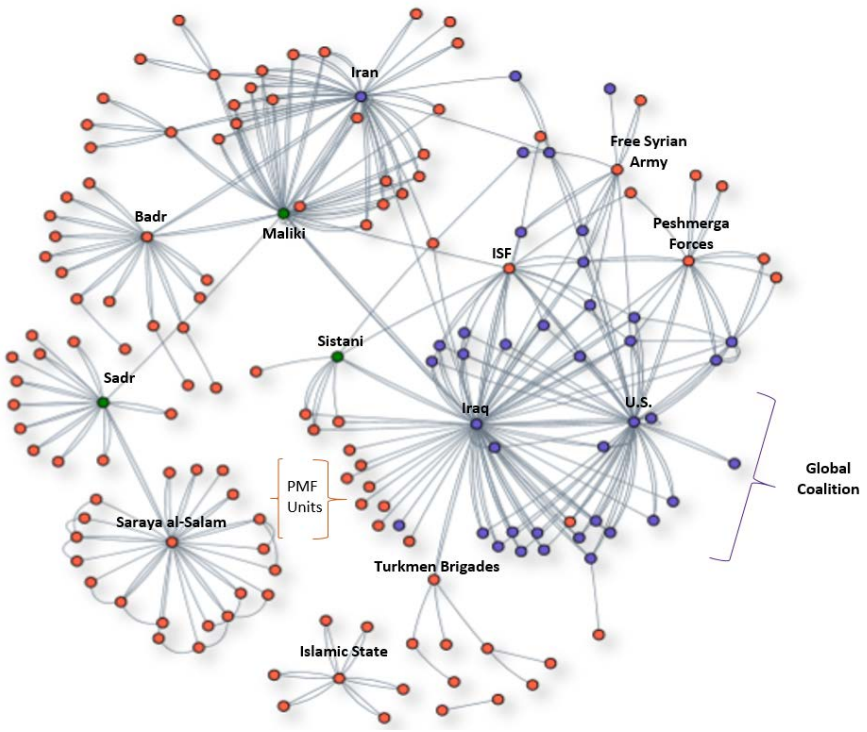


Figure 37. Trust and Loyalty Network



C. IRAN'S INTEREST IN IRAQ

For many policy and military security experts, Iran's expansive and influential footprint in Iraq is of no surprise. Since the 1979 Iranian revolution, the political establishment has persistently sought to etch a place for itself within Iraq's political party with a modicum of success (Felter & Fishman, 2008). Saddam Hussein's regime consistently ensured attempts by Iran to secure a foothold in Iraq remained at best unsecured. Iran is predominantly a Shia nation, and its enmeshed participation in the IS conflict reflects its current initiative to influence Iraq's political environment by sponsoring Shia militant organizations sympathetic to its political goals, such as the Islamic Dawa Party and the Islamic Supreme Council of Iraq (ISCI), and specific PMF units. Ideally, proxy-Iranian political agents enmeshed within Iraq's polity can leverage voting power to support policies amenable to Iran's interests.

Iran's ascendancy as an influential actor in Iraq (around 2013) did not unfold by happenstance, but by three evolutionary processes. First is the emergence of IS, which can

partially be attributed to the U.S. withdrawal of its forces from Iraq in 2011 (Al-Salhy & Arango, 2014) and IS's adroit ability to capitalize on Syria's Civil War in 2014 (Rodgers et al., 2016), and conquer large swaths of Iraq's territory, threatening its sovereignty (Mansour & Jabar, 2017). Second, Iraq's security apparatus proved ill-suited to deliver a deathblow to the IS movement shortly after its inception. Thousands of Iraqi security forces abandoned their post or fled upon first contact with the IS. Many removed their military attire and donned civilian clothes to merge with fleeing populations (Al-Salhy & Arango, 2014).

And third, a consequence of Iraq's fledgling security prompted then Iraq's prime minster, Nuri Kamal al-Maliki, to place the country in a state of emergency status and to implore friendly governments for help (Al-Salhy & Arango, 2014). Incidentally, Iran and Iraq's most powerful and influential Shia clerics called upon Iraq's citizens to seize arms and fight IS. The issuance of a fatwa (*wajib al-kifai*) by Iraq's most respected Shia cleric, the Grand Ayatollah Ali al-Sistani (Mansour & Jabar, 2017; Watling, 2016), had a particularly potent effect. On behalf of Sistani, Sheik Abdulmehdi al-Karbalai beseeched that: "citizens who are able to bear arms and fight terrorists, defending their country and their people and their holy places, should volunteer and join the security forces to achieve this holy purpose" (Bowen, 2014). As a result, thousands of Iraqis joined whatever militia was willing to confront the IS. These militias, currently composed of approximately fifty units, are commonly referred to as the PMF or al-Hashd al-muqadis, "the Sacred Mobilization Units" (Mansour & Jabar, 2017).

However, in legitimizing the PMF, the Iraqi government and the Shia clerics implicitly sanctioned Iran's presence in Iraq as just and paved the way for its ascendancy as an influential actor. Thus, understanding Iran's current influence in Iraq is best viewed from the perspective of analyzing existing relationships it currently enjoys with the PMF. Comprehensively analyzing the current relationship between Iran and the PMF will allow for the identification of effective strategies to counter and reduce Iran's malign influence in Iraq.

D. THE PMF: A BRIEF OVERVIEW

After IS defeated Iraq's security forces in 2014, tens of thousands Iraqi volunteers joined various existing paramilitaries. To bring order and legitimacy to the throng of paramilitary organizations operating against IS, the Iraqi government consolidated the movements under the umbrella organization of the Popular Mobilization Force (PMF). The PMF, thus, became an integrated entity subordinate to the Iraqi security apparatus. Estimating the PMF's size is, however, debatable, as they vary. Hameed (2016) puts the number around 110,000, while Doanvo (2017) contends the ideal number ranges anywhere from 100,000 to 120,000. And Mansour and Jabar (2017) cites a PMF spokesperson who insists the number is actually around 142,000 troops scattered about in approximately 50-some units. Nevertheless, there is little debate surrounding their overall impact. Unquestionably, the PMF successfully aided the government of Iraq in rolling back IS gains (Mansour & Jabar, 2017; Roggio, 2017).

However, while the majority of Iraqis systematically view the PMF as heroes, the movement writ-large has recently been met with mixed criticisms. On one hand, Iraqi Shia Muslims view the PMF as religious sanctioned paramilitaries with martyrs who "have given up their lives in defense of their country" (Mansour & Jabar, 2017, p. 3). As Amarah, a PMF fighter himself, asserted, "You can criticize any politician or even religious cleric, but you cannot speak against the Hashd and its martyrs" (Mansour & Jabar, p.3, 2017). For many Iraqis the PMF is a symbol of freedom. Many of the movement's martyrs are honored through music and posters (Mansour & Jabar, p.3, 2017).

On the other hand, some Iraqis have come to fear the PMF, believing the Iraqi government ignored their corruption and crimes. The U.S. Department of State Bureau of Democracy, Human Rights and Labor (2016), for example, points to the PMF's violation of human rights by "killing, torturing, kidnaping, and extorting civilians" (p. 2). Doanvo (2017) cites PMF's torture of thousands of Fallujah residents. Moreover, Amnesty International (2017) reports that efforts to defeat IS resulted in the PMF's complicity to commit "war crimes and other violations of international humanitarian law and human rights law" particularly in Sunni Arab locales (p. 11).

Then, of course, is Iran's close affinity with specific PMF organizations. Many Iraqis view the PMF as proxy agents working to fulfill Iran's agenda (Mansour & Jabar, p. 3, 2017; Watling, 2016). Watling (2016) reported that some of the largest PMF organizations take orders expressly from Iran's government in exchange for funding and military support. Asa'ib Ahl al-Haq and Kata'ib Hezbollah, for example, are some of Iran's largest proxy organizations within the PMF. Another is Kata'ib Sayyid al-Shuhada, which fought for the Syrian President Bashar Hafez al-Assad. Hadi al-Amiri's Badr Organization, with a tenured history of close relations with Iran dating back to the Iran-Iraq war, is arguably Iran's most devoted organization (Parker, Dehghanpisheh, & Coles, 2015; Watling, 2016). Amiri once observed of Khamenei that he "has all the qualifications as an Islamic leader. He is the leader not only for Iranians but the Islamic nation. I believe so and I take pride in it" (Parker, Dehghanpisheh, & Coles, 2015). Additionally, Amiri is a close confidant of Major General Qassem Suleimani, the Quds Force's leader. Of Suleimani he once asserted that, "I love Qassem Suleimani! ... He is my dearest friend" (Filkins, 2015). In effect, the prevailing view among many Iraqis is that Iran has thoroughly permeated and influenced PMF's largest and dominant organizations, with frequent consultations from Qassem Suleimani (Mansour & Jabar, p.3, 2017 & Parker, Dehghanpisheh, & Coles, 2015; Watling, 2016). The overt affinity for Iran impelled Muqtada al-Sadr and Grand Ayatollah Ali al-Sistani to harshly criticize some of the PMF organizations. Sadr once remarked of the PMF that it has become the *al-militiat al-waqiha*, "the Imprudent Militias" (Mansour & Jabar, 2017).

While in 2014 the PMF were viewed as heroes and liberators of Iraq from IS, they have since become a liability issue for Iraq's security apparatus and political establishment. Recently, certain PMF leaders, such as Amiri, expressed a desire for greater representation in Iraq's political process (Mansour & Jabar, 2017). The consequence of granting the PMF leadership political power, however, could prove detrimental for Iraq's government. PMF sponsorship in the political process could amount to greater influence for Iraq's government to adopt policies aligned with Iran's interests.

Indeed, social network analysis (SNA) reveals that Iran remains a highly influential agent within Iraq. In great measure, their expanse is attributed to their contribution to the

PMF in the form of military advisory, logistics, and weapons. Since the inception of the IS fight, Iran's security arm, the Quds Force of the Islamic Revolutionary Guard Corps (IRGC), committed some of its top military leadership, such as Qassem Suleimani, to mentoring the PMF leadership on military strategy and operations against IS (Mansour & Jabar, 2017). In return, many PMF organizations professed their loyalty to Iran. Iran's source of influence, thus, remains largely predicated on maintaining positive relations with the PMF. Recognition of the extent Iran provides external and internal support to the PMFs reveals insights into how best to reverse that process.

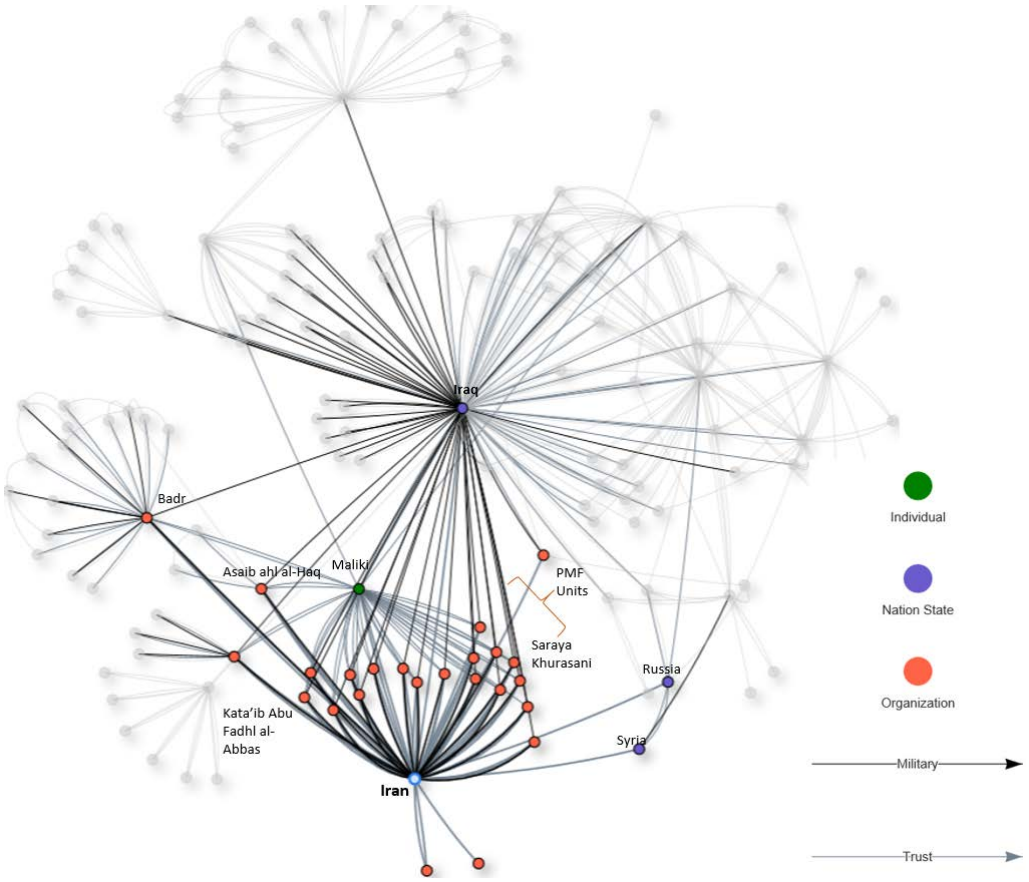
Before proceeding to analyze the extent, Iran influences the PMF, it remains important to identify the allegiance of the movement's sub-groups. Respectively, as Mansour and Jabar (2017) argue, the PMF can generally be separated into three distinct constitutive clusters: those that ally with Khamenei, Sadr, and Sistani. The PMF sub-groups identifying with Khamenei prefer greater inclusion into Iraq's political process. Conversely, the pro–Sadr and Sistani PMF sub-groups prefer dissolving the movement altogether or assimilating with Iraq's security forces after IS is defeated (Mansour & Jabar, 2017).

1. PMF Sub-groups Allying with Khamenei

According to Mansour and Jabar (2017), the PMF's most affluent and powerful sub-groups are those that pledged their loyalty to Iran's Supreme Leader Ali Khamenei (Figure 37). Overtime these groups "have been groomed by Iran as reliable political and military allies" (Mansour & Jabar, 2017, p. 13). They are, essentially, proxies for Iran. As such, they typically benefit largely from external funding, to include logistics and military support. Groups such as Kata'ib Abu Fadhl al-Abbas, KH, and Saraya Khurasani are proxies of Iran. So is Asaib ahl al-Haq and the Badr Organization. Thanks to Nouri al-Maliki, himself a proxy of Iran, the latter two evolved into political movements with expressed desire for inclusion in the upcoming 2018 Iraqi parliamentary elections. During an interview with Mansour a Jabar (2017), a close confidant of Maliki asserted, "the Hashd [PMF] are already politicians" (p. 13). In sum, these sub-groups remain loyal to Maliki,

have publicly expressed their affinity and loyalty to Khamenei, and desire to obtain seats in Iraq's parliamentary.

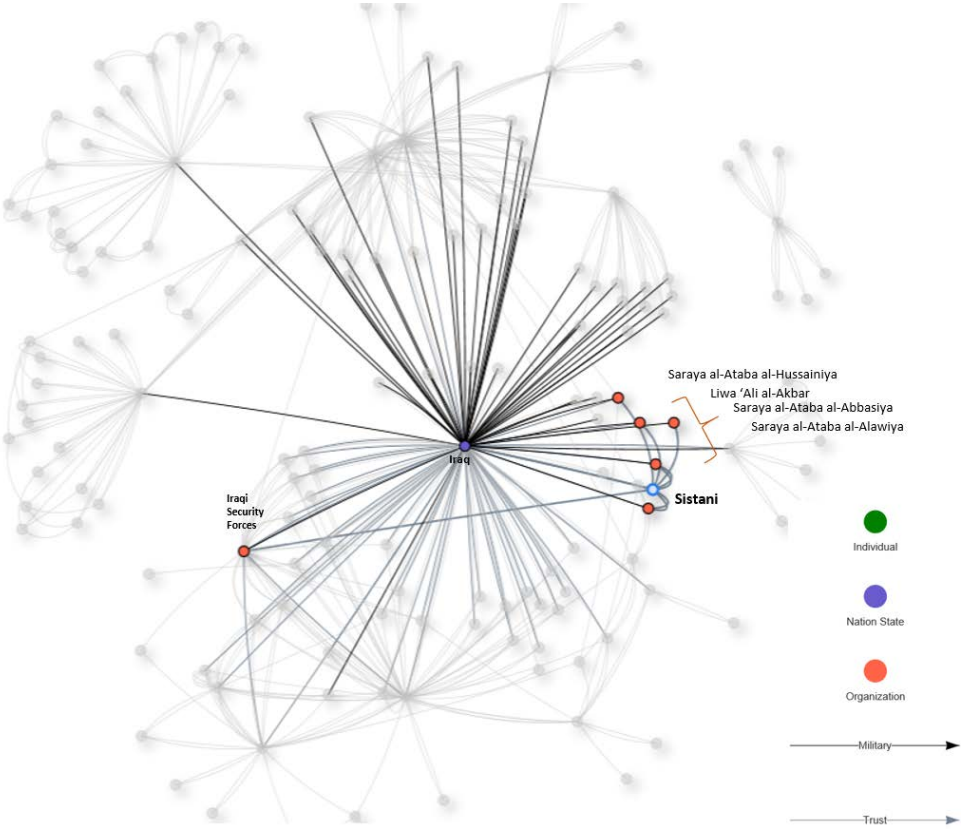
Figure 38. Iran's Allies



2. PMF Sub-groups Allying with Sistani

The second sub-group of PMF ally with Iraq's most influential Shia cleric, the Grand Ayatollah Sistani (Figure 38). These groups remain sympathetic to Sistani and believe it is their duty to preserve Iraq's land and prevent the destruction of Shia holy places from IS, such as Najaf, Karbala, and Kadhimiya. PMF sub-groups such as Saraya al-Ataba al-Hussainiya, Liwa 'Ali al-Akbar, Saraya al-Ataba al-Abbasiya, and Saraya al-Ataba al-Alawiya align with Sistani. According to Mansour & Jabar (2017), these groups have given their word to Sistani to disband after IS threat has been eliminated.

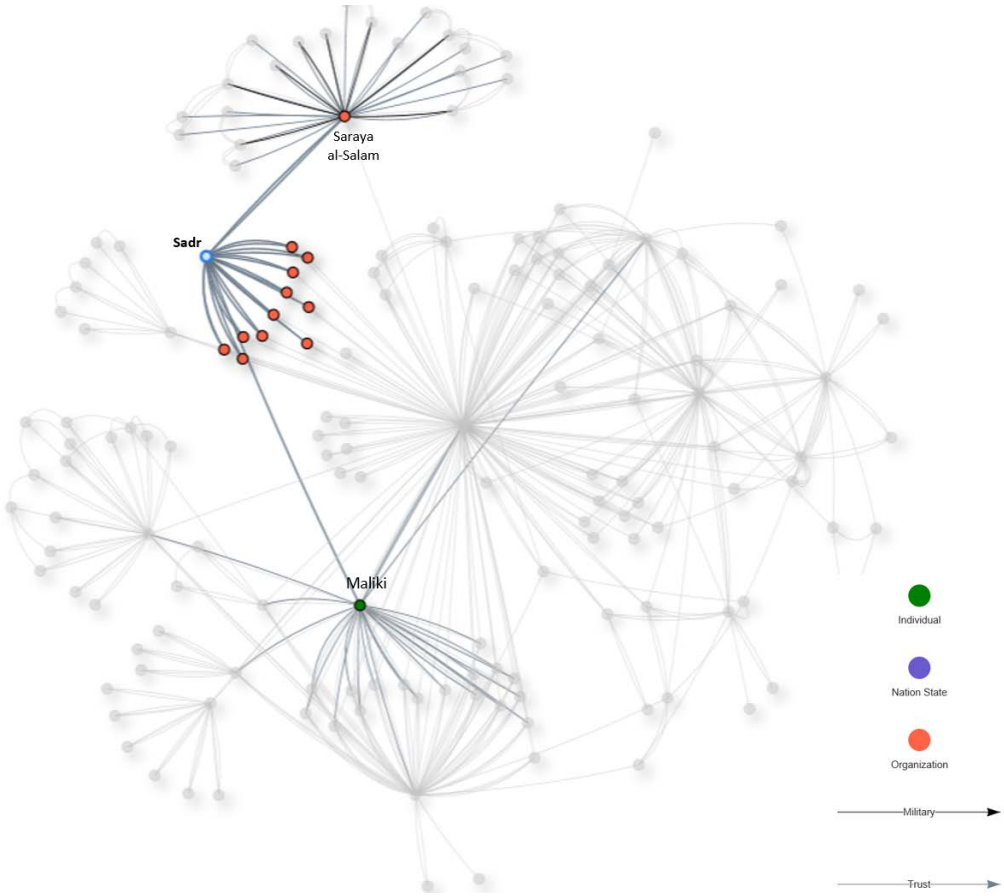
Figure 39. Sistani's Allies



3. PMF Sub-groups Allying with Sadr

The third sub-group of PMF ally with Muqtada al-Sadr (Figure 39). This group is commonly referred to as Sadr's "Peace Regiments," *Saraya al-Sala*, or Sadrist. The Sadrists were around prior to the official stardom of the PMF. They are a rebrand of the Jaysh al-Mahdi (JAM), which formed prior to 2008, but have since been revived as Saraya al-Salam in an effort to thwart the IS threat. According to Mansour and Jabar (2017), Saraya al-Salam possesses the potential to raise an army of 100,000, but remain constrained by the inability to accrue sufficient funding to purchase military equipment, a constraint PMF organizations loyal to Khamenei have little to worry about. Nevertheless, the Sadrist movement recognizes Muqtada al-Sadr as their "theological authority rather than a political leader" (Mansour & Jabar, 2017, p. 15).

Figure 40. Sadr's Allies



E. SNA RESULTS

1. One-Mode Asymmetric Military Resource and Training Support Empirics

To estimate the relational effects between Iran and the PMF, within the broader context of the whole network involved in IS conflict, centrality scores were assessed (normalized). Recall centrality measures identify some of the most significant agents within a given bounded network by the number of ties it shares with each agent. Table 1 presents the various centrality scores for each of the networks. Across the total degree centrality scores, Iraq (**0.1171**) provides the bulk of military resource and training support to the Iraqi Security Forces (ISF) and the PMF. Its score further suggests that within the network it enjoys access to other agents' beliefs and ideas. Iraq is essentially "in the know," by attaining the highest total degree centrality score.

However, Iran is also "in the know," when it comes to its relationship to the PMF units. While less substantial than Iraq, Iran's **(0.0316)** current military resource and training contribution to the PMF is evident. The betweenness centrality score suggests certain PMF units, like Badr **(0.0044)**, Asa'ib Ahl al-Haq **(0.0031)**, and Ansar Marjaiya **(0.0031)**, enjoys ease of access (in geodesic distance) to Iran. Additionally, it also means Iran acts a "bridge" to various PMF clusters, controlling the flow of information and military resources. Its eigenvector score **(0.2569)**, taking account both the number of ties to its agents and weighted by whether those ties remain in the periphery or located in the center is high, relative to the other agents within the network. On the one hand, this remains demonstrative of Iran's goodwill and commitment to pro-Iran PMF units. On the other, it underscores Iran's efforts to compete with the government of Iraq for PMF loyalty through the provision of material goods and military advisory support.

Table 1. One-Mode Asymmetric Military Resource and Training Support Results

Military Resource and Training Support				
Total Degree centrality	**Betweenness centrality**	**Closeness centrality**	**Eigenvector centrality**	**Information centrality**
Iraq (0.1171)	Iraq (0.0865)	U.A.E. (0.0082)	Iraq (0.9211)	Iraq (0.0639)
Iran (0.0316)	Saraya al-Salam (0.0191)	U.S. (0.008)	ISF (0.3119)	Iran (0.0548)
ISF (0.0285)	Badr (0.0147)	Islamic State (0.0079)	Iran (0.2569)	Saraya al-Salam (0.0408)
Saraya al-Salam (0.0142)	Turkmen Brigade (0.006)	Germany (0.0078)	Bosnia & Herzegovina (0.1917)	U.S. (0.0386)
Peshmerga (0.0142)	Badr, 5th BN (0.0044)	Italy (0.0078)	Abu al-Fadl al-Abbas Forces (0.1917)	Islamic State (0.0382)
US (0.0127)	Asa'ib Ahl al-Haq (0.0031)	France (0.0078)	U.S. (0.1615)	Badr (0.0356)
Badr (0.0127)	Saraya al-Salam, 5th SAS Div., (0.003)	Qatar (0.0074)	Germany (0.1435)	Turkmen Brigades (0.0355)
Islamic State (0.0111)	Ansar al-Marjaiya (0.0031)	Iraq (0.0073)	Italy (0.1435)	Badr, 5th BN (0.0322)
Turkmen Brigade (0.0111)	Badr, 2BN (0.0022)	New Zealand (0.0073)	France (0.1435)	Germany (0.0287)
Kurdistan Regional Government (0.0095)	Badr, 2BNb, (0.0022)	Canada (0.0073)	Islamic State (0.1357)	Italy (0.0287)

Table 1 also shows the causal mechanism by which military resource and training support is delivered. Whereas the bulk of the global coalition provide direct military resource and training support to the government of Iraq and its armed forces, Iran's support is an indirect bottom-up approach through the PMF. Potentially influencing PMF units sympathetic to Iran facilitates the spread of sway and appeal with greater ease than attempting to penetrate Iraq's existing political barriers where Western powers, such as the U.S., enjoy greater influence levers. The information centrality score for Iran (**0.0548**) instantiates that within the broader network it enjoys a position of influence and that it has strategically positioned itself well as an effective bridge, controlling the flow of information and material resources to certain cluster PMF units.

2. One-Mode Asymmetric Loyalty Empirics

Table 2 is an outgrowth of Table 1. The findings suggest that Iraq (**0.1329**) attains the highest total degree centrality score, followed by the U.S. (**0.0839**), and Iran (**0.0807**). However, the one-mode trust network substantiates concerns the U.S. and the Iraqi government shared for quite some time: that Iran has successfully entrenched itself well within Iraq and has earned the respect and trust of a decent percentage of PMF units. Iran's betweenness centrality score (**0.1369**), while less than Sadr (**0.1556**), Maliki (**0.2599**), and Iraq (**0.325**), nonetheless suggests that within the bounded network it is perceived as a legitimate and trustworthy agent. Indeed, as Table 2 demonstrates, it is well connected to two of the top ten agents in the betweenness centrality column, Maliki (**0.2599**) and Badr (**0.1184**). Leveraging SNA reveals an additional particularly noteworthy insight: Iran's source of influence remains largely wedded to maintaining positive relations with the PMF units, and not so much Iraq's citizenry or its government. Iran's absence from the closeness and eigenvector columns indicates its ties are restricted to the PMF clusters and proxy agents, such as Maliki. As revealed in Tables 1 and 2, the foundation for the mutual trust is rooted in Iran's ability to deliver on its promise in the form of military resource and training support. This remains the primary mechanism for which Iran solidifies its trust and extracts loyalty from certain PMF units.

Table 2. One-Mode Asymmetric Loyalty Results

Loyalty				
Total Degree centrality	**Betweenness centrality**	**Closeness centrality**	**Eigenvector centrality**	**Information centrality**
Iraq (0.1329)	Iraq (0.325)	Saudi Arabia (0.014)	Iraq (0.7202)	Free Syrian Army (0.0078)
U.S. (0.0839)	Maliki (0.2599)	Free Syrian Army (0.0136)	U.S. (0.5562)	Maliki (0.0076)
Iran (0.0807)	Sadr (0.1556)	Turkmen Brigade, Bashir Regiment (0.0131)	ISF (0.3614)	Sistani (0.0076)
Maliki (0.0728)	Iran (0.1369)	Turkmen Brigade, Sayyid al-Shuhada (0.0131)	Maliki (0.2683)	Iran (0.0075)
Saraya al-Salam (0.0491)	Saraya al-Salam (0.1217)	Turkmen Brigade, Talafar Regiment (0.0131)	Peshmerga (0.2678)	Dwekh Nawsha (0.0075)
Badr (0.0443)	Badr (0.1184)	Egypt (0.013)	Italy (0.2639)	Lalash al-Yazidiya Forces (0.0075)
Sadr (0.0364)	U.S. (0.0833)	Jaysh al-Mu'amal (0.013)	Kurdistan (0.2223)	Saudi Arabia (0.0075)
Peshmerga (0.0301)	ISF (0.0394)	Shabak PMF (0.013)	France (0.2065)	U.S. (0.0074)
ISF (0.0301)	Peshmerga (0.0305)	Al-Tufuf Brigade (0.013)	Germany (0.1972)	Qatar (0.0074)
Kurdistan (0.0206)	Turkmen Brigades (0.029)	Al-Taf Brigade (0.013)	Iran (0.1969)	Saraya al-Salam, 5th SAS Div.(0.0074)

Interestingly, findings from Table 2 suggest that Sadr, and to lesser extent, Sistani, retain loyalty with specific PMF units. In certain respects, loyalty along ideological lines remain a powerful pillar of support and resilience for specific religious leaders. For Iran, evoking loyalty shifts among PMF-units aligned with Sadr or Sistani remain a difficult hurdle to overcome. Nevertheless, loyalty shifts do not remain static and have the potential to evolve and shift. Figure 36 unveils the multiple trust relations agents within the network share. They are multiple, numerous, and not cleanly delineated. Evidence of loyalty shifts among PMF units to Iran would suggest Sadr or Sistani would no longer enjoy the influence and obedience among the PMF units they once enjoyed.

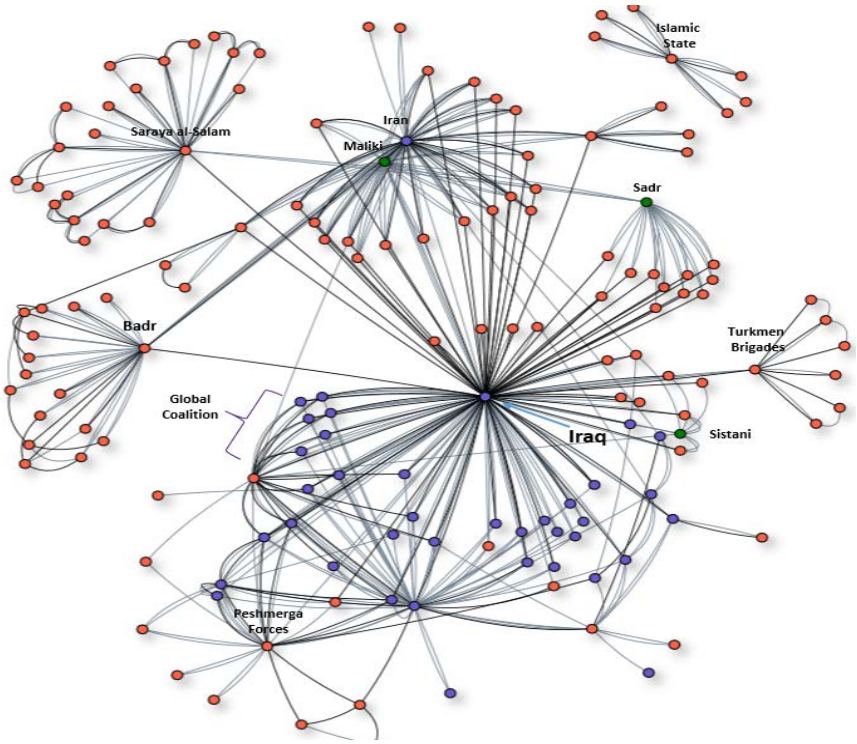
F. POLICY AND MILITARY RECOMMENDATIONS

While the current analysis teased out the causal relations between Iran and the PMF units, we should not ignore Iraq's influence, which is substantial. After all, across the majority of the centrality measures (Tables 1 and 2) Iraq generally attained the highest score. Thus, two inferences can be extrapolated. First, current analysis between Iran and

the PMF units tend to exaggerate Iran's influence while neglecting Iraq's. Table 1 demonstrates that while Iran's (**0.0316**) total degree centrality indicates it is a central actor within the network, Iraq's score (**0.1171**) is significantly higher, which means it is more central. Iraq's eigenvector (**0.9211**), betweenness (**0.0865**), and information centrality (**0.0639**) scores not only rival Iran's, but suggests it remains the most influential agent within the military resource and training support network. Therefore, Iraq can exert greater influence or control over the provision of material and training support to the PMF units if it chooses.

Second, the descriptive analysis presented in Table 2 indicates Iraq (**0.1329**) enjoys higher rates of legitimacy than Iraq (**0.0807**). Specifically, Iraq has a higher count of loyalty ties than Iran. Iraq's betweenness (**0.325**) and eigenvector (**0.7202**) centrality measures underscore the extent it remains an effective bridge between clusters, and that it is the most central of all the agents within the loyalty network. Thus, Iran does not currently possess enough influence within Iraq to dictate policy to the Iraqi government, despite efforts to win the PMF units over through the provision of material goods or military training support. In fact, the Iraqi government retains the opportunity to minimize and expel Iran from the region if it so chooses because Iran's Achilles heel is solely based on the relationship it enjoys with the PMF units. As such, what follows are non-lethal recommendations for rolling back Iran's influence in the region. In SNA, non-lethal operations (NLO) place emphasis on strategic patience. This approach focuses on weakening networks by undermining their existence. NLOs can take the exclusive approach of working across diplomatic, information, military and economic (DIME) elements of national power. They can also focus on exploiting tools within the military arsenal, such as psychological operations, information operations, and deception operations to support dissemination campaigns and or lethal operations (Roberts & Everton, 2011).

Figure 41. Iraq's Network



1. Option One: Integrate, Disperse, and Retrain PMF Units

The SNA provides useful insights into important strategic options. One means of generating disfavorable conditions to undermine Iran's influence is simply to integrate, disperse, and retrain (IDR) PMF units. The Iraqi government could leverage the same constitutional authorities used to legitimize the PMF to begin the IDR process into larger Iraqi Security Forces (ISF). This does imply that PMF units cannot exist as distinct entities mutually exclusive of ISF. So long as PMF units operate autonomously, they remain a potential destabilizing force the Iraqi government will have to contend with, especially those aligning with Iran. The IDR process of PMF units should be executed in such that (1) PMF units are not integrated as whole units but dispersed across ISF, and (2) PMF soldiers are screened and retrained to avoid potentially recruiting irreconcilable soldiers. As to the latter point, the target audience is foot soldiers, as many enlist primarily for economic reasons. Because high-ranking PMF leaders are ideologically motivated they are more inclined to remain loyal to their espoused religious leader. Therefore, they will most

likely remain irreconcilable. IDR has two additional benefits. First, PMF foot soldiers could boost ISF reputation. Recall, Iraqi citizens were most likely to enlist in the PMF because of ISF's dereliction of duty to confront IS in 2014. The IDR process, if done effectively, affords the Iraqi government an opportunity to resuscitate ISF's reputation as Iraq's sole protectors. Second, the IDR process has the added benefit of minimizing Iran's ability—to include PMF irreconcilables—to act as a powerful broker and add new recruits to their ranks. While this example is inevitably a soft approach, it has the merit of allowing the Iraqi government a means to begin reducing Iran's overall influence inside Iraq.

2. Option Two: Dissolve the PMF

The second option insists that the government of Iraq leverage its constitutional authority to dissolve the PMF altogether. The IS conflict allowed the PMF to gain legitimacy and rise from the social fabric space to the PFS. Within Iraq, PMF units such as the Badr Organization, Kata'ib Sayyid al-Shuhada, Kata'ib al-Imam Ali, Harakat Hezbollah al-Nujaba now possess the potential to affect policies favorable to Iran. As SNA demonstrates, Iran's current center of gravity is the PMF. Thus, insofar as the PMF remain unchecked entities, they are expected to infiltrate Iraq's parliament and influence the direction of Iraq's policies to be more in line with Iran. Ironically, the movement that helped save Iraq from IS caliphate, potentially stands as a destabilizing force in the region.

By dissolving the PMF units, the government of Iraq would achieve two overarching beneficial objectives. First, each PMF unit SE-I begins to lose gravitational influence. Without an organization to lead, SE-Is cannot compete on the PFS to manipulate policies. Further, the narrative that binds each PMF unit will experience increased entropy. The absence of an SE-I ensures the likely absence of a powerful narrative. And second, dissolving the PMF ensures Nouri al-Maliki's overall influence within the network is diminished. As Mansour and Jabar (2017) instantiate, and as the SNA demonstrates, Maliki remains a critical lynchpin (broker) within the overall network. As the godfather of the PMF (Mansour & Jabar, 2017, p. 1), Maliki, links Iran to the PMF units. Dissolving the PMF, then, removes Maliki and Iran as essential brokers within the network. It would force them to find an alternate route to circumvent and undermine Iraq's government.

3. Option Three: Sow Discord/Mistrust among PMFs

A unique NLO to undermine Iran's influence can very well take the form of deception. Deception operations require reinforcing perceptions, influencing attitudes, beliefs, opinions, and establishing robust feedback mechanisms. Deception is about manipulating adversary behavior, judgment, knowledge and concept of reality. Of course, a good operational security plan (denial) and a solid cover story is also required (Jajko, 2002, p. 354). Extrapolating insights to the SNA findings, Iraqi has the option of sowing discord among the PMF units. Ideally, target-sets would primarily consist of second- or third-tier PMF leadership loyal to Iran. Mid-level leaders typically fight for financial gains rather than ideological purposes. Sowing doubt, discord, and turning sympathetic Iranian-PMFs loyalists against one another would begin fracturing relations among the PMF units and undermine Iran's overall ability to influence the region. Deception, thus, remains an ideal practical strategic option to begin rolling back Iran's influence among proxy-Iranian PMF organizations.

G. CONCLUSION

It should be observed that no single non-lethal strategy mentioned will suffice alone. Ultimately degrading Iran's influence within the PMF requires a multi-pronged approach, perhaps, of the three options mentioned. As Jodi Vittori (2009) would say when formulating counterterrorism strategies, success is achieved through "a thousand cuts, rather than a decisive battle or targeting a single center of gravity" (p. 445). A similar approach applies to reducing Iran's influential expanse in Iraq. Nevertheless, the aim of the chapter is to introduce and demonstrate that SNA remains an applied tool that can complement the EUM forecasts. Thus, it is possible for analysts to create a network boundary from the very same agents used to forecast the future of IS to derive inferences about other agents not readably observed to sole reliance on the EUM. This chapter demonstrated that from the 162 agents involved in IS conflict, it is possible to identify precisely Iran's current locus of power and to explore contingencies to achieve alternate outcomes favorable to long-term U.S. interests.

X. CONCLUSIONS AND RECOMMENDATIONS

The central contention of this thesis sought to demonstrate that the EUM and SNA remain applied social science tools that can realistically allow analysts to better forecast and gain an in-depth understanding of the impact and consequences that emerge from political decisions on current and future military affairs. This thesis provided political and military analysts a framework for which to conceptually think about how agents—such as nation-states, illicit organizations, and SE-I—rise to the PFS to influence political outcomes for nefarious purposes. Additionally, this thesis introduced the EUM and SNA as applied social science tools that can help mitigate uncertainty, a topic that appears to continually deter analysts from attempting to overcome such obstacles. The tools were then applied to IS case study to (1) generate forecasts based on the global coalition's current policy and military efforts to degrade and defeat the revolutionary movement; (2) to determine the appetite of Iraqi political organizations, to include relevant external agents such as the United States and Turkey, to partition Iraq into three sub-states while remaining subordinate to Iraq's government; and (3) to identify Iran's current locus of power in Iraq and explore recommendations for rolling back its influence.

Based on the findings generated from the EUM and SNA, several assertions can be made. First, the EUM accurately forecasted the IS caliphate's demise. Indeed, the global coalitions' publicly stated position matched their capability contribution to support Iraq in defeating the movement. Furthermore, despite a divergence of interests between such nation-states as the United States and Iran, the EUM revealed that they prioritized the defeat of IS over other domestic or international affairs. Second, the EUM concluded that despite this success, the global coalition is expected to reduce its overall capability contribution to defeating IS as an insurgency. This suggests leaders of the global coalition will likely reprioritize efforts to more pressing matters, whether domestic or international. The cost of reprioritization, in part, is thus expected to contribute to increasing IS's lifeline as an insurgency. Finally, in a post-IS environment, the Iraqi government and relevant external agents such as Turkey, the United States and the United Kingdom, have no appetite for a policy that partitions the country into three sub-states along Shi'a, Sunni, and

Kurdish lines for the moment, despite Kurdistan's recent referendum for partition. Nevertheless, the forecast bares out the possibility that in the future (approximately five years) this topic could become an attractive proposition worth exploring.

This thesis also used SNA to identify Iran's locus of power, the PMF. The military resource and training support, and the trust and loyalty asymmetric social networks, suggest that Iran aims to create an imbalance of power tilted in its favor. By aligning with pro-Shia militias, and working by, with, and through Maliki, Iran seeks to install proxy-PMF agents within the government of Iraq that would, in essence, vote on policies favorable to their long-term interests. More specifically, Iran seems to express a desire to become the strongest regional powerbroker in the Middle East. As such, based on the SNA findings, this thesis provides three broad recommendations to begin rolling back Iran's influence. Recommendations range from such non-lethal operations as the integration, dispersal, and retraining (IDR) of the PMF to completely dissolving the PMF altogether to lethal operations, such as sowing discord through deception among pro-Iran PMF units.

A. RESEARCH RECOMMENDATIONS

Additional research is required to further determine the suitability of the recommendations provided for each policy forecast. While outside the scope of this thesis, it is absolutely possible to leverage the EUM and SNA, using the same process outlined in the thesis, to test the practical and feasible nature of the recommendations proffered. Engineering the future means exploring the strengths, weaknesses, vulnerabilities, and consequences emerging from each of the policy recommendations. Additionally, future research is needed to develop the understanding for how to precisely accelerate a narrative's entropy in order to disable SE-Is from adequately generating movements of change.

B. RECOMMENDATIONS FOR POLITICAL AND MILITARY ANALYSTS

Political and military analysts would benefit from the use of the EUM and SNA for three reasons. First, the use of the EUM and SNA can assist political and military analysts work through the fog and noise generated by uncertainties to more clearly apprehend the agents attempting to influence political outcomes for nefarious purposes. Second, the EUM

and SNA can illuminate a range of strategies to influence adversarial agents that may otherwise go unnoticed in their absence, or through sole reliance on subject matter expertise. Finally, these tools can assist in identifying discrepancies between political aims and those of the U.S. military objectives.

That said, the EUM and SNA are not panaceas for political or military strategic problems. For all their sophistication, the EUM and SNA will not lessen the workload analysts must endure do to understand a given problem-set. Each case study is fraught with unique challenges, not to mention deleterious consequences, for reaching wrong conclusions, and will require analysts to work through the process methodically. Nevertheless, these tools-sets potentially provide an applied means to (1) close the gap between political aims, (2) to identify practical strategic opportunities that best supports U.S. interests, and (3) to determine what realistically is achievable through employing the U.S. military.

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