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THE SECOND-ORDER IMPACT OF RELATIVE POWER ON OUTCOMES OF CRISIS

BARGAINING: A THEORY OF EXPECTED DISUTILITY AND RESOLVE

by

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ABSTRACT

THE SECOND-ORDER IMPACT OF RELATIVE POWER ON OUTCOMES OF CRISIS
BARGAINING: A THEORY OF EXPECTED DISUTILITY AND RESOLVE

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Old Dominion University, 2021
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How does structure shape behavior and outcomes in crisis bargaining? Formal bargaining models of war rely on expected utility theory to describe first-order effects, whereby the payoffs of war determine actors' "resolve" to fight as a function of costs and benefits. Value preferences of risk and future discounting are routinely treated as predefined and subjective individual attributes, outside the strategic context of bargaining or independent from expected utility. However, such treatment fails to account for context-conditional preferences sourcing from actors' expectations of relative gain or loss. Drawing on a wealth of experimental evidence from behavioral economics, but without departing from rational choice or compromising theoretical parsimony, this dissertation proposes a systematic differentiation of value preferences conditional on anticipated gain/loss, i.e., the endogenous shift in power bargaining is expected to produce. Whereas the utility of gain incentivizes a challenge to the status quo, the disutility of loss imposes reactive resolve via asymmetrical risk-acceptance and lower discounting of future payoffs. The proposed theory of reactive resolve, thus, reveals the second-order impact of structural conditions on behavior and outcomes in crisis bargaining. Short of this behavioral effect, bargaining models exhibit a tendency of automatic adjustment of benefits which fails to capture the very essence of conflict and encourages erroneous hypotheses about the role of superiority, such as the nuclear superiority hypothesis reviewed and rejected as part of this research.

The prescriptive and predictive inaccuracy of the standard rationalist approach is evident in the solution of the most fundamental bargaining problem - a credible commitment problem arising in the context of "bargaining over future bargaining power" (Fearon 1996). By formally integrating and simulating expected gain- and loss-induced preferences, this study demonstrates substantial deviations from previous results. Based on the findings, several theoretical and empirical implications are derived concerning the mechanism of crisis escalation, the relationship between the distribution of power and the likelihood of war, and the challenge to coercion. The prescribed mechanism is then empirically tested against cases of compellence and deterrence, including two of the most significant cases of nuclear crisis, using process tracing as a qualitative tool of causal inference.

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CHAPTER I

INTRODUCTION

[P]olitically speaking, it is insufficient to say that power and violence are not the same. Power and violence are opposites … Violence appears where power is in jeopardy.

—Arendt, *On Violence* (1970)

Research Context

      This dissertation is broadly concerned with the puzzle of war. It seeks to complement deductive models addressing the mechanism of bargaining and the conditions for the escalation of crises to war. More specifically, it is concerned with the impact of structural conditions on actors' utility/value preferences, i.e. the utility of potential bargaining outcomes and their discounted future value, and how that impact affects the process and outcome of bargaining in crises. As it describes state behavior induced by relative power realities at the structural level, the research is located within the neorealist International Relations (IR) paradigm.

      IR theory more broadly perceives the origins, conduct, and termination of war as part of a bargaining process (Powell 2002, 173). This image is best captured in Schelling's often-cited statement, that "conflict situations are essentially bargaining situations" (Schelling 1960). Or to rephrase Clausewitz, we could say that war is bargaining by other means.

      Formal theory on the causes of war conceptualizes conflict as a process of bargaining over the distribution of resources, whereby outcomes of bargaining are shaped by the expected costs and benefits of war. It posits that the costliness of war always provides for a bargaining range, meaning, a range of settlements that actors rationally prefer to a costly war. Problems arise when the parties are unable to locate the range due to information uncertainty (that is, private information

about the parties' values for war) or when they cannot credibly commit to maintaining a settlement within the bargaining range due to shifts in power and costs over time (Fearon 1995; Powell 2006). According to Fearon, these causes constitute the main foundations for a coherent "rationalist or neorealist theory of war," in other words, the mechanisms by which war occurs between unitary states under anarchy (383). Consequently, the settlement of crises in the rational-actor framework has entailed either resolving information uncertainties and clarifying the bargaining range or identifying factors capable of restricting or mitigating the impact of the credible commitment problem.

The use of the term *crisis vs. conflict* highlights the higher likelihood of military hostilities and a greater time pressure on actors in a conflict situation.[1] A crisis does not necessarily imply the use of force but stresses the potential for violence (Brecher and Wilkenfeld 2000). In strategic, non-cooperative bargaining contexts, where the credibility of the use of force serves as the mechanism of enforcement, situations of conflict are essentially understood as crises. The goal of deductive formal models is then to determine the range of mutually acceptable settlement outcomes or to reveal how crises escalate to war (Morgan and Wilson 1989, 1).

But how do parties arrive at bargaining outcomes more precisely?

Traditional formal models imply a certain automaticity in the mechanism or process of bargaining, in which the contestants adjust the distribution of benefits/resources in line with expected payoffs. Demands arise naturally from calculated gains of the use of force, and concessions follow automatically, in line with a rational cost-benefit analysis. Meanwhile, actors'

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[1] The definition of an international crisis, as developed by the International Crisis Behavior (ICB) project, includes both international system and individual actor perspectives. From the system perspective, a crisis is defined by the condition of changing type and/or increasing intensity of disruptive interactions, destabilizing the structure; from an individual actor perspective it is characterized by a finite time horizon for decision making in response to an existing threat to its basic values; and in both cases an international crisis involves a heightened probability of military hostilities (Brecher and Wilkenfeld 2000).

value preferences are fixed at some moderate level and imagined to be external to the conflict dynamics. Such a framework appears to equate actors' motivation or *resolve* to fight with structural advantages, pretty much justifying the victory of superior capability in all bargaining situations. Action is automatically followed by accommodation, so to say. But is this how the world works? And if not, are alternative models necessarily irrational?

The prescriptive and predictive inaccuracy of the standard rationalist approach is evident in the solution of the most fundamental form of bargaining problem - a commitment problem arising in the context of "bargaining over power" (Fearon 1996). When no barriers to information certainty exist and no exogenous shifts in power are expected, but the subject matter of dispute holds capability value (e.g. strategic territory), Fearon concludes that a gradual appeasement through sufficiently small demands and concessions of territory/resources should follow, as long as the impact of concessions on the distribution of power is continuous, even if leading to complete elimination. Powell (2006) further strengthens this conclusion by maintaining that inefficient bargaining should only occur when the size of transfers is discontinuous *and* relatively large.

This finding strikes a casual observer of international conflicts as problematic precisely from a rationality perspective. Under what circumstances can a path of gradual concessions leading to elimination be rationally preferred to even a very costly war with an uncertain outcome, when even minor territorial concessions are very difficult to extract in international conflicts without resorting to violence? Think of the line of control between India and Pakistan in Kashmir, or the line of actual control separating Aksai Chin, where every inch of territory is permanently controlled by contesting powers with occasional skirmishes in the Himalayan mountain range, despite the colossal dangers of potential escalation between nuclear states. Parties in conflict do not easily concede and settle despite evident power disparities and expected costs of war, and

international mediation often does not succeed in bringing their positions closer. Action usually generates reaction, rather than accommodation, much like the law of action and reaction in natural sciences.

In fact, asymmetrical conflicts are among some of the most enduring rivalries in the world today. The U.S. failure to submit the Taliban in Afghanistan throughout the two decades-long military effort, the long-standing Palestinian resistance against Israel, or Ukraine's resistance against Russia's hybrid intervention in eastern Ukraine evolving for the eighth year already, are only some examples of the repeated failure of the logic of concessions under power pressure. Empirical research also demonstrates that superiority does not guarantee either compellence or even deterrence, as weaker states (or non-state actors) are not uncommon initiators of conflicts against more powerful rivals (De Mesquita 1981; Jervis 1989).

When game theorists use the notion of resolve to describe the expected utility of war (i.e. anticipated gains) such terminology may seem harmless. However, as soon as high resolve of fighting is linked with risk-taking behavior or cost tolerance in situations of crisis,[2] the causal relationship between expected payoffs and risk taking becomes very problematic. Furthermore, it leads to erroneous hypotheses about the role of superiority, such as the nuclear superiority hypothesis reviewed and rejected via a detailed process-tracing methodology as part of this research.

If the calculus of expected material payoffs does not support the empirical evidence of resolve to fight against preponderant force, a likely gap in modeling lies in assumptions about actors' value preferences. Utility or value preferences such as risk-taking and future-discounting

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[2] For instance, Fearon mentions in a 1994 paper that the state with higher values for war will run a higher risk of war to attain the prize (Fearon 1994, 582).

propensity feature prominently in formal bargaining models of war, but literature treats those at the level of basic assumptions, independent from the key parameters of conflict, that is, expected payoffs or cost-benefit analyses. Despite admitting that high risk preferences and low rates of future discounting are potential sources of a narrowing bargaining range, peaceful settlement equilibria generally rely on assumptions of constant risk neutrality (or averseness) and discounting rates as ostensibly reflective of actors' rational behavior. In other words, the premise of rationality appears to incorporate fixed or pre-determined risk neutral/averse and future discounting behavior. Furthermore, because these preferences or characteristics are treated as factors exogenous to the conflict dynamics, they are represented through common values across the combatants almost universally.

Drawing on a wealth of experimental evidence from behavioral economics, this study challenges all three assumptions about value preferences: their independence from expected utility, their property as a fixed attribute, and their homogeneity across actors, by contending that:

(a) Expected gains and losses are a major source of risk and future-discounting preferences (as in *prospect theory* and the *sign effect*). Hence, utility preferences are endogenous to the bargaining process and dependent on its key parameters. Moreover, the impact of expected gains and losses is considerably more emphasized in the context of systemic-level analysis in IR, where states are not solely motivated by absolute gains, they are particularly concerned about *relative* gains and their positional nature in the system (Waltz 1979; Grieco 1988; Mearsheimer 1994);

(b) This conditionality undermines the rationale of fixed and common value preferences and imposes a rationality of varied and differentiated value preferences conditional on actors' expected payoffs. All else being equal, risk neutrality and common rates of future discounting are more characteristic in situations where the parties are not expecting to improve their position by

use of force - power parity being a potential contender. In neorealist parlance, stable conditions of this sort are not particularly conducive to war, quite the contrary, these are conditions for peace. Hence, assumptions of common value preferences are neither justified nor helpful in capturing crisis behavior, in the sense that those are not likely to be characteristic of conflict situations.

Canonical formal models derive expected utility from predefined individual preferences following utility maximization under von Neumann and Morgenstern axioms. However, the rationality of predefined and fixed utility preferences is debatable, particularly in the context of crises where actors' value preferences appear to develop in association with the risks and stakes involved. A better understanding of risk and future-discounting propensity, sourcing from behavioral economics, provides systematic and theoretically relevant ways of accounting for these variables.

Research in behavioral IR has embraced these findings, especially those described in prospect theory, but mostly from the angle of individual psychology or cognitive limitations. By contrast, in this study, I argue that a limited core of those findings resting on the idea of loss-aversion are not only consistent with rational choice, but that they are also surprisingly congruent with neorealist IR theory for which bargaining models of war are designed. This is because expected gain- and loss-induced preferences capture the socializing effect of international structure on state behavior via the assumption of relative gains concerns.

Incorporating valuable theoretical assumptions from behavioral economics, this study seeks to revise, rather than depart from a rationalist framework. It, therefore, does not represent a systematic integration of prospect theory or the sign effect into the formal context of crisis bargaining, but only adopts a different utility representation by integrating those minimum elements that are theoretically compatible with rational choice. By and large, this is the assumption

of reference-dependence in evaluating outcomes from a rationally accountable "status-quo" reference point. That is to say, actors' value preferences are conditional on their expected payoffs of war (or the corresponding settlement outcome) in turn determined by relative capabilities and costs.

Rationale and Scope of Study

The overall purpose of the dissertation is to improve the theoretical and practical understanding of behavior in international crisis bargaining. To that end it offers a mechanism of crisis bargaining which accounts for the context-conditionality of value preferences, allowing to arrive at more realistic bargaining solutions or equilibria. Utilizing the findings of prospect theory and the sign effect, this study formalizes and empirically demonstrates a fundamental causal linkage between *first-order* structural-situational conditions and *second-order* value preferences underlying the mechanism of crisis bargaining and explicating the reactive nature of resolve. In that sense, the significance of systematically incorporating gain- and loss-induced behavioral preferences is well beyond testing alternative assumptions.

First of all, the study emphasizes the necessity of the linkage for improving theoretical and empirical accuracy. Situations of conflict inherently assume anticipated gain and loss whereby the gain of one is the other's loss. Therefore, everything else being equal, there is *always* actor-level heterogeneity in risk-taking and future-discounting propensity, induced by the structural environment. The failure to account for this heterogeneity in bargaining models risks omitting a major feature of the conflict at stake or describing bargaining environments that are not particularly conflictual. The zero-sum nature of bargaining outcomes (as they are concerned with the distribution of resources) and the zero-sum perception of conflicts in general tend to prioritize concerns about relative gains and losses.

In practical terms, actors' behavioral preferences driven by anticipated gains and losses may potentially be more influential factors playing out in conflict dynamics than the precise cost-benefit calculus under uncertainty. Where perfectly optimal decisions may be hard to arrive at, expected gains or losses may always serve as a heuristic.

A crucial theoretical significance of the proposed approach is in connecting actors' behavior to the context of conflict as opposed to their individual characteristics or domestic-level constraints. We can not systematically account for individual qualities, but we can have a parsimonious theory relying on the structural-level distribution of power and benefits jointly conditioning actors' value preferences via anticipated gain/loss. That is precisely what this dissertation offers by proposing a *theory of reactive resolve*. Resolve is understood in this context as a response to the structural constraints or the expected dis-utility of loss, manifested through higher risk-taking and lower future-discounting propensities.

Finally, the revised formal model developed and simulated in this study offers a set of theoretical and empirical implications. One of them concerns the causal mechanism or process of escalation described and tested against several case studies in later chapters of the research. Other implications concern the ineffectiveness of coercion under the fear of loss, and the complex relationship between the distribution of power and the likelihood of war. The theory of reactive resolve adds theoretical and empirical value to existing research on these themes. In doing so, it remains parsimonious by adding very few assumptions well grounded in a wealth of experimental evidence, and maintains the analysis at the systemic level, within the neorealist IR paradigm.

The more immediate objective of the research is to identify the holistic impact of structural conditions of power on bargaining outcomes, including both first- and second-order effects. It sets

forth the following research question: <u>How does relative power impact bargaining outcomes under</u> <u>complete information?</u>

Why relative power? Because power is relative in general and in the setting of international conflict in particular. Potential revisions to the distribution of power and resources among the contestants immediately impact their relative standing. So expected gains and losses directly reflect the relative nature of power among the contestants. The dissertation pushes this reflection to the extreme by focusing on a formal model of bargaining where actors are contesting "future bargaining power." This focus both limits the scope of formal analysis and highlights a fundamental cause of bargaining breakdown - the problem of credible commitment sourcing from an endogenous shift of capabilities.

The scope of research is further narrowed by the assumption of complete information. In formal analyses, complete information excludes any uncertainty about the contestants' payoffs or values for war, so that lack of information concerning payoffs is not an additional source of concern.

The research question involves two sorts of analysis. The first relates to the mechanism of impact: *how* does relative power impact behavior? The second relates to the space of bargaining outcomes that theoretical assumptions map into. The dissertation hypothesizes and theorizes that relative power has a dual effect on conflict behavior: it boosts the temptation of the strong as well as the reactive resolve of the weak. Both, incentives of gain and disincentives of loss, motivate the combatants to act, potentially escalating crises to war. Yet common knowledge about reactive resolve should have a partial, endogenously neutralizing effect on demands for concession. Furthermore, the disutility of loss overweighs the utility of gain (as in loss aversion) and this effect is likely to be amplified by the zero-sum nature of conflict where relative gains concerns loom

large. Therefore, the dissertation hypothesizes that if demands for concessions are put forth, the bargaining range of mutually acceptable solutions will be much more restrictive than previously assumed.

Methodology and Chapter Outline

The dissertation builds on an extensive review of formal and empirical literature, and uses a similar mix of game-theoretic, simulation, and case-study methodologies to buttress the theoretical analysis and test the new findings. It begins with the theoretical implications of some empirical measures already identified in behavioral economics, then derives certain empirical implications from the newly constructed model, to be tested in case studies.

The emphasis is on formal methodology used in non-cooperative bargaining theory. The study employs formal methods particularly to revise Fearon's classical 1996 work "Bargaining over objects that influence future bargaining power." The new formal model is complemented by a computational simulation technique using the Statistical Analysis System (SAS) software. The simulation experiment captures the effect of varying discount factors on the likelihood of bargaining breakdown. Finally, the mechanism of bargaining and escalation is tested against specific case studies of international crises using process tracing as a tool of causal inference. This method of qualitative research is often employed in combination with formal methods to contribute leverage in causal inference via the examination of sequential processes and trajectories of change. Where sufficient insight is available, I follow Waldner's (2015) completeness standard by developing causal graphs and history maps of crises studied.

Chapter II sets stage for theory construction by a comprehensive review of cross-cutting literature on the causes of war in bargaining theory structured around the Fearon-Powell bargaining framework, the competing paradigms of expected utility theory and behavioral economics, and the

long-standing IR debate concerning the distribution of power and the likelihood of war. The review is followed by an important clarification concerning the level of analysis. Although the integration and generalization of findings from individual-level behavioral economics to international conflicts raises concerns of external validity, I emphasize compatibility with the neorealist IR context.

Chapter III begins with a discussion of approaches to the concept of resolve in formal-rationalist and behavioral theories, as an important abstraction in crisis bargaining. The theory of reactive resolve then redefines the concept as a reactive dispositional phenomenon induced by structural conditions and manifested via high risk propensity and low discounting of future payoffs. The theory thus deviates from both standard rationalist as well as behavioral approaches. The components of this approach are found not only in behavioral economics but also in IR sources, including de Mesquita's (1985) conceptualization of risk due to vulnerability, and Kertzer's formulation of "resistance to situationally induced pressures" (2017, 114). The chapter concludes with a discussion of a critical question - can reactive resolve constitute a rational explanation of war?

The formal modeling and simulation of bargaining outcomes under reactive resolve is presented in Chapter IV. I begin by describing how the behavioral parameters generally impact the bargaining space in game theoretic models, then move to integrating the new theoretical assumptions of risk attitude and future discounting into Fearon's model representing the credible commitment problem with endogenous shifts. I show that opposing risk preferences with loss aversion and especially lower rates of discounting of expected loss create significant room for bargaining breakdown. Moreover, to the extent the size of expected gains and losses is impacting actors value preferences, greater anticipated changes directly influence the likelihood of war.

These findings have important theoretical and empirical implications which are discussed in Chapter V. They suggest a particular pattern of crisis bargaining and escalation in which demands are triggered and controlled by the party anticipating gain and acting with risk aversion, whereas conflict escalation is driven by the party anticipating loss and acting under risk acceptance. An important theoretical implication concerns the relationship between the distribution of power and the likelihood of war. The model also implies a major challenge to coercion under the expectation of loss. Finally, the chapter discusses some auxiliary implications for third-party mediation of crises.

Chapter VI introduces the qualitative methodology for case studies and develops causal graphs based on the mechanism of crisis bargaining summarized in the previous chapter, against which it tests several cases of international crisis including cases of compellence and deterrence. I separate the "ideal" causal mechanism of escalation operating under anarchy from a "chain reaction" under conditions of cascading power relationships. The latter are exemplified by brief narrative evidence from the Melian Dialogue and used in the case study of the conflict in Ukraine. The challenge to deterrence is revealed in two of the most significant cases of nuclear crisis to date – the Cuban Missile Crisis and the War in Kargil.

CHAPTER II

LITERATURE REVIEW

Introduction

Theorizing about a highly context-dependent phenomenon like war is always a difficult balance between parsimony and explanatory power. The dominant rationalist, neorealist IR paradigm has emphasized international anarchy and relative power determinants of international conflict (Waltz 1979), necessitating further clarification on the specific mechanisms of causation. The bargaining theory of war, to a large extent, is concerned with this puzzle. And although there has been a growing dissatisfaction with how structural models explain variations in outcomes, and literature on the causes of war has somewhat shifted away from the systemic to the state-societal levels of analyses (Levy 1998), this review identifies potential for some revision in the rationalist bargaining model of war, by linking structural determinants with actors' behavioral preferences in situations of crises.

This chapter provides an overview of primarily formal but also empirical literature on the causes of war, exploring the conditions allowing for its outbreak and termination in the context of bargaining (potentially with third-party mediation), and the likelihood of war conditional on the distribution of power.

The review is structured around the Fearon-Powell framework. It focuses on the problem of credible commitment as the most fundamental source of conflict and highlights, particularly, the type of commitment problem where power is the object of dispute. This case magnifies the dynamics of the power relationship, relative gains concerns, and allows to directly explore the implications of expected gains and losses on actors' behavior. I then discuss a body of literature at

the intersection of rationality and cognitive psychology and argue for its relevance for structural-level analyses.

The Causes of War in Bargaining Theory

Literature on the causes of war generally takes one of the following three directions: the first identifies the fundamental logical conditions that make war possible; the second attempts to compare and explain variations of occurrence from one context or time frame to another; and the third investigates the causes of specific wars (in accordance with Levy's (1998) description of the different meanings of the broader question of the causes of war). Formal theory on the causes of war is very much concerned with the first direction, i.e. identifying the logically necessary or permissive conditions for war. Alternatively, we may say, it is concerned with the necessary conditions of peaceful settlement, as the two conditions mirror one another. To understand the causes of war, one must look at the causes of peace, Blainey (1988) contends. Therefore, understanding what makes settlements possible or what terminates war provides some clues as to what the sources of conflict might have been in the first place. In that sense, game theoretic models of crisis bargaining discussed below address the causes of war and peace.

Bargaining theory models the essence of conflict as a "disagreement over resource allocation and/or policy choice" (Reiter 2003, 28). In simple rational terms, the parties to a conflict or a bargaining contest aim at maximizing their own share of the potential bargain by persuading the opponent to concede – whether through diplomacy or the use of force. War is a costly and risky strategy producing inefficient bargaining outcomes, yet the sides can fail to reach a settlement which they both prefer to war. The central puzzle of war is to explain why this takes place - a puzzle clearly set by Fearon and answered rather comprehensively in his foundational 1995 article "Rationalist Explanations for War."

Information Uncertainty, Credible Commitment, Domestic Constraints

Inefficient bargaining outcomes may certainly result from irrational decisions, psychological and cognitive sources of misperception and bounded rationality (Jervis 1976, 1988; Levy 1983, 2013; Stein 1985). As early as 1973, Blainey argued that states are unlikely to fight a war against one another if they agree on their relative power. "The start of war is – almost by the definition of war itself – marked by conflicting expectations of what that war will be like," he maintained (Blainey 1988, 56). Such differences of assessment may result from both irrational psychological factors as well as information uncertainty or information asymmetry. An expected utility framework developed by Bruce Bueno de Mesquita, suggested that wars could also be initiated, even if entailing losses, when the expected utility of the conflict exceeded that of the status quo, i.e. "when the value of the status quo is sufficiently un-attractive to offset the losses from war" (De Mesquita 1985, 163). The Fearon-Powell framework builds on these rational causes, demonstrating that war can become a rational choice when the anticipated benefits exceed the costs of war.

More specifically, Fearon classifies rationalist explanations for war into problems of information uncertainty or problems of credible commitment.[3] In the first case, the parties are unable to locate the bargaining range due to private information and incentives to misrepresent their private information; in the second case, they cannot credibly commit to maintaining a settlement within an existing bargaining range due to shifts in power and costs over time (Fearon 1995, 1996; Powell 2006). Fearon defines these sources as constituting the foundations for a

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[3] In the seminal 1995 paper, Fearon also identifies the "indivisibility" of issues under negotiation or "irreducible" interests as a third category of bargaining inefficiency. However, Powell (2006) argues that bargaining indivisibilities do not provide a "distinct solution to the inefficiency puzzle and should really be seen as commitment problems" (170). Alternatively, indivisibility may be linked with sub-systemic, domestic constraints to bargaining efficiency. Fearon himself hints on the causes of indivisibility rooted in either "domestic political mechanisms" or the problem of credible commitment under anarchy.

coherent "rationalist or neorealist theory of war" - the mechanisms by which war occurs between unitary actors under anarchy (383).

A host of other domestic/societal and individual-level constraints may operate below the international system level, impacting decision-making. Most prominent among domestic constraints analyzed via formal models are theories of political audience costs in relation to making credible commitments and signaling resolve (Fearon 1994, 1997; Smith 1998), locking in reputational stakes or using coercive bargaining leverage (Fearon 1994; Tarar and Leventoğlu 2009). There is research looking at the conditionality or assumptions of audience costs such as size requirements or sufficiency (Slantchev 2005; Trager and Vavreck 2011; Snyder and Borghard 2011; Tarar and Leventoğlu 2012). Other sub-systemic factors include the shifts in the domestic power distribution or the inability to follow-through an agreement (Powell 2006), institutional divergence and leader incentives (Krainin 2013, 2017). All of these constraints potentially contributing to bargaining inefficiency, and often interacting with problems of information uncertainty or commitment, are outside the purely unitary actor assumption at the structural level.

For simplicity, formal theorists have conventionally modeled war as a costly lottery with an outcome of complete victory or defeat, thus equating the outbreak of war with bargaining failure or breakdown. Nevertheless, the bargaining process does not usually stop with the outbreak of war. Moreover, hostilities often facilitate settlement. Empirical literature provides abundant evidence linking the success of negotiations as well as the success of third-party mediation efforts to the intensity or the "ripeness" of conflict (Zartman 1985, 2000; Greig and Diehl 2006). Well preceding this literature, Henry Kissinger had articulated in a 1974 interview with the New York Times that the condition of stalemate was "the most propitious condition for settlement" (Reston Oct.12, 1974). According to the thesis on ripeness, developed later by Touval (1982) and Zartman (1985,

2000), when the conflict escalates but victory remains elusive, the parties find themselves in a "mutually hurting stalemate" whereby both are increasingly unable to bear the heavy costs of the conflict, even if unwilling to back down from their claims. It is particularly this costly deadlock that creates room for the feasibility of settlement.

A valid question to raise here is - which source of negotiation failure does fighting resolve? Irrational choices, information uncertainty, and commitment problems are all potential candidates.

Such an outcome could be interpreted as a confirmation of the type of "contradictory optimism" about the likely duration and outcome of war that Blainey had in mind when explaining the outbreak of war. In other words, had the parties accurately estimated the costs of war, they might have been able to reach a settlement without resorting to military force. Biases and misperceptions leading to overestimating own chances and/or underestimating the adversary, their intentions and capabilities, all play a large role in decisions of war (Jervis 1988).

Challenges to accurate estimation may also exist in the rational domain. From a rationalist perspective, a situation of a mutually hurting stalemate would likely indicate inefficient pre-war bargaining due to incomplete or asymmetric information. As Fearon describes, "rational leaders may be unable to locate a mutually preferable negotiated settlement due to private information about relative capabilities or resolve and incentives to misrepresent such information" (Fearon 1995, 381). The incentive to misrepresent private information is of utmost importance here, as it does not allow the parties to accurately estimate adversary's capabilities and/or resolve to fight. As Fearon describes, "this is not simply a matter of miscalculation due to poor information but rather of specific strategic dynamics..." (ibid).

When the settlement process is obstructed due to private information or the parties to the conflict disagree about their relative strength due to misperception, war may serve as a tool to

reveal hidden information or test mutual perceptions. A number of rationalist models explicitly treating war as part of the bargaining process rather than its end, have formally characterized how progress in the battlefield informs the negotiation process and the settlements to be reached. In 1979, Wittman had demonstrated that hostilities were conducive to settlement, and argued that war should be expected to continue until both sides concluded they were better off to agree on a deal. Wagner (2000) reinstated the possibility of negotiated settlements as a result of war rather than in contradistinction to it.

Slantchev (2003) explicitly described war as "coercive bargaining" - a policy instrument used to convince the opponent to settle by transmitting information about the prospects of war. War allows the parties to converge on their expectations of war, he says, and "once expectations converge sufficiently, war loses its information content" allowing for it to cease (621). In the same vein, Powell (2004) has modeled bargaining and learning while fighting, Smith and Stam (2004) have relaxed the common-priors assumption. All of these models follow Blainey's footsteps to seek the answers to the causes of war in their termination.

A branch of formal literature modeling mediation, as a process of conflict management, interjects a mediator into the crisis bargaining context to address asymmetric information or barriers to private information and expand the bargaining space (for instance, in Smith and Stam (2003), Kydd (2003, 2010), Rauchhaus (2006)). However, questions arise concerning the source of private information available to the third party invited to mediate a crisis. A mediator's ability to both acquire/reveal and transfer private information from one side to another has been formally dismissed as 'cheap talk' (Fey and Ramsay 2010; Kydd 2003). The credible transfer of externally-sourced private information raises questions about mediator's bias and acceptability - although sometimes effective in terms of performing a function of trusted external verification.

Mechanism design is another formal modeling approach attempting to overcome some of the limitations in addressing asymmetric information by dis-incentivizing the misrepresentation of private information (see, for instance, Hörner, Morelli, and Squintani 2015). It may be argued, however, that the high level of mathematical abstraction used in mechanism design is somewhat disconnecting from real strategic contexts, undermining its practical relevance in terms of real-life mediation opportunities.

Yet, even complete information and accurate estimation of war values do not guarantee a peaceful settlement when more fundamental commitment problems are at work. Despite significant attention in bargaining and mediation literature dedicated to the problem of private information, information uncertainty alone hardly qualifies as a chief candidate for explaining war. Fearon cites A. J. P. Taylor's account of the diplomatic history of Europe between the 19th to early 20th centuries, concluding that "every war between the Great Powers started as a preventive war" (Taylor 1954, 166 cited in Fearon 1995). He adds to that E. H. Carr's similar view that wars are fought most often to prevent the adversary from becoming stronger (Carr 1964). More recent literature confirms this stance. Information uncertainty is recognized as a particularly poor explanation of prolonged conflicts, the early phases of which would be expected to have resolved any information asymmetries (Slantchev 2003; Fearon 2004; Powell 2006). It has also been pointed out that information about relative capability or the likelihood of victory among states is rarely perfect, yet international crises do not pervasively escalate into war (Leventoğlu and Slantchev 2007). Finally, the dynamics characterized in purely asymmetric information models were empirically shown to exist only when the commitment problem was absent, and vice versa (Wolford, Reiter, and Carrubba 2011).

The potential for a commitment problem, which is at the core of this study, requires additional elaboration and analysis.

Three Types of the Credible Commitment Problem

The problem of credible commitment is generated by incentives to renege on potential settlement options. Also described as the "time inconsistency problem," it points to the actors' changing payoffs of war due to anticipated changes in the distribution of relative capabilities and costs over time (Beardsley 2008). When a disputant is anticipating a power shift in its favor tomorrow, pledging commitment to the settlement today is not credible to the opponent. Lack of external enforcement, as in the international context, allows the parties to cheat despite earlier settlements. The inability to credibly commit "makes it impossible for states to strike deals that would avoid the costs of war" even under complete information (Fearon 1995, 381).

Three classical types or mechanisms of the credible commitment problem (CCP) were identified by Fearon (1995, 1996), conditional on the source of anticipated power shift: (1) the first type relates to anticipated exogenous shifts in the balance of power that precipitates preventive war; (2) the second relates to offensive or first-strike advantages producing preemptive war; and (3) the third attributes the source of the shift in power to the very object of the dispute. All three types of CCP were demonstrated by Powell (2006) to be operating via the same mechanism. In each case, large and rapid shifts of power were producing bargaining inefficiency through the inability to commit. More specifically, "when the per-period shift in the distribution of power [was] larger than the bargaining surplus" (Powell 2006, 183).

In a later article, Powell shows additionally that unlike large and rapid shifts, when the distribution of power is relatively stable, or shifting slowly, competing factions are able to settle or cut deals (Powell 2012). Krainin (2017), however, broadens the scope of potential conflict by

contesting the "rapid" shift requirement for preventive war. As long as the size of shift in the distribution of power meets Powell's bargaining inefficiency condition, he argues, the shift can occur over time in a relatively slow but persistent fashion. In fact, such an accumulating power shift may cause war "only after some delay" (Krainin, 2017, 103). Under this multi-period war-sufficiency condition, Krainin's model also allows for much smaller per-period shifts in power with more natural and empirically plausible differential rates of growth.

Some restricting conditions or mitigating circumstances of the commitment problem have also been analyzed in literature. For instance, Bas & Schub (2017) emphasize the centrality of estimating future balances of power by states and numerous uncertainties involved in that continuous estimation process, concluding that war, as a commitment problem, is overpredicted. Aside from uncertainties involved in the assessment of shifting power or strategic neutralization effects, and perhaps more fundamental to the logic of bargaining theory, questions were raised with regard to the possibility of endogenizing the credible commitment problem, i.e. bringing the problem of shifting power into the bargaining process. If exogenous shifts in relative power are causing a commitment problem, why can't bargaining address the determinants of shifting power specifically? Studying this problem, Chadefaux (2011) develops a complete information model showing that the rising power can credibly commit to a settlement by giving up capabilities in present time. He concludes that "shifts in power never lead to war when countries can negotiate over the determinants of their own power. If war occurs, then, it must be that negotiations over power are impossible or too costly" (Chadefaux 2011, 228). He invokes previous empirical evidence (particularly on civil wars) of transfers of power or power-sharing arrangements between competing actors as a mechanism of commitment, including research by North and Weingast (1989), Acemoglu and Robinson (2000), Walter (2002).

Arguably the most significant mitigating condition, relevant for the international anarchic environment, was provided by Debs and Monteiro (2014). The authors argue that most large and rapid shifts in the balance of power are inherently endogenous to state interaction due to the process of militarization. In particular, they question the literal mapping from growth rates or resources into military power, emphasizing subsequent decisions to invest in military capability and, notably, the time lag between investment decisions and the availability of necessary capabilities to fight. Focusing on militarization brings back questions of transparency and information uncertainty, but now in the context of the credible commitment problem. Debs and Monteiro conclude that shifts in power (in the sense of militarization) can be deterred by the threat of preventive war when there is certainty about investment decisions, as opposed to situations where militarization efforts go undetected, carrying a threat of a fait accompli. Spaniel (2015) further conditions militarization on the changing credibility of preventive war producing a commitment problem of its own.

The Fearon-Powell mechanism does not specify how war resolves the strategic problem of commitment, although it states that the weakening power tries to "lock in" a share of the flow at a time most beneficial for carrying out the attack. It may also be interpreted as undercutting the adversary's anticipated growth advantage and thereby neutralizing the source of the commitment problem. In their punctuated equilibrium model of war, Leventoglu and Slantchev (2007) address this particular issue with a more detailed description for inefficient fighting, in which war proceeds as a sequence of battles allowing the parties to terminate at discrete windows of opportunity. The costs of conflict escalate as the fighting goes on, potentially leaving "both players worse off at the time peace is negotiated than a full concession would have before the war began" (Leventoglu and Slantchev 2007, 755).

Opportunities for third-party mediators to manage the credible commitment problem by either extracting concessions or enforcing agreements, are generally limited. According to empirical data analysis by Beardsely and Lo (2013), mediation only helps extract minor "challenger concessions" facing problems of political cover at home, not "defender concessions" facing the primary hurdle of commitment. Mediators may also attempt to address the commitment problem by leveraging costs or at least promising to monitor and enforce a particular deal (Touval and Zartman 1985; Bercovitch 1997). Both of these mechanisms are qualitatively different from the literal meaning of the concept, in one case implying "mediation with muscle" (offering carrots and sticks, manipulating the opportunity costs of the conflict), in the second case implying a costly long-term engagement which may not be credible to the parties of the conflict.

More importantly, these mechanisms tend to induce artificial settlement outcomes that are short-lived in the absence of continued influence. Werner and Yuen (2005), Beardsley (2006, 2008) provide some empirical evidence in this regard. Hence, the mediation dilemma discussed by Beardsley (2006, 2011): leveraging costs can manage the conflict in the short term, preventing the imminent breakout of hostilities, but contributes to instability (and even exacerbating instability) in the longer term.

When Power is the Object of Dispute

It has been noted that bargaining theory sees the essence of conflict in disagreement over the allocation of benefits, a "pie" which the two sides have to share - often territory or resources to which both parties lay claims or a policy matter concerning which they have opposing interests. Take note, however, that even though the dispute concerning this pie is normally perceived outside of power considerations, settlement solutions or equilibria in bargaining models always reflect the balance of power and costs. This becomes much more noticeable under perfect information, when

the single remaining source of conflict is the problem of credible commitment due to the shifting power distribution. Again, the approach in general is to present the shifting balance of power (BoP) as an obstacle to concluding an acceptable agreement over the "more substantive" issue of dispute - a particular object to be shared. But since the only problem standing in the way of settlement is the shifting power itself, the "substantive" object of dispute (or at least its importance) appears to dissipate, at least in formal modeling. This observation raises a question on whether conflict, in the context of CCP, is about relative power alone?

It helps to distinguish three theoretically possible situations:

1. when the object of dispute is perceived to be distinct from the problem of shifting balance of power but, unfortunately, the latter creates a commitment problem;

2. when the object of dispute is the source of the shift in power large enough to create a CCP;

3. when both elements are present, i.e. an exogenous shift in the BoP interferes with a solution to a dispute which in turn may exacerbate the power shift.

The most broadly discussed situation in bargaining literature is the first. Fearon discusses preventive and preemptive wars as generated by CCP in a way that views the power problem distinct from the primary object of the dispute. In this context, the models offered by Chadefaux (2011), Debs and Monteiro (2014), and others looking at how the commitment problem may be mitigated are particularly interesting. What bargaining solutions produce, ultimately, is not merely a distribution of a pie, but the fundamental BoP at the following stage that should sustain it. Chadefaux offers to bring in the shifting BoP as a second object of bargaining and allow the parties to share their power along with the redistribution of the pie. Theoretically plausible, the practical realization of such a scenario among two adversaries appears unlikely. Debs and Monteiro capitalize on the required militarization time-lag arguing that the shadow of preventive war is

sufficient to deter large and rapid shifts in power. However, we know from Krainin (2017) that shifts occurring more slowly over time may still constitute a commitment problem. The increasing gap over time is still very likely to jeopardize a settlement at some point in the future producing a CCP today.

The second situation is of particular interest. Fearon (1996) discusses this as the third type of the commitment problem, when states bargain over objects that are sources of capability and influence future bargaining power. The model discussed by Fearon assumes no exogenous shifts in the distribution of power, that is, the source of change in the military balance and changing odds of winning are determined entirely by the settlement outcome in the previous period (e.g. transfer of territory). Note that in this case the outcome of bargaining is identical with power redistribution, so the solution is solely in the realm of redistribution of power, if one is available. This situation allows us to directly concentrate on the power value of the object of dispute, which is theoretically no different than two parties contesting or fighting over relative power. In fact, here, Fearon assumes that states bargain over the disposition of all territory controlled by both, which makes it difficult to locate a particular object of dispute other than absolute power and control.

A third possibility is when both elements are present. If, in the first case, the anticipated shift in the BoP prevents a bargain (or feeds a dispute) and, in the second case, the disputed object produces a power shift, when both elements are present, a shifting BoP highlights a disputed object which in turn may exacerbate the power shift. This case is important for several reasons. (A) Both the anticipated exogenous shift due to differential growth rates and the potential endogenous shift resulting from the transfer of the object need not be very large individually. It is their combined effect that needs to meet the bargaining inefficiency condition. (B) When the security dilemma is heightened, minor concessions may become significant, especially when strategic territory is

concerned. In other words, exogenous shifts in power are likely to highlight any potential endogenous sources of power accumulation, exacerbating conflict. (C) Transfers of strategic territory or natural resources almost certainly carry at least some capability value. Therefore, all such transfers, considered under Situation 1, should in fact be considered as situations with dual/combined impact. Powel (1996b) discusses a situation of this kind in his appeasement model.

Among these three situations, the second possibility manifests the relative power dynamic the best, as this is a case when the object of dispute and its outcome entirely coincide with the power distribution. Whereas formal literature is overwhelmingly concerned with situations of the first type, this study focuses particularly on the "bargaining over power" dynamic (ibid. 16) as a primary source of conflict and zeroes in on the mechanism of conflict when solely relative power is at stake.

In particular, Fearon's 1996 formal solution attributes the success of bargaining to the continuity of function $p(x)$ – where the probability of winning (p) is a function of the territory/resources (x) held or transferred. He arrives at a fascinating conclusion that bargaining is efficient as long as $p(x)$ is continuous, and such continuity allows for the gradual adjustment of military odds through sufficiently small demands and transfers of territory/resources, i.e. gradual appeasement or "salami tactics." When offense dominates (i.e. small changes or transfers imply a large shift in power) the initially weaker state is nearly or completely eliminated over time; and when defense dominates (i.e. the likelihood of winning is less sensitive to territorial changes), concessions lead to a "stable division, or rough 'balance of power'" (Fearon 1996, 1). Thus, war occurs only when $p(x)$ is discontinuous and the impact of concessions on the distribution of power jumps - in other words, when small changes in territory produce large shifts in the relative power distribution or when the territory/resource is not infinitely divisible (Fearon 1996). Powell (2006)

further contends that not "any size" of such discontinuous jump can lead to war, but only a relatively large one.

Such a solution may strike a casual observer of international conflicts as problematic from a rationality perspective. If continuous voluntary concessions by a weaker power (even in negligible amounts) were projected to lead to a complete elimination over time, how could such a path of concessions be viewed as rationally preferred to even a very costly war with an uncertain outcome? Obviously, the answer is in actors' value preferences – either their valuations of future outcomes vs. outcomes today, or in their preferences of risk-taking, or both. A potential gap then lies in the rationality of assumptions about value preferences of the parties to the conflict.

How rationality is conceived in bargaining models of war and what value preferences, if any, can be considered "rational," is to be discussed next.

Two Competing Paradigms: Rational Choice and Expected Utility Theory vs. Behavioral Economics and Behavioral IR

The founder of the school of neorealism, Kenneth Waltz, himself, admitted he didn't like the assumption of rationality, as dominant powers from Napoleonic France to Imperial Germany, Japan, and Nazi Germany, had demonstrated non-strategic, irrational behavior, which is precisely why they were "punished" by the system (Mearsheimer 2009). Such a discrepancy between normative theory vs. empirical evidence is the subject of debate in behavioral IR, closely following suit with the findings of behavioral economics.

Canonical formal models of war are grounded on expected utility theory which anticipates, or at least prescribes in a *normative* way, that rational decision makers would (or should) choose actions with the highest expected utility when facing uncertainty concerning the outcomes of their actions (Von Neumann and Morgenstern 1947). Actors' utility functions are derived from

individual preferences if those preferences satisfy basic axiomatic assumptions such as transitivity, completeness, continuity, and independence of irrelevant alternatives, as well as related assumptions of dominance and invariance of the preferences regardless of their presentation method or order. To maximize expected utility, actors weigh the utilities of potential outcomes by the likelihood of their occurrence and choose the strategy that provides the highest combined utility. Rationality, from the von Neumann-Morgenstern perspective, is thus modeled as maximizing expected utility which, in turn, is derived from well-defined individual preferences.

Empirical evidence of actual human behavior under uncertainty has shown systematic violations of the basic axioms and the expectations of expected utility theory. In contrast to the classical rationalist approach, behavioral economics has highlighted the psychological effects, cognitive biases, and socio-cultural determinants affecting decision-making processes and has significantly undermined the *descriptive* or *predictive* power of expected utility theory, although it has not *prescribed* how decisions *should* be made.

The sources of the behavioral revolution can be traced to Herbert Simon's early work on "bounded rationality."[4] But most often it is identified with prospect theory as developed by Daniel Kahneman and Amos Tversky and demonstrated in a variety of controlled experiments (Kahneman and Tversky 1979, 1982, 1984; Tversky and Kahneman 1992). A core tenant of prospect theory is reference dependence. It posits that "carriers of value are changes in wealth or welfare, rather than final states" or "absolute magnitudes," therefore outcomes are evaluated relative to some reference point such as the status quo (1979, p.277).

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[4] Simon (1957) introduced the concept of bounded rationality in the *Models of Man: Social and Rational*, to describe limits to human capacity for calculation, the nature of human actions as partly rational and partly irrational, and replaced the perfect optimizer by a more realistic human rationality that seeks "good enough" results.

Kahneman and Tversky also observe that the preference order is reversed between the domains of losses and gains, implying risk aversion in the positive domain and risk-seeking in the negative domain (*reflection effect*).[5] Furthermore, they show that "the value function for losses is steeper than the value function for gains" (279). Such over-weighing of losses versus gains, also labeled as "loss aversion," corroborates with the so called "endowment effect" used by Thaler to describe the over-valuation of current possessions (Thaler 1980), and has been directly linked to the "status quo bias" i.e. the frequent adherence of decision-makers to status quo options as opposed to what the standard expected utility model would predict (Samuelson and Zeckhauser 1988). Other inconsistencies reported by Kahneman and Tversky include the underweighting of uncertain outcomes (*the certainty effect*) or the discarding of common components in all prospects (*the isolation effect*) contributing to unstable preferences, etc.

Experimental evidence of anomalies in decision-making related to framing and endowment effects, under- and over-weighing of probabilities, the impact of social preferences, etc. has grown since the publication of prospect theory. Following suit, the relatively novel subfield of Political Science and International Relations, *Behavioral IR*, has analyzed the biases and anomalies of the traditional rationalist models in foreign policy behavior, such as the leaders' susceptibility to framing effects, the effect of emotions and political loss aversion, the bias of "wishful thinking" etc. (Levy 1997, 2003; Mintz 2004; Geva and Skorick 2006; Nincic 1997), although Jervis, Janis, Lebow and Stein are considered to be the forerunners of behavioral IR from early 1970s to 1980s. Political scientists have directly applied prospect theory to explain foreign policy choices of state leaders facing international crises. For instance, McDermott (1992, 2001) analyzed Carter's costly gamble in the Iranian hostage crisis, Farnham (1992) discussed Roosevelt's decision-making in

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[5] The labeling of the term is related to the reflection of prospects around zero.

the Munich crisis, Richardson (1992) provided evidence from British action during the Suez crisis, etc. Historian and economist Roger Ransom (2018) has analyzed the history of World War I as series of risky gambles aimed at avoiding loss or defeat in war.

Berejikian and Early generally theorize U.S. policy makers as "more resolute in pursuing preventive policies that seek to avoid losses than ... in pursuing promotive policies that seek to acquire new gains" (Berejikian and Early 2013). In an earlier study, Berejikian also discusses prospect theory's relevance for deterrence and asymmetric conflict: "To the extent that deterrent threats contribute to a losses frame, they can produce the very aggression they are intended to deter. A crucial component to a successful deterrent policy is, therefore, to avoid pitching opponents into a losses frame. … Furthermore, some have argued that dissatisfaction with the status quo offsets "perceptions of insufficient capability," thus leading to aggression even in the case where smaller states face more powerful rivals (Zinnes et al. 1961, p. 470)" (Berejikian 2002, 769).

Research on rent-seeking contests has come up with results similar to prospect theory in demonstrating "power-induced" risk behavior. According to Teng (2013), in asymmetric distributions of power the contest "instills" a risk-taking preference in the weaker contestant and a risk-averse preference in the stronger contestant (ibid, 441). The effect of rent-seeking contests on risk preference is further amplified by the "mass factor" which highlights the disparity in power between the sides (Teng 2013).

Prospect theory is only part of the behavioral revolution in economics that involves other spheres of human choice. Another sphere of preferences crucial for bargaining models, relates to the pattern of discounting future outcomes vs. outcomes today. Experimental research in behavioral economics has emphasized different processes involved in discounting positive and

negative outcomes, very similar to the expectations of prospect theory (Frederick, Loewenstein, and O'Donoghue 2002). A more detailed discussion of both risk and time discounting propensities follows in Chapter III. For now, I would like to focus on the rationality-irrationality debate.

Due to the focus of Behavioral IR on the "cognitive limitations" and the psychological "biases and errors" in decision making, this subfield has clearly differentiated the rational choice paradigm from nonrational choice (Mintz 2007, 158). It is important to note, however, the tension between rationalist vs. non-rationalist approaches does not necessarily surface when integrating certain non-standard behavioral assumptions within rational choice models. In fact, some of the key propositions in behavioral economics have been subsumed within rational choice models with updated assumptions about preferences (Levy 1997, Berejikian 2002, Butler 2007, Powell 2017). Powell (2017) emphasizes this point on the lack of tension when incorporating the relative gains concern into a bargaining model as an example of a "quasi-behavioral approach." The key question he raises relates to the nature or properties of these behavioral expectations - whether those are pre-defined at the individual level or induced by the structure in the process of interaction. "Would it be more useful to assume nonstandard preferences, that is, a concern for relative gains, was impeding cooperation? Or would it be more useful to assume standard preferences and then strive to understand how structural features like the intensity of the security dilemma could induce these concerns?" he asks (ibid. 271).

Inducement, we could say, represents the re-evaluation of utility given a certain prospect – still very much within the realm of rationality, despite its characterization as a non-standard, behavioral feature. Loss aversion, in this sense, is not inconsistent with the presumption of rational choice which broadly seeks to maximize utility. Rather, it violates the premises of expected utility maximization under von Neumann and Morgenstern (VNM) axioms, which specify certain

demands and derive utility from a predefined ordering of preferences. But why do we perceive rationality in terms of predefined preferences in the first place?

The question touches upon a fundamental problem in the rationalist paradigm: the causality between preferences and utility. In her book on risk taking in IR, Rose McDermott (2001) provides an elucidating historical background to prospect theory, where she compares the expected utility theory to the utility function proposed by Daniel Bernoulli two centuries earlier. Already in the 18th c., Bernoulli had demonstrated via the St.Petersburg paradox that the utility (or subjective value) of a payoff was different from its expected absolute value; it was shaped by additional factors such as the probability of winning; and it was precisely this subjective utility that people tried to maximize instead of the absolute expected payoff. This is why their utility function was found to be concave (diminishing marginal utility) as opposed to a linear function of wealth. McDermott clarifies:

> "*To the extent that Bernoulli assumed that people are typically risk averse, he explained this behavior in terms of people's attitudes toward the value of the payoff, rather than in terms of the phenomenon of risk-taking behavior itself. People's attitudes toward risk were posited as a by-product of their attitude toward value. Two centuries later, von Neumann and Morgenstern revolutionized Bernoulli's expected utility theory by advancing the notion of "revealed preferences." In developing an axiomatic theory of utility, von Neumann and Morgenstern turned Bernoulli's suppositions upside down and used preferences to derive utility. In the von Neumann and Morgenstern model, utility describes preferences...*"
> (McDermott 2001, 16-17)

McDermott's observation that the logic of Bernoulli's decision model was reversed by von Neumann and Morgenstern, is of utmost importance. The predictive inaccuracy of rational choice grounded on expected utility theory is in part stemming from the condition of pre-defined preferences satisfying a set of axioms. As it turns out, however, this is not (and it has not been) the only approach. Utility theory has previously derived risk preferences from utility, until this

approach was reversed to derive utility from preferences. But what are the grounds to claim that the standard VNM approach is more "rational" than the assumption of preferences derived from utility?

Insofar as the status quo is perceived to be the reference point, conditioning actors' preferences with their expected utility constitutes an objective reflection of the state of affairs (i.e. expected gain or loss), rather than a psychological bias. A pattern of risk propensity derived from this expectation is not any less rational than the presumption of pre-defined and fixed subjective preferences. Prospect theory, at least, provides us with a good analytical framework to understand risk propensity. By contrast, standard rationalist models apparently assume that allowing for a more general approach to risk preferences covers the full spectrum of behavior. This would be true if those preferences were treated as predefined and fixed individual attributes, rather than derived from expected utility as part of the game. Whereas the latter imposes a particular pattern of preferences that is inconsistent with VNM rationality.

A great deal of the literature at the intersection of rationality and psychology is interpreting the behavioral revolution as a way of discovering the psychological sources of rational choice and integrating the new behavioral expectations into formal models as psychological insights (Kertzer and Tingley 2018; McDermott 2001, 2004). However, it is important to recognize that part of these new insights (as described above) are entirely compatible with rationality and rational choice as a general framework for maximizing utility. And so in those particular cases, a strict meta-theoretical separation of rationalist vs. nonrationalist paradigms is misleading. Loss aversion belongs in this category - although outside standard VNM rationality, it is still very much a rational approach, which makes it so easy to be incorporated into rationalist models. In this context, Jack Levy has argued that while prospect theory hypotheses regarding the reflection effect and loss aversion are

easily subsumed within expected utility theory or rational choice models via an S-shaped utility function, "evidence of framing effects and nonlinear responses to probabilities are more problematic for the theory." (Levy 1997, 87).

The above discussion does not in any way dismiss the existence of psychological biases, subjective valuations, emotional or irrational factors interfering with rational decision making. In fact, a number of processes identified by Kahneman and Tversky, including the subjective *framing effect* with potential past or future-aspired reference points, the *isolation effect* involving a tendency to discard the common components among various alternatives, or the under- and over-weighing of probabilities, can hardly be categorized in the realm of rationality. Rather, it emphasizes that the underlying of risk preferences on expected utility from a current position reference point is not a matter of subjective framing, a cognitive limitation, or a psychological bias. It is merely another way of conceiving risk attitude based on objective expectations under uncertainty - one that is very much in line with the structural approach in IR maintaining that state behavior is induced by anarchy or the structure of the system.

A key proposition of Neorealism relates to the socializing effect of international structure on state behavior (Waltz 1979). Although this proposition relates to balancing behavior given the distribution of power in the system, the assumption of behavioral attribution is congruent with that identified through prospect theory, in the sense that it shifts the source of behavior from innate individual attributes (as in Classical Realism) to external structural circumstances such as the distribution of power. Moreover, the external circumstances are nearly identical in the case of international conflict bargaining, as both relate to the distribution of capabilities driving expectations of gain and loss. Neorealism argues that states are positional in nature and that relative

gains are a core concern, narrowing opportunities of international cooperation especially in the security realm (Waltz 1979, Grieco 1988, Mearsheimer 1994).

Curiously, conceptualizations of conditionality of preferences can be found from within rationalist IR models, using the language of security and vulnerability. For instance, de Mesquita's earlier revision of the expected utility model literally describes that "i's risk acceptance increases as i's security score approaches its level of greatest vulnerability, and that i's risk aversion increases as its security approaches the level possessed by its safest policy portfolio" (de Mesquita 1985, 157).

The Distribution of Power and War

Closely related to rationalist explanations of war is a long-standing debate in International relations theory concerning the relationship between the distribution of power and the likelihood of war. The subject of the debate is whether balances or imbalances of power are more peaceful.

On one side of the debate are the representatives of the *balance-of-power school*, (Claude 1962; Morgenthau 1967; Waltz 1979; Mearsheimer 1990), who have argued that lower concentrations and balances of power are more conducive to deterrence and stability as opposed to movements toward hegemony that destabilize the system by triggering counter coalitions and hegemonic wars (Levy 1998). On the other side of the debate are the representatives of power transition theory or the *preponderance-of-power school* (Organski and Kugler 1980; Gilpin 1981), arguing that peace is better served under power preponderance since hegemons usually establish an institutional order that stabilizes the system and deter potential challengers more successfully. Hegemonic war occurs at transitional junctures when either a rising challenger initiates war to claim its share of benefits in the system, or the weakening hegemon initiates preventive war to thwart an opponent's rise.

Empirical research on the topic has led to contrasting findings. Some statistical analyses have yielded support in favor of relative equilibria (Siverson and Tennefoss 1984) while others in favor of power preponderance (Kim 1992; Moul 2003); some have suggested a complete lack of statistically significant correlations between relative power and the likelihood of war (de Mesquita and Lalman 1992); others indicated conditionality on time or other parameters (Mansfield 1992; Singer, Bremer, and Stuckey 1972) (Powell 1996).

Formal models of bargaining have largely presented the distribution of power as unrelated to the probability of war, with an underlying assumption that actors are risk neutral. In particular Wittman has argued that "increasing the probability of winning may not increase the probability of a settlement" (Wittman 1979, 743). There are references to Fearon's unpublished work in 1992 and 1993, indicating an adjustment of bargaining demands in accordance to power capability, but otherwise maintaining that the likelihood of bargaining failure is independent of the power distribution (Powell 1996; Kydd 2010).

An important nuance resurfaces with Powell's (1996) model of an infinite horizon bargaining game where the distribution of power plays out in relation to the distribution of benefits (the status quo). Here, the actors' payoffs of war are still determined by relative capability and costs, but the outcome of bargaining is a function of the disparity between the distribution of power and benefits - essentially, a function of satisfaction. The concept was already introduced by de Mesquita in 1985, but follow-up research had found dissatisfaction to be unrelated to the probability of war (de Mesquita and Lalman 1992). Powell obtains a different result under information uncertainty.

> *"When this disparity is small, the division of benefits expected from the use of force is approximately the same as the existing status quo distribution. The gains to using force are therefore too small to outweigh the costs of fighting. Neither state is willing to use force to change the status quo, and the probability of war is zero.*

When the disparity between the status quo division of benefits and the distribution of power is large, then at least one state is willing to use force to overturn the status quo." (Powell 1996, 241).

Absent information uncertainties, bargaining is still always efficient in this model, and the distribution of power only informs the settlement outcome, very much in line with preceding formal and some empirical analyses. However, war can erupt under incomplete information as the party satisfied with the status quo is uncertain about how much to concede to satisfy the challenger.[6] Under these circumstances, war tends to be more likely when the disparity between the distribution of power and benefits grows, and it is least likely "when the distribution of power mirrors the status quo distribution" (ibid. 264).

The model's expectation thus contrasts with both theoretical schools of balance-of-power and preponderance-of-power, by establishing a meaningful linkage where the distribution of power interacts with the distribution of benefits to determine bargaining outcomes. Empirical testing of this model has demonstrated some positive results. Using the United Nation's roll-call data as a proxy measure for the distribution of benefits, Reed et al. (2008) have found support for Powell's hypothesis that the probability of interstate conflict increases with the mismatch between the balance of power and the distribution of benefits.

The most significant element of Powell's theoretical proposition is the role of the status quo distribution of benefits that serves as a reference point for actors' satisfaction or dissatisfaction. Once the reference point is set and the bargaining outcomes are determined in terms

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[6] Notably, there is no information uncertainty about the status quo distribution. In order to introduce incomplete information, Powell assumes that the parties to the conflict are uncertain about each others' costs of fighting. In direct quotation: "*Although c_1 and c_2 have been described as the states' costs of fighting, these variables also have a more general interpretation. The lower c_1, the higher S_1's payoff to fighting. Accordingly, c_1 can be interpreted more generally as a measure of S_1's willingness to use force or of S_1's resolve. That is, the lower c_1, the more willing S_1 is to use force and the greater its resolve. Thus, the game may be seen more broadly as a model of bargaining between two states that are unsure of each other's willingness to use force*." (Powell 1996, 250)

of conformity between power and benefits, the next logical step in this theoretical string is to define what such adjustment means for the parties concerned: as one side gains, the other loses. Integrating the effects of expected gains and losses into the bargaining model is the primary goal of the current study. A supplemental/auxiliary goal is to derive implications for third-party mediation, accounting for these behavioral effects.

Research on international conflict mediation from as early as the 1960s has suggested that relatively balanced power between the adversaries correlates with mediation effectiveness (Young 1967; Ott 1972; Bercovitch 1985; Bercovitch, Anagnoson, and Wille 1991; Wall, Stark, and Standifer 2001). Empirical evidence provided by Bercovitch (1985) showed high mediation impact for even distributions and low to no impact in case of high disparities. Low mediation impact in uneven distributions is at least to some extent linked to the stronger party's lack of interest or willingness to cooperate. According to the results obtained by Bercovitch, Anagnoson, and Wille (1991), no mediation occurred in nearly half of disputes between states with unequal power. When the parties were in relatively equal positions (and especially when both were "relatively weak states") the likelihood of mediation success was five times higher (ibid. 12).

The case for the "mutually hurting stalemate" as the most favorable or "ripe" timing of intervention for the mediator has similarly originated from a proposition of relative symmetry between the disputants (Richmond 1998). As Richmond describes, assuming that the conflict is asymmetric "reinforces the proposition that disputants will tend to view mediation as zero-sum. This is because mediation will be viewed as an extension of the disputants' efforts to 'win', or at least to avoid defeat." (p.709) Closely linked to this perception are the mediator's role (e.g. as an actor empowering the weaker side), their leverage, motivation, and potential bias, which have implications for the acceptability of the mediation effort *ex ante*.

Analyzing data on third-party intervention in ethnic conflicts, Cetinyan (2002) argued that additional support from third parties "would affect the terms of any potential deal but not the likelihood that bargaining fails and violence erupts" (Cetinyan 2002, 647). Benson, Meirowitz, and Ramsay (2016) have emphasized the external countervailing incentives that tend to mitigate or entirely offset the strategic effects of power shifts, maintaining the same level of the likelihood of war (neutralization).

Lastly, experimental studies and agent-based models have also been developed on the subject matter. To name a few, Krainin and Wiseman (2016) offer a dynamic model of war, where power varies stochastically, and war is inevitable if the states are patient enough. An experiment by Herbst, Konrad, and Morath (2017) considers both endogenous demands between two parties in conflict as well as exogenous proposals by a mediator. In the former case bargaining is more efficient when power is balanced, while in the latter case, the likelihood of conflict proves unrelated to the distribution of power.

The Level of Analysis

The level of analysis question runs through this entire theoretical review and requires clarification.

The causes-of-war literature summarized above covers all three "images" or levels of analysis, as identified by Waltz (1959): the individual, the nation-state, and the international system. However, the discussion here is structured around the Fearon-Powell framework that is originally defined as the foundation for a coherent *neorealist* theory of war, characterizing the mechanisms by which war occurs between unitary actors under anarchy (Fearon 1995).

The concurrent debate on the relationship between relative power and the likelihood of war is similarly at the structural level. Even though power capability itself is a state-level attribute,

Waltz (1979) has described the distribution of power as a system-level attribute characterizing the strategic environment which, in turn, imposes certain behavioral patterns on state actors. This is precisely the intended level of analysis of this dissertation.

Where the level of analysis is fuzzy, is in relation to behavioral patterns: rational choice and expected utility theory vs. behavioral economics and political psychology. The problem is that theoretical insights borrowed from behavioral economics are exclusively "first-image" explanations. These are results produced from controlled lab experiments performed on human subjects. Generalizations of these empirical findings have raised concerns about the external validity of individual experiments or their relevance in the context of international affairs often involving high-stakes decision making at the national level (see, for instance, discussions by Levy (1997) and Hafner-Burton et al. (2017)).

Two broad approaches were identified by Powell (2017) within Behavioral IR. One of them incorporates the empirical findings of behavioral economics by focusing on individual political actors or leaders, with the benefit of direct behavioral relevance at the individual level. The other, *quasi-behavioral approach*, makes nonstandard assumptions about the preferences of international actors - who are not typically individuals but aggregates, presumably acting as unitary actors with defined preferences. Powell contends that while the former approach is facing well known obstacles in IR theory related to bottom-up theory construction, pursuing the latter approach is also problematic in the sense that the link between the empirical findings and nonstandard assumptions about state actors is weak. It requires the modeler to establish a "tight deductive link between assumptions and conclusions" (ibid. 270). As an example, he offers a quasi-behavioral bargaining model incorporating relative gains, where he models concern for relative gains as a 'social preference' variable by replacing standard preferences about absolute gains with a non-standard

behavioral assumption that states care about their payoff as well as their counterparts' payoff (Powell 2017).

The current study follows the second approach, in the sense that it incorporates nonstandard behavioral assumptions into a standard model, but it also highlights two important points:

A. Rational choice and the expected utility hypothesis underlying the standard models of bargaining are similarly grounded on assumptions about individual-level decision making. Moreover, utility functions are derived from *individual preferences*, which are absolutely subjective individual predispositions that have no linkage to state or system-level behavior.

B. Unlike predefined individual preferences, the assumption of generic preferences derived from expected gains and losses is highly congruent with the structural level of analysis and neorealist IR theory where the behavior of state actors is induced from the strategic environment rather than constituting individual or state-level characteristics, and where relative gains and losses have security value.

Finally, as discussed above, standard models of bargaining have already used the status-quo reference point to determine bargaining outcomes and the likelihood of conflict as a function of satisfaction with the distribution of benefits. The theoretical revision intended here relates to the behavioral repercussions of expected gains and losses which has a particular relevance for relative power and security in the international context.

Neorealism has often been criticized for retaining a small set of rationalist assumptions (about anarchy, the distribution of power, self-help, the security dilemma, relative gains concerns) and for having a limited ability to explain state behavior. How relative gains and losses impact behavior is not a minor detail in international conflicts. Omitting these behavioral implications would mean further constraining theory's explanatory power.

Conclusion

In summary, bargaining theory of war is primarily concerned about the logically necessary conditions allowing for the outbreak of war as well as its termination. It can be studied at individual, state/societal, and systemic levels of analysis. The current study follows Fearon's seminal work on rationalist explanations of war focusing on the system level of analysis and specifying the key mechanisms by which war occurs under anarchy. Accordingly, the review of literature above has provided only a brief overview of domestic and individual-level constraints and paid a greater attention to rationalist models at the structural level.

Formal theory posits that the costliness of war always provides for a bargaining range, i.e. a range of settlements that actors prefer to war. Problems arise either when the parties are unable to locate the range due to information uncertainty, or when they cannot credibly commit to maintaining a settlement within the bargaining range due to shifts in power and costs over time (the Fearon-Powell framework). In a mirroring logic, war ultimately resolves these fundamental sources of conflict by revealing private information or uncertain intentions, or by subverting an expected shift in power, and producing feasible settlements in present time. Third-party mediators may potentially add value via both mechanisms, by either helping resolve uncertainty or leveraging costs to expand the bargaining range before crises erupt into violence. The review of formal and empirical literature concludes, however, that mediators are facing significant limitations on both counts.

The review has targeted the strategic problem of commitment, grounded on the shifting balance of power, increasingly recognized as the chief candidate for explaining war. Analysis of the types and combinations of possible commitment problems has boiled down to the essence of the conflict – the relative power dynamic, determining the focus of the study on the third type of

CCP - "bargaining over power" corresponding to Fearon's 1996 specification, and where power is the object of dispute. Fearon's solution raises questions about the rationality of assumptions concerning state actors' risk and time discounting preferences. Canonical formal models, including the model characterizing states bargaining over power, assume preferences of risk neutrality and a common rate of discounting of future payoffs. Are these preference assumptions "rational"? Or is it even rational to assume pre-defined preferences independent of the conflict dynamic?

Behavioral economics has encouraged hypotheses about state behavior in crisis that run counter to expected utility theory underlying formal models of war. It has suggested that decision-makers will take greater risks and have higher patience or valuations of future outcomes under a losses frame. Integrating these behavioral expectations into the bargaining context has raised at least two important questions: the first concerns on the rationalist-nonrationalist tension in Behavioral IR, and the second relates to the level of analysis discrepancy.

Regarding the first, the analysis of literature suggests that not every anomalous behavioral deviation constitutes a violation of rational choice as a broad framework for maximizing utility. Deviations related to loss aversion indicate a potential gap in the way rationality is built into formal models, opening room for adjustment. The review also discusses an important challenge related to the levels of analysis. Empirical findings from behavioral economics are at the individual level and generalizations to state- or system-level analyses suggest a weaker linkage or relevance in international contexts. At the same time, the assumption of actors' preferences being derived from expected gains and losses is highly congruent with the structural level of analysis as described by neorealism and arguably provides a better fit for bargaining models as compared to the demands of expected utility theory which assumes individual preferences.

A concurrent theme explored in the literature review relates to the relationship between the distribution of power and war. Despite conflicting theories and empirical findings, formal analyses in this field have pointed to a more meaningful linkage where the balance of power interacts with the balance of benefits as a function of satisfaction. This theory, advanced by Powell after de Mesquita, emphasizes the importance of the status quo reference point, similar to prospect theory, but does not account for the distinct behavioral effects as one side expects to improve its position from the status quo while the other expects to decline. Such differentiation of value preferences in accordance with expected gains and losses is the object of analysis in Chapter III. Chapter IV moves to integrate these divergent effects directly into Fearon's 1996 model, to account for their impact on settlement outcomes as well as on the likelihood of war.

CHAPTER III

RESOLVE TO FIGHT: A FUNCTION OF EXPECTED GAIN OR LOSS?

Introduction

Resolve is an important abstraction in crisis bargaining literature. Often interpreted as a rational incentive to fight, it is also perceived to be a psychological disposition of perseverance. The rationalist approach is relatively straightforward but somewhat limited, while controlling for individual psychological dispositions is a challenging task. Sometimes decision-makers will take greater risks, demonstrate greater patience, and tolerate greater costs, other times they will not. Are these value preferences accountable in theoretically relevant ways?

The answer to this question depends on another puzzle debated in this chapter: Is dispositional resolve an innate quality or is it imposed by the strategic environment?

Theoretical approaches to the study of resolve in many ways echo the debate of rationalist and behavioral paradigms discussed in Chapter II. Using the wealth of knowledge derived from behavioral economics and political psychology, I theorize that the sources of dispositional resolve are not disconnected from the context of conflict but are reactively induced from the very same expectations of shifts in power that generate the problem of credible commitment.

Approaches to Resolve: Rationalist Models and Behavioral Theories

The concept of resolve is commonplace in both formal and empirical literature on conflict management, in deterrence theory, rationalist models of bargaining and mediation, as well as in behavioral approaches, but does not necessarily denote the same thing everywhere. Commonly indicating a "willingness to fight" its sources are often loosely defined resulting in competing interpretations. Even within bargaining theory there is some inconsistency in conceptualization.

The most limited rationalist interpretation of the term flatly equates "resolve to fight" with the structural advantages providing for higher payoffs for war. In strictly material terms, war payoffs are a function of the probability of winning a war *(p)* and the expected costs of fighting *(c)*, so higher chances of victory and lower costs are associated with high resolve. Here is a passage from Kydd (2006)describing this narrow perception rather straightforwardly:

> *"In bargaining models, the uncertainty is over how much the other side can be pushed to make a concession. Types with a high payoff for war, in comparison to the concession one would like to extract from them, have high resolve. The payoff for war is in turn a function of relative power and the costs of war; increasing relative power and decreasing the costs of war increases resolve."* (Kydd 2006, 453-454)

Such an exclusive material focus on relative capabilities and costs is very unambiguous but is hardly sufficient to describe resolve to fight.

Quite a few rationalist models suggest that resolve may also indicate or incorporate the *utility* of war payoffs i.e. the subjective value each party assigns to their war parameters (the probability of winning and costs). Fearon and Powell both use such terminology, e.g. the "value placed on winning," the "utility of victory," the "value for the interest or issue in question," or the "resolve to defend a particular foreign policy interest" (Fearon 1994, 1997), indicating not merely (or perhaps not at all) the material outcomes of war, but the cost-benefit analysis or the 'stakes relative to costs' balance, also referred to as the "inverse of the costs" (Powell 1996b).

Broadly speaking, the cost-benefit or the cost-stakes approach still relates resolve to fight to the function of war payoffs, but those payoffs incorporate certain utility functions reflecting the actors subjective values for victory $(pv - c)$, otherwise expressed in terms of their value of costs $(p - c/v)$. For instance, discussing the costs of war in one context Fearon notes that "the terms C_A and C_B capture not only the states' values for the costs of war but also the value they place on winning or losing on the issues at stake. That is, C_A reflects state A's costs for war relative to any

possible benefits." (Fearon 1995, 387). As a matter of fact, signaling resolve in bargaining models also takes place by a demonstration of the willingness to pay costs. In another article by Fearon (1997) on *Signaling foreign policy interests*, a credible communication of resolve involves two types of costly signals: 'tying hands' by generating audience costs to be suffered ex post, or 'sinking costs' by demonstrating mobilization. Thus, resolve to fight is formally characterized as a willingness to suffer costs.

An alternative way of conceiving resolve offered by Powell is through risk preferences. Here is a passage reflecting this intuition:

> *"The parameter r denotes the rising state's willingness to go to war. ... Most narrowly, one can think of r as the inverse of the rising state's cost of fighting. The lower the cost, the higher is r, and the larger the rising state's payoff to the gamble of fighting. Alternatively, one can think of r as inversely related to the rising state's level of risk aversion. The more risk averse the rising state, the lower is r, and the lower its expected payoff to fighting. Most broadly, r reflects the rising state's level of resolve. The more resolute the rising state, the higher is r, and the higher its expected payoff to fighting."* (Powell 1996b, 752)

Formal bargaining models of war do not necessarily associate resolve to fight with risk preferences, however such an association is very meaningful considering that risk attitudes represent actors' utility preferences over outcomes, essentially measuring the same values or stakes in the conflict. It is common for particularly high-stake crisis situations to be described as "competitions in risk-taking." For instance, Schelling (1966) has described the Cuban Missile Crisis in terms of the canonical game of Chicken where the United States and the Soviet Union both attempted to demonstrate resolve and force their opponents to concede by taking high risks. Since then, some observers have argued that Schelling's model of the game is not necessarily an accurate characterization of the crisis (see, for instance, Zagare 2014), nevertheless it is an important case of formalizing risk-acceptance as a way of communicating resolve under uncertainty.

Notably, discussions about individual values of war often appear in the context of private information and the need to credibly communicate resolve when incentives of misrepresentation may operate. Absent information uncertainties concerning the values for war, the parties would presumably be able to account for their opponents' resolve through their known utility functions or the inverse values of costs. In this case, their war payoffs would be incorporating these subjective values from the outset and resolve to fight would still be represented via the expected utility of war. And whether you consider the strictly materialistic depiction of payoffs or the adjusted cost-stakes approach accounting for individual value preferences, in either case, higher power capability and lower costs are going to be associated with a higher resolve to fight. Which is why literature often treats resolve as a product of relative strength and the achievement of deterrence by raising the costs of conflict.

Behavioral theorists have opposed such rationalist formulations of resolve associating the concept with the expected utility of war. Instead of viewing resolve as a structural or "situational" feature reflecting the cost-benefit calculus, they have pointed to its nature as an individual "dispositional characteristic," a "second-order" phenomenon, assuming qualities of willpower and determination that allow for individual variation in the perception of situations the parties are confronted with (Kertzer 2016, 2017). Referring to Herbert Simon (1985), Kertzer reminds that "theories of rational utility maximizing are only as useful as the auxiliary assumptions they rely on about where actors derive their utility from" (Kertzer 2017, 115). The clarity of situational predictions comes from an "iceberg parsimony," he continues, where "much of the theory's mass is hidden under water. ... It is one thing to say that actors will be resolved when their payoff structures tell them to be, but it is another to specify where these payoffs come from in the first place." (ibid. 116).

But where do those payoffs come from?

Part of the scholarship in behavioral IR attempts to identify the domestic sources of individual sensitivity, willpower, patience, or willingness to pay. For instance, there is some evidence that democratic states are more likely to be sensitive to or intolerant of costs while autocratic regimes are more likely to be patient and tolerate the costs of war (Haggard and Kaufman 1997; Mansfield, Milner, and Rosendorff 2002). In fact, empirical models of "balance of power" have been contrasted with models of "balance of resolve" or "balance of motivation" as competing predictors of war outcomes, with somewhat divergent results (Young 1968; Hopmann 1978; Maoz 1983; Reiter and Stam 1998). It has been argued that democratic states tend to win wars with superior war-fighting ability due to factors like the military morale, organizational efficacy, initiative and leadership which democracies encourage (Lake 1992; Reiter and Stam 1998). The model developed by Maoz (1983) depicts resolve to fight as an "outlet to antecedent feelings of frustration" in accordance to the frustration-aggression hypothesis in psychology. This psychological explanation of resolve competes with the capability model placing the weight on the psychology of conflict management. Maoz demonstrates that resolved parties outperform more powerful actors by sustaining higher pressures of escalation and risk-taking, demonstrating brinkmanship and, thereby, compensating for inferior capability. He concludes that it is the resolve of the parties, not their possession of raw capabilities, that is "consistently related to dispute outcomes" (ibid. 95).

Maoz does not explore what the underlying sources of such resolved psychological dispositions may be, or what conditions are leading to high risk-taking propensities. Meanwhile, Kertzer (2016, 2017) tries to reveal the sources of individual persistence and cost-sensitivity in his behavioral theory of resolve but, instead, appears to reverse the logic of causality by formulating

variations in risk and time preferences as the "micro-foundations" of resolve. So, whereas Maoz explains risk-taking propensity in terms of resolve as an individual psychological phenomenon, Kertzer defines resolve in terms of pre-existing risk and time-discounting preferences. Such a shift is curiously reminiscent of the reversal of utility theory from Bernoulli to VNM. Are the actors more risk-taking and patient because they are somehow psychologically resolved to fight? Or are they resolved because they have innate risk and time preferences? Unfortunately, correlation does not imply causality. But also, unlike the findings in behavioral IR, suggesting distinct preferences conditional on expected gains and losses, Maoz is not pointing to any sources of such heterogeneous psychological dispositions.

What is surely evident from these empirical and experimental studies is that resolve is certainly associated with risk and time-discounting propensities. Let's say for now that resolve is an abstraction that embodies these two behavioral tendencies. That is, resolved actors are more risk-seeking and more patient as reflected in their value preferences and/or via cost-tolerance. Take note that these associations of resolve remain very similar to the formal modeling intuition. Similarly, note that the assumption of pre-determined individual risk and time-discounting preferences is also shared by rationalist models of war. But thus far neither the rationalist nor the psychological approaches expose where those dispositions and utilities are coming from.

With the exception of behavioral theories identifying regime type as a potential source of variation, none of the above focusing on risk and time preferences provide a theoretically relevant explanation of what might be potential sources of such value preferences. Kertzer's assumption that risk and time-discounting preferences are the micro-foundations of resolve still does not explain why some actors are more risk-taking or patient than others. Clearly, those who are individually disposed to have greater patience and risk-seeking attitudes, are more likely to display

those qualities in a conflict situation, demonstrating persistence and resolve. But if those individual preferences are, indeed, individual and random, then this information is not particularly useful from a theoretical standpoint and searching for the micro-micro-foundations of something that is considered to be an individual-psychological trait is similarly futile.

In this context, the opposition of behavioral approaches to rationalist explanations of resolve is somewhat unjustified as rationalist models are not necessarily dismissive of the individual sensitivities or characteristics that the parties to the conflict may bring to the table. Individual valuations attributed to victory and costs of fighting (discussed above as part of rational choice models) broadly account for potential individual variations, but especially because these characteristics are treated as random-individual preferences, their significance gets lost in formal modeling as soon as the values are known. From an expected utility perspective, there is little to rationalize about these preferences - all preferences can be considered rational as long as there is a certain transitive preference ordering in place. Therefore, provided complete information, these values are simply assumed to play out in combination with the distribution of power and costs of war, constituting actors' war payoffs.

Perhaps it may be more appropriate to say that rationalist models see these factors as complementary rather than mutually exclusive explanations of bargaining outcomes. As a matter of fact, some empirical models distinguishing between balances of power and resolve have similarly noted the complementary nature of the two explanations. For instance, Maoz refers to Allan (1980) in pointing out that the relative capability and resolve models can be seen as "part of an additive function designed to predict conflict outcomes" despite the fact that each places the emphasis on distinct factors as the most decisive determinants (Maoz 1983, 201). Rationalist models also tend to value parsimony over eclecticism, hence, the greater focus on situational

determinants. So, on one side, rationalist conceptions of resolve emphasize "first-order" structural-situational incentives of war, without necessarily excluding individual values as part of war payoffs; on the other side, behavioral approaches strongly emphasize the "second-order" individual-dispositional nature of resolve, but without necessarily dismissing the cost-benefit analysis. Both associate the individual motivations of fighting with risk-taking propensity and sometimes also with future discounting or cost-tolerance, and both seem to consider these behavioral parameters to be largely untraceable individual preferences or traits. And it appears as though the two paradigms are just complementary.

There is, however, something important about the nature of resolve which behavioral theory is alluding to, perhaps inadvertently, something that transforms the cumulative-complementary nature of the two explanations. This crucial property comes to light in the search for the sources of actor-level heterogeneity.

The Conflict-Conditionality of Resolve

Amid a profoundly individualistic approach to time and risk preferences as the components of resolve, Kertzer suddenly exposes a source of dispositional variation that is not only theoretically significant, but also relevant to the strategic context of conflict. Resolve is said to be "resisting situationally induced pressures to retreat or reverse course," "maintaining a policy *despite* contrary inclinations or temptations to back down" (Kertzer, 2017, 114). Kerzer emphasizes this quality of resolve to confront rationalist approaches that reduce this complex phenomenon to cost-benefit or utility calculations and to highlight the individual sources of variation. Yet this quality is the exact antithesis of expected payoff functions.

If the above characterization of resolve is true, then this is a phenomenon that emerges (at least in part) from structural-situational pressures, despite a strong behavioral opposition to such a

linkage. And while subjective individual sources of variation may co-exist, here is a source of behavioral preferences that can be directly identified and one that is *not* an innate attribute or an intractable psychological preference for risk and patience. As a matter of fact, it is not even a "preference" for risk or patience, but a reactive force of resistance to the pressures induced by power politics. The connotation is not simply in conflict with the rationalist approach to resolve as a calculus of satisfaction and *utility*, it is in direct opposition to the rationalist approach implying dissatisfaction and *disutility*, with important theoretical implications.

Resolve as a force of "resistance to situationally induced pressures to retreat" is missing from both rationalist and behavioral models. The former focus on expected utility advantages or incentives of fighting from a position of strength, the latter focus on pre-existing and largely untraceable individual preferences, and neither pays heed to the vulnerability induced by the expected disutility of war. The disposition to fight is certainly a behavioral form of resistance, but insofar as it is induced by the pressure to "retreat or reverse course," it is not an abstract individual-psychological trait. Even if the behavioral reaction itself may be described as a psychological phenomenon of determination and perseverance, it is very important to recognize that a crucial source of this phenomenon lies within structural-situational pressures.

Furthermore, the power-induced nature of resolve finally connects actors' behavior to the context of conflict. Ultimately, what we are interested in, from a theoretical standpoint, are the determinants of resolve related to the conflict in question, internally dependent on the conflict dynamics. Why is an actor resolute about a specific conflict? What makes them unusually patient, cost-tolerant and risk-acceptant when it comes to one conflict as opposed to another? Can we anticipate or prevent such a reaction before it strikes back with unintended consequences? That's what conflict management must be targeting through bargaining and third-party mediation.

Approaching resolve from a position of conflict-conditionality does not deny the existence of subjective, individual-psychological sources of resistance, potentially unrelated to the dispute. Hypothetically, resolve to fight can be impacted by both individual-dispositional as well as internal situational factors. But whereas focusing on the former does not add much theoretical value, accounting for the latter component is a possibility. Focusing on the conflict-conditional, situational sources of resolve offers a path to construct a feedback mechanism from situational pressures to resolve and back into the bargaining framework.

This is also where the wealth of knowledge from behavioral economics comes in particularly handy. The debate covered in detail in Chapter II, between rational choice under expected utility theory (assuming subjective predetermined value preferences) and behavioral economics (conditioning actors' choices on expected gains and losses), virtually mirrors the discourse about resolve. In both cases we are dealing with the same behavioral parameters: risk and time-discounting preferences, conditional on expected gains or loss, but unlike their economic counterparts, theorists of behavioral IR have not clearly identified this conditionality on structural factors, despite alluding to resolved actors' expectations of retreat and loss.

A Theory of Reactive Resolve

The theory of resolve developed in this study underscores the crucial linkage between structural-situational conditions and dispositional parameters. I argue that resolve as a behavioral disposition is not necessarily sourcing from individual-psychological traits. There are important structural constraints directly associated with the conflict that condition the manifestations of resolve via high risk propensity and large discount factors, and there is plenty of theoretical and empirical evidence to support this effect. A dispositional resolve to fight, as a form of resistance to situationally induced pressures, is not disconnected from the conflict and the relationship of

power that generates it. Although described as a second-order behavioral phenomenon, to the extent that this disposition is a reaction to first-order incentives (as opposed to innate psychological tendencies), resolve to fight has another second-order quality as the *extension* of first-order situational incentives.

To clarify the linkages and conditionality implied in the construction of reactive resolve, let me briefly characterize the variables involved in conflict bargaining.

Parameters of First-Order and Second-Order Impact

We may say that bargaining theories of war involve two sets of parameters impacting the outcome of bargaining: situational (first-order) and dispositional (second-order).

Situational factors reflect the circumstances on the ground - the parties' probabilities of winning, their estimated costs of fighting, the status quo division of resources, potentially the offense-defense balance. All these parameters essentially represent the distribution of power and benefits between the parties to the conflict and belong in the systemic-level of analysis. Even the costs of fighting reflect the opponent's capability to inflict harm, although bargaining models usually maintain individual costs of fighting for each party or standardize the costs as a common variable. Parameters of first-order impact are most directly associated with actors' payoffs of war and determine the material space of potential bargains that they may prefer to war. However, this space is also affected by actors' behavioral parameters.

Parameters of second-order impact are responsible for decision-makers' attitudes toward risk taking and future discounting of payoffs. In particular, risk preference demonstrates their individual utility of potential outcomes, and the discount factor shows how much that utility is discounted over time, i.e. how much they value future payoffs vs. present payoffs. As noted above, these values are broadly treated as actors' dispositional qualities grounded in psychology, implying

a strictly individual level of analysis. Outside the projected costs and benefits of military options with underlying relative power capability determinants, these two behavioral attributes are key for determining the bargaining range and finding mutually acceptable solutions. Chapter IV describes in detail how these variables impact the outcome of bargaining by broadening, narrowing, shifting, or completely emptying the bargaining range. Lacking theoretical grounds for actor-level differentiation, and especially under complete information, bargaining models of war often normalize the variables of risk and time-discounting as common utility functions for both sides, essentially depriving the models of actor-level heterogeneity.
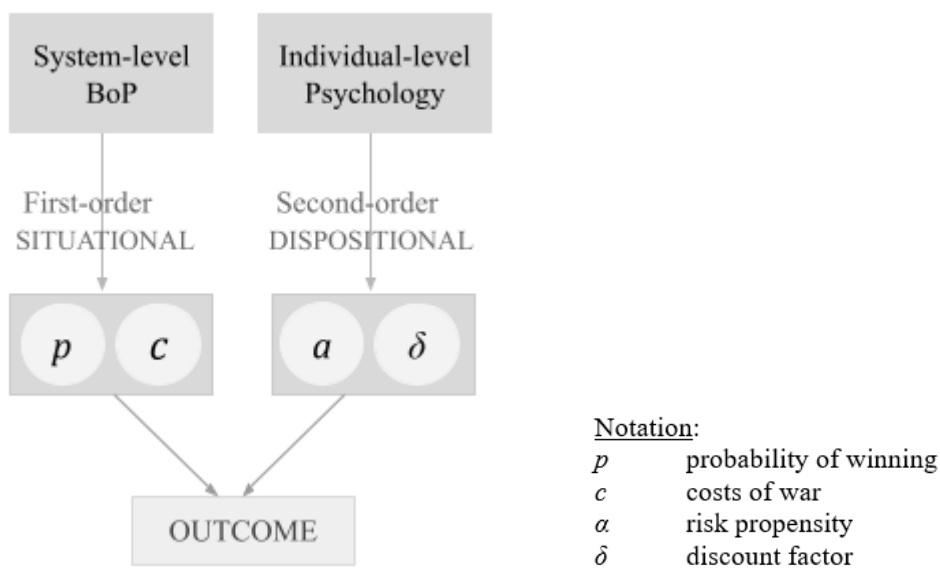
Figure 1. A General Framework of First- and Second-Order Impact on Bargaining Outcomes Shared by Rationalist and Behavioral Theorists

It would be fair to say that both rationalist and behavioral theorists share a common framework where both situational and dispositional parameters operate and impact the outcome of bargaining, as demonstrated in Figure 1. But whereas rationalist approaches tend to highlight the situational determinants motivating state actors to fight, behavioral approaches emphasize the

importance of dispositional factors, and sometimes assume complementarity between the two. The real puzzle concerns the source or nature of individual dispositions: are these innate qualities or preferences imposed by the strategic environment?

Rationalist theories do not pose a puzzle of this sort, as they are not particularly interested in individual qualities or valuations. These values may come up in the context of private information but once known, they are "dealt with" as part of the payoff structure. Resolve is understood as an *incentive* to use force with an expectation of improving one's position. A party to a conflict is credibly willing to fight if the expected payoff of war is greater than its share of the status quo distribution, i.e. if it anticipates to *gain* something by launching a military attack. The motivation to fight, as a 'first-order' phenomenon, reflects precisely this incentive of gain.

Although refusing to treat resolve as a utility calculus and insisting on its quality as an individual predisposition, behavioral theories are not offering theoretically relevant sources of actor-level heterogeneity that would describe why some actors take greater risks or tolerate greater costs and pressures while others do not. Yet, there are significant grounds to claim that dispositional parameters are, at least in part, stemming from the situational conditions actors face. Specifically, we know that risk and time-discounting preferences are driven by expected gains and losses. A large body of research pointing to these effects is to be detailed below. Neither the rationalist nor the behavioral approaches to resolve acknowledge this linkage, despite alluding to the source of dispositional resolve in "resisting situationally induced pressures" (Kertzer 2017, 110, 114).

The Second-Order Impact of Relative Power on Outcomes of Bargaining

That the behavioral manifestations of resolve are driven by expected gain and loss, is important for two reasons. One, that conflict bargaining outcomes are all about gain and loss. Two,

these outcomes are not simply about *absolute* gains or losses, they are about *relative* gains against a particular opponent. The neorealist school has long emphasized the positional nature of states (see, for instance, Grieco 1988) and the concern for relative gains as states seek to "maximize their relative power positions" to achieve greater security (Mearsheimer 1994, 12). International conflicts over strategic resources, especially zero-sum contests of relative power under scrutiny here, highlight the importance of relative vs. absolute gains. Specifically, Fearon's 1996 model of bargaining over power is one where the effects of relative gains concerns would be vital.

If the prospects of gain and loss drive actors' risk and time-discounting propensities, we are essentially talking about dispositional resolve that is induced by the BoP – more precisely, by expected shifts (or transfers) in relative power that bargaining is expected to produce. A theory of reactive resolve is, therefore, a theory of *expected disutility*: the disutility of projected outcomes in the form of payoffs for war or of bargains imposed that have potential consequences for the future. Although behavioral in its manifestation of risk-taking and time-discounting, reactive resolve is still consistent with rational choice because it is generated to prevent loss.

Furthermore, if expected gains constitute the Challenger's rational incentive to fight, and expected losses inform the Defender's dispositional resolve to resist, we are dealing with the dual impact of the exact same source of conflict - again, the balance of power. Contrasting expectations of gain and loss boost the temptation of the strong as well as the resolve of the weak. So, it is not simply that the dispositional parameters are informed by the situational conditions the actors face. To the extent that this is the case, the drivers of first-order situational and second-order dispositional resolve are opposed. In one case the motivation to fight is driven by strength and the expectation of gain, in another, it is driven by weakness and an expectation of loss and retreat. Figure 2 below demonstrates this logic through a model where relative strength has a positive

influence on war payoffs but, at the same time, it has a negative influence on dispositional parameters of risk taking and future discounting.

The hypotheses put forth in this dissertation are stemming particularly from this logic of differential effects. As the Challenger's expected utility of gain triggers risk averseness and the Defender's disutility of loss induces risk acceptance, the combined behavioral effect should be expected to shift the bargaining range toward the Defender's preferred settlement options. At the same time asymmetrical risk acceptance (or loss aversion) would be responsible for narrowing the bargaining range. Similarly, as the Challenger's expected utility provides for a relatively steeper future discount rate and the Defender's disutility induces greater patience, the range of peaceful bargains will continue to shrink. Chapter IV explores these differential effects in greater detail.
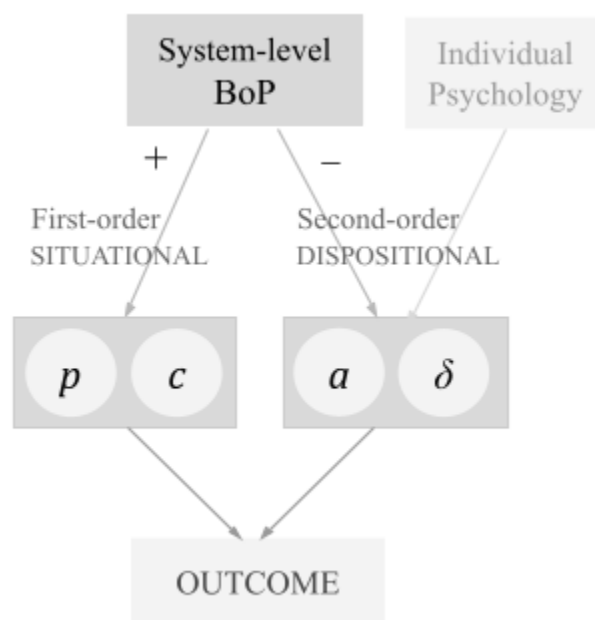
Figure 2. The Dual Impact of Relative Power on Resolve to Fight

Note, that the model completely sidelines the individual-psychological sources of resolve. While the theory of reactive resolve proposed here does not reject the existence of sub-systemic sources of resolve, it attempts to control dispositional parameters insofar as they are influenced by expected changes in relative power. Reactive resolve is about power-induced risk and time-discounting propensities. A theoretical emphasis on the situational sources of resolve maintains the analysis within the rationalist domain, at the systemic level.

It also suggests that we don't know much about the sources of individual psychology pre-determining actors' risk and time preferences. In fact, actors do not necessarily have pre-determined risk attitudes or time-discounting preferences that would influence their choices more broadly. We know that their utility functions form in association with certain conditions such as the likelihood of gains and losses – at least, this is how Bernoulli had described the tendency toward risk aversion, and what a wealth of experimental evidence suggests in opposition to expected utility theory.

The theory of reactive resolve, thus, differs from both standard rationalist and behavioral approaches. It re-affirms dispositional resolve as a second-order phenomenon of resistance but emphasizes its conditionality on structural-situational incentives as opposed to innate psychological tendencies. In this sense, resolve to fight has an alternative second-order quality: it is the second-order impact of relative power on outcomes of bargaining, manifesting via behavioral parameters.

Supporting Theoretical Foundations

My task of demonstrating that dispositional resolve is (at least partly) grounded in first-order conditions is greatly facilitated by valuable empirical evidence from behavioral economics.

Briefly highlighted above, I use the following subsections to describe in detail each of these behavioral variables and their conditionality on expected gain and loss.

Risk Attitude

Attitude toward risk demonstrates an actor's utility of possible outcomes under uncertainty. Figure 3 below demonstrates the three classical utility functions in the form of concave, convex, and linear utility curves, corresponding to risk-averse, risk-acceptant, and risk-neutral preferences, respectively.
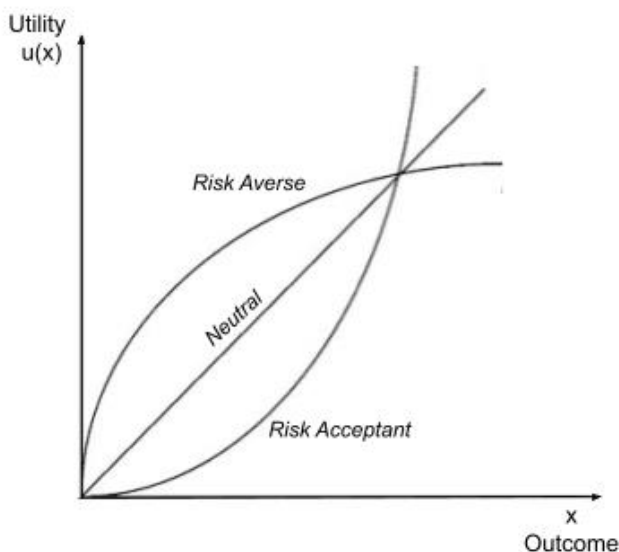
Figure 3. Risk-Averse, Risk-Neutral, and Risk-Acceptant Utility Curves

Bargaining models of war frequently assume a particular utility function - risk aversion or, at least, risk neutrality - to describe the value preferences of both parties to the conflict. This is certainly a helpful simplifying assumption, however, one that is not necessarily justified. The debate between two competing paradigms, expected utility theory and prospect theory, presented

in detail in the previous chapter, has demonstrated the gap in both the logic of argumentation as well as in actual evidence of behavior demonstrated in numerous experimental settings.

Recall that in prospect theory, "carriers of value are changes in wealth or welfare, rather than … absolute magnitudes" (Kahneman and Tversky 1979, 277). Therefore, outcomes are evaluated relative to a reference point such as the status quo, and the preference order is reversed between the domains of losses and gains, implying risk aversion in expectation of gains and risk acceptance in expectation of losses (ibid). In crisis bargaining, expected outcomes always imply changes from the status quo, as bargaining is over redistribution of resources or benefits. Assuming complete information, one of the parties is normally expecting to gain while the other is expecting to lose, otherwise a crisis would not emerge. Powell's (1996) characterization of the outcome of bargaining as a function of satisfaction or adjustment of the disparity between the distribution of power and benefits fits this logic the best. But whereas the challenger of the status quo expects the outcome to be a function of satisfaction through gain, implying a typical risk-averse utility function, the defender expects an outcome loss, which would imply risk acceptance.

The results of prospect theory are often contrasted with rationalist models to indicate non-standard, psychological preferences. As I argue in Chapter II, the findings concerning loss aversion are neither inconsistent with rational choice nor incongruent with the expectations of IR theory. In fact, relative gains concerns are even likely to amplify the behavioral effects of loss aversion. Even absolute gains and losses impact value preferences, but zero-sum conflict takes that meaning to another level. Here, a party expecting to obtain a resource of size x is not only gaining that resource but is also depriving the opponent of the same, which means, it is gaining both x and the opponent's loss of x. The fact that the utility of the gain is higher than its absolute value is indisputable in a zero-sum environment. On the other hand, the party losing x, is losing more than x. From a relative

gains perspective, it is in a far more disadvantageous position due to the opponent's gain of its own loss, therefore the weight of the loss is heavier than its absolute value. Recall that De Mesquita's (1985) conceptualization of risk propensity in terms of security in the IR context has pointed to the same effects. He assumed an increase in risk acceptance under a higher degree of vulnerability and an increase in risk aversion under conditions of security.

Another supportive explanation of power-induced risk behavior relates to the impact of rent seeking contests, of which wars are a good example. According to Teng (2013), in asymmetric distributions of power, when the weaker side "has little to lose" (in the sense that it is expecting to lose in any case) and the stronger side "has much to lose" (in the sense that it already has a lot while the conflict is a lottery with extreme outcomes) the contest "instills" a risk-taking preference in the weaker contestant and a risk-averse preference in the stronger contestant (ibid, 441). The effect of rent seeking contests on risk preference is further amplified by the "mass factor" which highlights the disparity in power between the sides (Teng 2013). This is precisely reflective of the magnitude of asymmetric distribution driving the high risk behavior of the weak.

It appears as though rationalist theories of war model utility functions exclusively from an expected gains perspective, in which case the assumption of risk aversion would hold. For instance, expected utility theory describes the utility function u(x) as the utility of the value an agent may "receive" or, in other words, the value of gain. The other, potentially more important, half of the story appears to be overlooked. Why more important, because we know from prospect theory that the value function for losses is even steeper than that of gains, i.e. losses are usually over-weighed as compared to gains. The latter corroborates with Thaler's (1980) "endowment effect" describing the over-valuation of current possessions, and has been directly linked to the "status quo bias" by Samuelson and Zeckhauser (1988).

Chapter II has also pointed to a series of applications of these findings from behavioral economics in behavioral IR, inspired by the evidence of "anomalies" in decision-making. While many focus on political leaders' individual concerns of loss affecting their foreign policy options, I find, the most significant application of the reflection effect should come at the structural level of analysis where the distribution of power and benefits and corresponding expectations of gain vs. loss should be expected to induce a particular risk behavior on states as unitary actors. Somewhat close to this level of analysis are Berejikian and Early's findings showing American foreign policy makers as generally more resolute in the pursuit of preventive policies seeking to avoid loss, rather than in the pursuit of acquiring gains (Berejikian and Early 2013, 649).

These empirical and theoretical observations necessitate a revision of rationalist models with a view of incorporating risk attitudes induced by the structure of the strategic environment. Such an approach to risk would need to incorporate the effects of opposing prospects faced by the parties to the conflict. As one side is expecting to gain, the other is expecting to lose. Moreover, their gains and losses are amplified due to the zero-sum relationship with greater repercussions for the losing party. The respective impact of such first-order conditions on second-order risk behavior suggests risk aversion for the party expecting to gain and risk acceptance for the party expecting to lose, with a relatively greater propensity for risk acceptance.

The model developed in the next chapter aims at incorporating these updated assumptions of risk (as well as time-discounting preferences) into Fearon's 1996 model on bargaining over future bargaining power. Among important previous efforts in this direction, Butler (2007), has applied prospect theory to reconstruct Fearon's 1995 canonical bargaining model of war, reporting that bargaining failure is possible under complete information when employing the logic of prospect theory. Notably, Butler goes well beyond loss aversion to incorporating subjective

individual framing effects as well as the tendency for people to perceive uncertain outcomes as certain (known as the "pseudocertainty effect"). The current study does not intend to mimic prospect theory as a whole by including misperceptions or psychological biases at the individual level, but rather attempts to separate and focus on the rational core of these behavioral expectations that are conceptually in line with the structural level of analysis. But even with the minimum assumption of loss aversion, the model still demonstrates possibilities for bargaining breakdown.

Time Discounting

Recall that international conflict bargaining is a process with a longer (infinite or indefinite) time horizon in which war may or may not occur. We know that the bargaining space is impacted by the "shadow of the future" (as articulated by Axelrod in *The Evolution of Cooperation*) or the future implications of decisions made today. The shadow of the future, denoted by the discount factor δ, is interpreted as either the likelihood of repeated interaction or the extent to which the parties discount future payoffs relative to present payoffs, reflecting their preferences for the same outcome tomorrow versus today (later versus earlier). The degree to which parties discount future payoffs conditions the ex-ante estimated surplus that creates room for concessions today. It is also interpreted as the degree of actors' patience: more patient actors value the future more, which means they discount future payoffs less. The rate of time discounting is inversely related to the discount factor δ,[7] so a higher rate of discounting corresponds to a lower discount factor and vice versa, as demonstrated in Figure 4.

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[7] "The lower the discount rate, the less one discounts the future, the higher the discount factor, and the greater the "discounted present value" of future payoffs" (Levy 2013, 19).
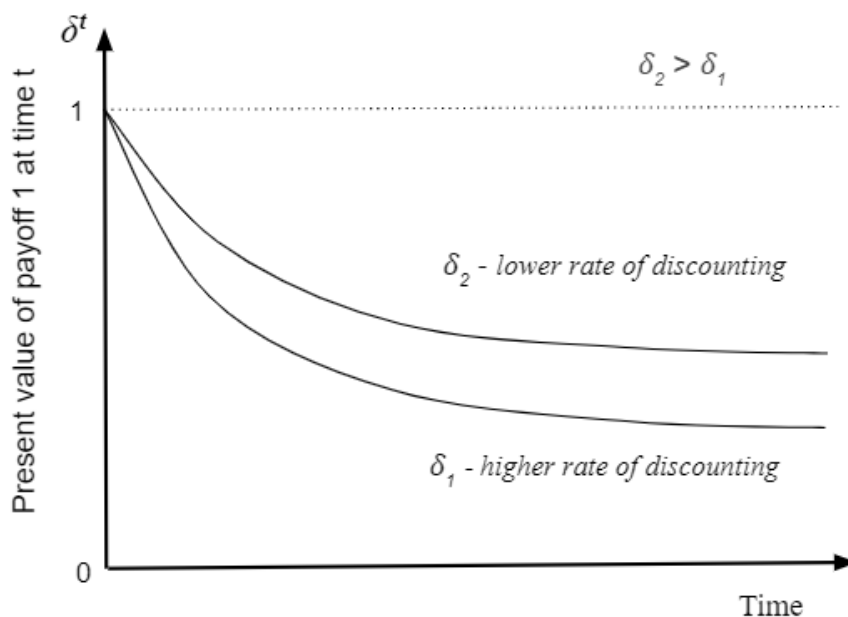
Figure 4. The Present Value of Future Payoffs Discounted at Different Rates

Cooperation theorists like Axelrod (1984), Keohane (1984), Oye (1986) and others, have conventionally argued that given a sufficiently large shadow of the future (i.e. if the parties are a expecting the interaction to continue long enough, and if the parties care about their future payoffs enough), the threat of future retaliation would make cooperation more likely. However, the implications of higher discount factors in the bargaining context are far more complex.

First, as Fearon notes, there are two ways in which the shadow of the future "cuts": whereas it deters cheating and makes agreement *enforcement* possible, it can incentivize states to *bargain harder*, to get a more favorable deal (Fearon 1998, 270). Furthermore, when considering the credible commitment problem generated by changes in bargaining strength, it turns out that a longer shadow of the future actually exacerbates the commitment problem leading to greater bargaining inefficiency. Tingley demonstrates this negative relationship between repeated interaction and bargaining inefficiency in *The Dark Side of the Future* (Tingley 2011). He points

to the fact that the conventional wisdom about the benefit of the shadow of the future is grounded on incentive structures like the game of the Prisoner's Dilemma, and does not necessarily extend to other bargaining environments, particularly those that are zero-sum with relative gains concerns. When you're expecting your opponent to get stronger over time, the larger shadow of the future makes bargaining less efficient (akin to the preventive war constraint).

By no coincidence, findings in behavioral economics are pointing to the fact that opposing expectations of gain and loss are exactly the kind of scenarios generating high discount factors. Experimental and field research has demonstrated different processes involved in discounting positive and negative outcomes, very similar to the expectations of prospect theory (Frederick et al. 2002). In particular, future gains were found to be discounted at a much higher rate (or more intensely) than losses of comparable size in numerous experimental studies (Thaler 1981, Loewenstein 1987, Loewenstein and Prelec 1992, Benzion et al. 1989, Estle et al. 2006, Molouki et al. 2019, and others). This result of gain-loss asymmetry is broadly known in experimental and behavioral economics as the "*sign effect*."

Whereas risk behavior has been in the spotlight following the results of Kahneman and Tversky, revisions concerning attitudes toward discounting the future have received much less attention. The behavioral revolution with regard to discounting patterns has been associated mainly with the problem of "hyperbolic discounting" (see, for instance, Hafner-Burton et al. 2017). However, the implications of gain and loss expectations for discounting future payoffs are far more significant in the context of bargaining. The sign effect implies concession aversion on part of the actor anticipating losses, as future losses are discounted at a much lower rate than comparable future gains. An alternative way to interpret concession aversion is via increased cost-tolerance, i.e. actors are willing to pay costs of higher value than yielding concessions the opponent wants to

extract. As Levy points out, "the greater the weight a declining actor gives to the future, the greater its incentives for war now" (Streich and Levy 2007, 199).

Another relevant pattern is the "*magnitude effect*" according to which larger payoffs are discounted at a lower rate as opposed to smaller payoffs (Frederick et al. 2002). Again, a large number of experimental studies have converged on this pattern by varying the sizes of outcomes (among them Benzion, Rapoport, and Yagil (1989); Green, Fristoe, and Myerson (1994); Kirby (1997) and others). Investigating the differential effects of magnitude, Estle, Green, and Myerson (2006) find that when it comes to large amounts, probabilistic gains are discounted at significantly higher rates than probabilistic losses. Situations of international conflict touching upon major interests of territory or strategic resources certainly belong in the category of large payoffs, which should be expected to have a greater weight on the discount factor in general. The article by Levy (2013) is one of the few pieces drawing attention to these patterns as being potentially consequential in IR. He views the magnitude effect as reinforcing "the concession aversion and the impediments to negotiated solutions because it leads people to overweight the future costs from current concessions relative to their future benefits" (Levy 2013, 319)

These theoretical observations similarly necessitate a revision of the rationalist approach with a view to incorporating assumptions about future discounting conditional on expected gains and losses and their magnitude. Bargaining models routinely apply common discount factors for both sides of the conflict, which is a rather unlikely assumption given the theoretical distinctions above. At least one previous study looking at potentially contrasting future discount factors has demonstrated divergent results. This is the analysis by Chadefaux (2011) arguing that Fearon's 1996 solution suggesting peaceful adjustment of territory under the continuity of p(x) does not hold true when states value the future differently. Problems arise when "the rising state does not

value the future as much as the declining one" (Chadefaux 2011, 242). Notably, Chadefaux is not coming from a relative gains and losses perspective, and his model somewhat differs from the problem described by Fearon, in the sense that it considers concurrent exogenous and endogenous shifts in power. Nevertheless, his observation about the parties' willingness to fight under conditions when the rising state values the future less than the declining one is extremely important, as I expect this condition to be prevalent.

To be fair, both Fearon and Powell recognize the conditionality of their solutions on the common discount factor. What they do not recognize is the theoretical significance of this parameter, likely by virtue of assuming random individual valuations or tendencies that are not to be controlled in a rationalist model. Chadefaux and Tingley pointing out the importance of this factor similarly do not investigate its conditionality on expected gains and losses. The model developed in this study attempts to account precisely for these theoretical assumptions.

Last but by no means least, I would like to address the question of the possibility of bargaining breakdown due to risk-seeking or time-discounting propensities, as this question is not a trivial matter in rationalist thought. This possibility will be addressed more fully in Chapter IV.

Can Reactive Resolve Constitute a Rational Explanation of War?

Consider the following observations by Gartzke (1999) on the problem of risk acceptance. Gartzke ponders over the effect of risk propensity on the Pareto space of peaceful bargains (or the size of the bargaining range actors prefer to war). On the one hand, he says, high risk acceptance could constitute a fourth rationalist cause of war, on the other hand, "explaining international conflict in terms of risk acceptance seems to necessitate either continual conflict or risk propensities that change as a result of exogenous factors that would then really constitute

explanations for war" (Gartzke 1999, 578). Neither of these lines of argumentation seems appealing to the author.

Reflecting on these arguments, O'Neill (2001) points to the fact that Gartzke is assuming risk attitudes "innate to the decision-maker," whereas "a revision of Fearon's approach would try to identify the kinds of situations that induce risk acceptance and block a negotiated settlement" (635). The kinds of examples O'Neill offers, however, appear to be descriptive of the problem of indivisibility of objects or interests, including references to Axelrod's 1969 theory of conflicts of interest or Hassner's 1999 analysis of sacred, religious sites, or identity issues potentially inducing risk acceptance.   However, the issue-indivisibility argument itself is not a particularly convincing one. Initially identifying it as an independent source, Fearon (1995) has hinted on the causes of indivisibility potentially rooted in "domestic political mechanisms" or the problem of credible commitment under anarchy. Powell (2006) has argued subsequently that indivisibilities do not provide a "distinct solution" to the bargaining inefficiency puzzle and should therefore be recognized as commitment problems themselves. Returns to the problem of risk acceptance, he argues that this problem too shall be viewed as part of the credible commitment problem, since preferable settlement options would otherwise always exist. "If one thinks of war as a costly lottery, all of the states would do better by agreeing to the equivalent costless lottery, that is, a lottery in which the states' chances of winning are the same and there are no costs. In each of those cases, the problem is not the absence of Pareto-superior peaceful agreements; the problem is that the states have incentives to renege on these agreements," he says (Powell 2006, 180).

This is certainly so if risk preference is perceived to be a predefined, innate attribute, rather than something influenced by the prospective outcome. However, a state actor accepting high risks in fighting due to lack of a better option is very different from a gambler tossing a coin who would,

indeed, choose a costless lottery if presented with such an option. It neither has a reckless preference for risk, nor it is willing to accept the odds of the game being imposed. It is a state rebelling against the odds imposed by the distribution of power, rebelling against a losing prospect, and it does so precisely by tolerating the costs it would otherwise not. That is how risk behavior manifests itself – at the expense of anticipated costs of war. Therefore, a state anticipating loss may not accept a shortcut lottery with the same odds and the same expected outcome of loss.

Risk taking is not necessarily emotional or irrational, as it utilizes the weaker side's bargaining leverage grounded on a credible concern of vulnerability. If the rationale behind risk aversion is to lower uncertainty for a party who has something to lose, the rationale behind risk acceptance is to generate or exploit opportunities offered by uncertainty when the prospects are otherwise nearly certain to be grim. Think of it as an extraordinary attempt to modify the situation, potentially by influencing the opponent with a demonstration of resolve and uncertainty. Ultimately, war is a lottery that may produce unexpected outcomes for everyone concerned, including the party expecting to win.

In another context, Slantchev (2003) references Clausewitz to convey a similar rationale for the weaker side's ability to exploit the risk and uncertainty of war: "Why do weak states sometimes attack stronger ones even when it is clear that they have no chance of victory? One argument forces us to assume irrational expectations or resolve. This is not necessary: ... as von Clausewitz ([1832] 1984, 92) put it, if the weaker state succeeds in giving the stronger one "doubts about the future," it can hope to profitably exploit its fear of prolonged conflict" (Slanchev 2003, 622). Powell's association with the costless lottery does not capture this rationale behind risk acceptance as a method of frustrating the prospect of loss, likely because risk attitude is being viewed as a pre-determined individual disposition, rather than a reaction to situational pressures.

I argue that reactive resolve to fight, expressed via risk acceptance and low future discounting, can generate bargaining inefficiency as it manifests cost tolerance in response to first-order conditions. It may not be a cause of war on its own, because reactive resolve is conditional on relative gains and losses that bargaining is expected to produce. It is in association with those anticipated changes that risk and future discounting behavior contribute to bargaining failure, but this second-order effect still has tangible consequences for outcomes of bargaining. The anticipated gains and losses have been recognized as potential sources of conflict when they are sufficiently large to constitute a credible commitment problem, whether due to endogenous or exogenous shifts in power. It is their amplifying effect on risk and future-discount factors that is missing from bargaining models. As Powell (2006) demonstrates, all three types of CCP operate via the same mechanism: in each case, large and rapid shifts of power produce bargaining inefficiency through the inability to commit. These shifts in power, whether exogenous or endogenous to the subject matter of dispute, constitute nothing more than relative gains and losses large enough to overshadow the bargaining surplus. But the changing BoP does not only impact first-order parameters in bargaining, it also effects the second-order dispositional parameters by inducing differential risk acceptance and future discounting, reflecting the parties' willingness to tolerate costs.

So yes, we may say that the problem of risk acceptance (as well as that of future discounting) is related to the problem of credible commitment, but not because risk acceptance would otherwise allow the parties to reduce a battle to a toss of a coin. As long as the alternative costless lottery is expected to produce the same prospect of loss, this is not an option the losing party is willing to take, even if that implies costs to be tolerated. It is because risk acceptance itself

is a reflection of the underlying problem of shifting power potentially generating a credible commitment problem.

Coming back to O'Neill's (2001) contention that a revision of Fearon's approach would need to reveal what sorts of situations "induce risk acceptance and block a negotiated settlement," the answer provided here is evident from multiple sources, including prospect theory and its numerous applications, the endowment effect, rent-seeking contests, the sign effect and the magnitude effect in behavioral economics, de Mesquita's reconceptualization of risk due to vulnerability in the IR context, even Kertzer's inference of expected loss, and likely other sources that this study has not been able to capture. The situations inducing risk acceptance and greater patience are the very same expected shifts in power as described in Fearon 1996, i.e. the expected gains and losses when bargaining over future bargaining power.

CHAPTER IV

FORMALLY INTEGRATING THE IMPACT OF BEHAVIORAL PARAMETERS

Introduction

This chapter formally integrates resolve to fight as the second-order effect of the structure of the conflict on outcomes of crisis bargaining. It does so by introducing contrasting behavioral parameters conditional on the parties' expected gains and losses, in line with the revised theoretical framework in Chapter III.

The formal model builds on Fearon 1996 which specifies the third type of the commitment problem - bargaining over objects that influence future bargaining power. The model assumes complete information and allows us to focus on a core commitment problem, which, in the authors' own words, "is clearly central to much of the bargaining that takes place between states in international relations" (16). Not only is this problem central to bargaining in international conflicts, it accentuates the value of potential gains and losses in terms of their contribution to future outcomes. Here, the parties to the conflict anticipate no exogenous shifts in power, but the object of the dispute itself (e.g. territory or another resource) constitutes a source of capability which may produce such a shift. In other words, power itself is the subject matter of the dispute. The setting allows us to abstract away from information concerns, subjective aspirations or sources of conflict, and place no uncertain limits on ambitions.

An important point to make is that the purpose of the updated model is *not* the systematic application of prospect theory and the sign effect from behavioral economics into the strategic IR context. Rather, the current research emphasizes the efficacy of these empirical findings in demonstrating the potential gaps and solutions in the way we rationalize the causes of war. It

formulates a revised framework by integrating the key element of reference dependence in evaluating outcomes that is theoretically compatible with rational choice as well as with the neorealist logic in IR and the systemic level of analysis it requires. So, the model developed below does not aspire to incorporate all the behavioral implications of these behavioral economics theories directly and comprehensively into the crisis bargaining context, but only takes the minimum core assumptions that are theoretically relevant for rationalist models of war.

For this reason, both subjective framing and pseudocertainty effects are not included in the revised framework or the updated model below.[8] In particular, when integrating loss aversion, I refrain from discussing framing effects by focusing solely on expected loss from a current status-quo reference point. This approach simplifies the model, but also keeps it parsimonious and devoid of individual-level assumptions. Similarly, the bargaining model centering on the credible commitment problem implies no information uncertainties. Thus, I leave out the probability weighting function, which would be very hard to reconcile with either rational choice or the condition of complete information.

Before moving to the setup of the formal model, I begin by describing how the behavioral parameters generally impact the bargaining space in game theoretic models. With this background I move to Fearon's setup, briefly summarize the new theoretical assumptions concerning risk attitude and time discounting and, finally, update the model in view of the new assumptions with subsequent findings.

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[8] By contrast, Butler (2007), for instance, applies prospect theory to reconstruct Fearon's 1995 model of bargaining, including both individual framing and pseudocertainty.

How the Behavioral Parameters Impact the Bargaining Range

Let us recall that the range of peaceful settlements is fundamentally determined by the players' values for war. Game theoretic models tend to normalize the object of the dispute to an interval spanning from 0 to 1, e.g. State 1 and 2 are negotiating control over territory of size $X = 1$, with each end of the space corresponding to its full control by one of the parties. Each party calculates their probability to win $(p, 1 - p)$ and individual costs of war (c_1, c_2), and the winner is expected to take over the entire space (outcome $x = 1$). The general formula for calculating the parties' expected payoffs for war is $p \times u(1) + (1 - p) \times u(0) - c$ which is often reduced to $p - c$ assuming the parties' utility for an outcome x is equal to its absolute value ($u(x) = x$), as in Fearon 1995. Absent information uncertainties or credible commitment problems arising out of capability shifts, bargaining is always efficient in the Fearon-Powell tradition, and the bargaining range extends between the parties' disagreement points from $(p - c_1)$ to $(1 - p - c_2)$, the latter located on the linear space of size 1 as $(p + c_2)$.

Figure 5 below depicts this bargaining space with an overlap of potential outcomes that both parties prefer to war. If there are no other challenges in terms of committing to a settlement in the future, the parties to the conflict would strictly prefer any potential settlement/division offer x, within this range, to fighting.
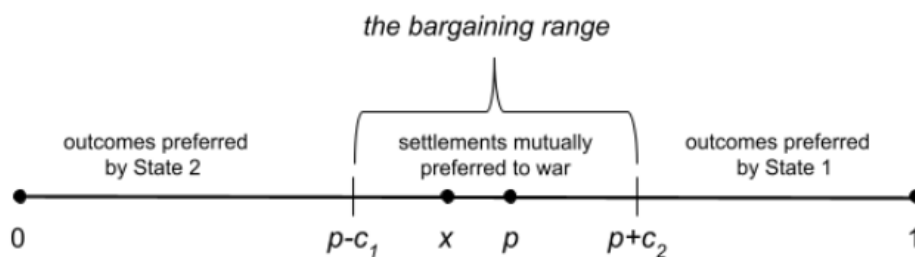
Figure 5. The Bargaining Range with Risk-Neutral Preferences (as in Fearon 1995)

Two additional variables, at the focus of this study, impact the outcome of bargaining by narrowing or broadening the bargaining range. Those are the parties' utility functions which represent their attitudes toward risk - $u_i(x)$, and their future discount factors - δ_i. Individual variations in these behavioral parameters have a major impact on the outcome of the game but are standardized in canonical models.

To see how divergent risk preferences alter the opportunities for bargaining, imagine different utility functions for the players in the special model above. One simple way to formally characterize risk preferences is by $u(x) = x^a \ where \ 0 < a < 1$ in the case of risk aversion, $a > 1$ in the case of risk acceptance, and $a = 1$ in the case of risk neutrality (i.e. $u(x) = x$). In the spatial model above, the assumption is that both parties are risk neutral, i.e. $u_1(x) = x, \ u_2(1 - x) = 1 - x$, and any settlement option x within the bargaining range is acceptable for both sides in the sense that it's strictly better than their war payoffs.

If at least one of the parties is risk-averse, i.e. $u_i(x) = x^a \ where \ 0 < a < 1$, the bargaining range is wider, because their utility of x is greater than its absolute value. If both parties are risk averse, the range is even wider as it is increasing at both ends (as in Figure 6A) ensuring a broad and safe space for engagement. The opposite pattern occurs when at least one of the parties is risk-seeking/risk-acceptant, i.e. $u_i(1 - x) = (1 - x)^a \ where \ a > 1$. A risk-seeking player has a lower utility than what is provided by the absolute value of its share. Such a utility function shrinks the bargaining range and may potentially empty the range of mutually acceptable settlements if the risk-seeking party's reservation point surpasses that of the opponent. When both parties have risk-seeking preferences, the bargaining space shrinks from both ends (see Figure 6B) and increases the potential for bargaining breakdown. Figure 6C illustrates this lack of overlap between the two states' preferred settlement outcomes.

In this context, the only agreements acceptable to both states would involve a hypothetical lottery between the extreme outcomes akin to the war outcomes but with lower or no associated costs (e.g. a combat of champions). Whether such a lottery could be feasible is an open question. The discussion in Chapter III on Powell's idea of a costless lottery has reflected on the nature of this problem. I have argued that the hypothetical lottery option is infeasible when high risk acceptance is a reaction to and a way of confronting the prospect of loss despite the costs implied, rather than an external preference for risk disconnected from the context of the conflict. Observe on the bargaining space, that risk-seeking value preferences manifest exactly at the expense of the costs of war and beyond. In this sense it is difficult to reconcile a party's agreement to the "costless" lottery with their risk-seeking attitude.
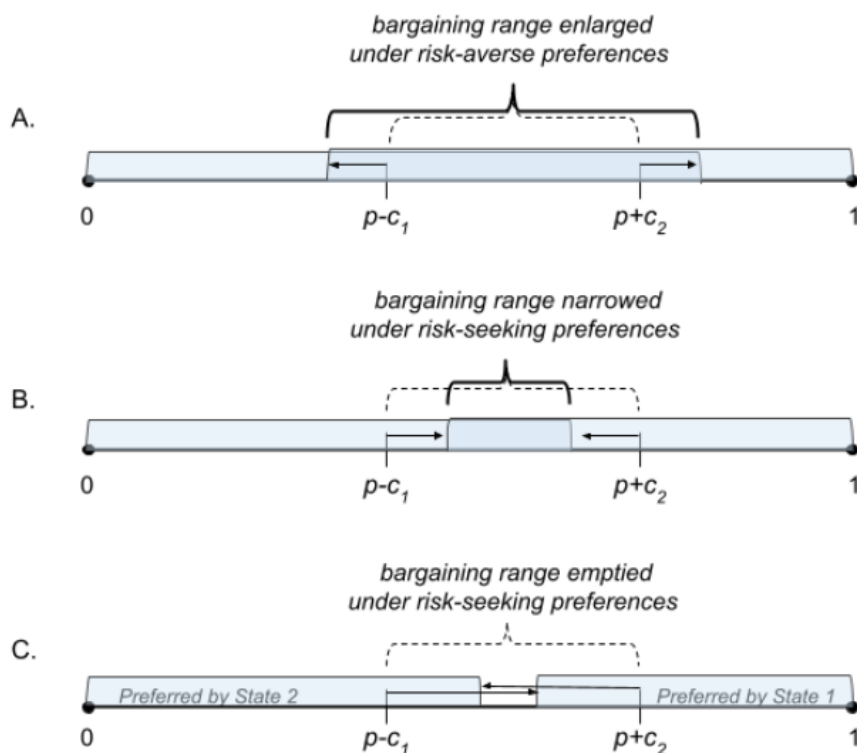
Figure 6. Transformation of the Bargaining Range under Risk Aversion or Risk Acceptance

The transformation of the bargaining range takes on a different shape under opposing risk preferences. Aside from enlarging, shrinking or emptying, when one of the parties is risk averse while the other is risk acceptant, the bargaining range also shifts and even dislocates outside the original interval, and always in favor of the party who is risk seeking (see Figures 7A and 7B). Such a shift takes place by virtue of risk aversion compensating for risk acceptance to some extent. In the event of symmetrically opposing risk propensities the shifted or dislocated bargaining range maintains its size. If the propensity for i's risk aversion is higher than that of j's risk acceptance, the new bargaining range would be wider than the former. And in the opposite case, the range would be narrower and potentially empty. Bargaining would break down beyond i's capacity of risk aversion to compensate for j's higher propensity of risk acceptance (Figure 7C).
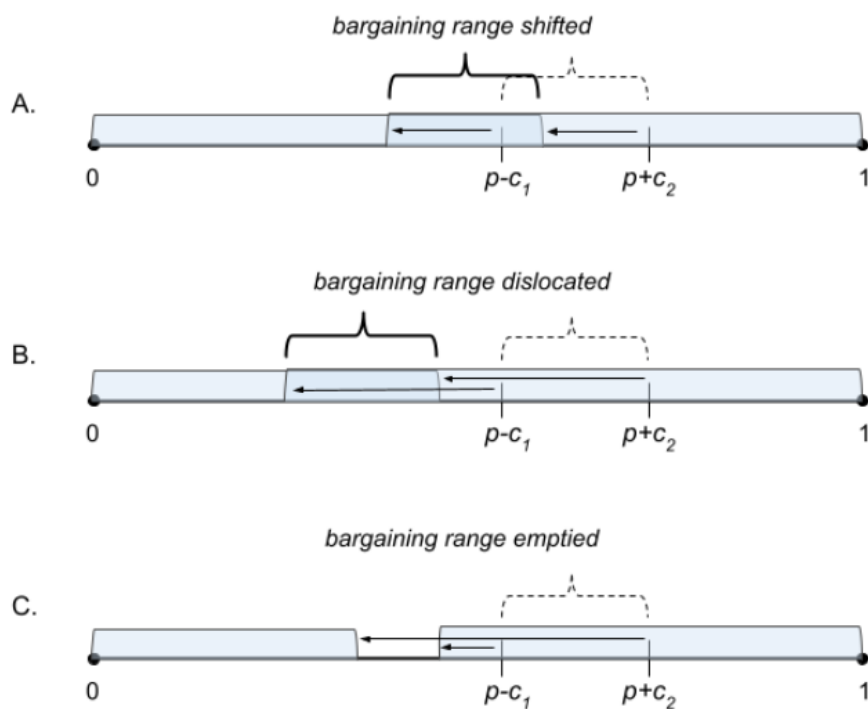
Figure 7. Transformation of the Bargaining Range under Opposing Risk Preferences

A numerical example of the transformation under opposing risk preferences is illustrated on Figure 8. Suppose $(p - c_1) = .5$ and $(p + c_2) = .6$. Then any settlement proposal $x \in (.5, .6)$ would produce an efficient outcome under risk neutrality. However, State 1 is risk averse at $a_1 = \frac{1}{2}$ while State 2 is risk seeking at $a_2 = 2$. In this case, State 1's utility at $x = .5$ is over .7. Meaning, its real reservation point corresponding to a utility of .5 is actually lower, at .25, since $u_1(.25) = .5$. So even though State 1 calculates a war payoff of .5, a risk-averse utility function implies that it may settle for less in order not to risk a costly war gamble. Shifting State 1's reservation point to the left expands the bargaining space to $x \in (.25, .6)$. Meanwhile, State 2's reservation point is no longer at $(1 - .6) = .4$; their utility of this outcome is much lower at: $u(.4) = .16$. For a settlement offer to be an improvement over their war payoff of 0.4, State 2 now requires that its share of the settlement comprise at least $1 - x \approx .63$, i.e. $x \approx .37$. Such an expectation shrinks back the bargaining range dislocating it entirely outside the former interval.

Take note that if this player was dealing with a risk-neutral (or another risk-seeking) party, the bargaining range would be empty with a gap between their reservation points of .5 (or higher) and .37. But in this case, State 1's risk aversion is compensating for State 2's risk acceptance, allowing for bargaining to be efficient for any $x \in (.25, .37)$. Only the bargaining range is shifting to the left, with more favorable settlement possibilities for State 2.
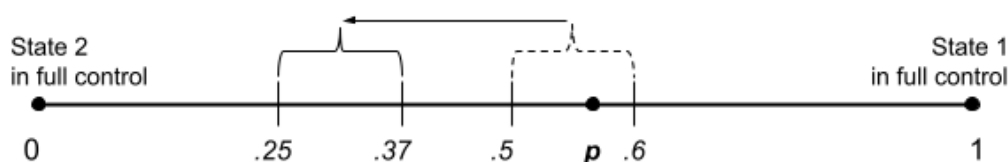
Figure 8. Example of a Dislocated Bargaining Range when State 1 is Risk Averse (at a₁=½) and State 2 is Risk Seeking (at a₂=2)

Note that the new bargaining range is further away from the probability of winning. Such a radical shift may appear unusual, but it demonstrates the considerable impact of the utility function on the bargaining space. One may think of the former bargaining range as corresponding to the raw calculus of capabilities and costs, while the revised range as reflecting the subjective individual value or utility of those outcomes for the parties concerned. However, as has already been discussed in Chapter III, I expect the parties to have reactive risk preferences that reflect their position relative to the status quo and the expected gain/loss from that position. In these terms, the revised range is *not* a reflection of subjective, individual-level valuations, but an objective, system-level distinction conditional on the status-quo division of territory and the gain/loss anticipated from a potential redistribution.

Let's look at the implications of these preferences in the simple bargaining model above.

If the status-quo division is to the left of the initial bargaining range ($q_1 < .5$), State 1 is anticipating an improvement of its position at State 2's expense, imposing risk-averse and risk-acceptant behavioral patterns on states 1 and 2 respectively, shifting the range to the left. The spatial models under figures 6 and 7 above all illustrate this case.

If, on the other hand, the status quo distribution is to the right of the initial bargaining range ($q_2 > .6$), State 2 would be expecting to gain at the expense of State 1, and so their risk behaviors would be reversed, shifting the revised bargaining range to the right. In each case, the potential challenge to the weaker or defending side is somewhat neutralized by the reactive nature of risk propensities.
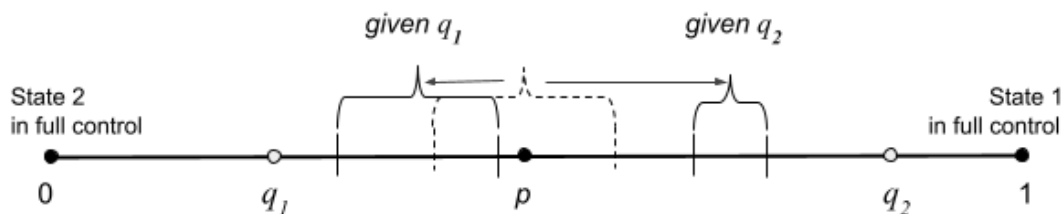
Figure 9. Updating the Bargaining Range Given the Location of the Status Quo (q)

In fact, as we will see in the following section, when the distance between q and p is large, the bargaining range is likely to shrink (as illustrated in Figure 9). That is to say, when there is a large gap in the distribution of capability and the distribution of territory requiring a sizeable revision of the status quo, the party expecting to lose a large chunk of territory has a higher risk-taking propensity than the party expecting to gain is willing to accommodate.

So far, I have considered the bargaining process as a single-time event. When bargaining is not a one-shot game but is repeated in multiple stages or has an infinite horizon, the bargaining space is also impacted by the shadow of the future. Designated as the discount factor δ, it is interpreted as either the likelihood of repeated interaction or the extent to which the parties discount future payoffs relative to present payoffs.

As discussed in Chapter III, unlike incentive structures like those of the Prisoner's Dilemma where the longer shadow of the future is generally perceived to facilitate cooperation, in zero-sum bargaining context with relative gains concerns there is a negative relationship between repeated interaction and bargaining inefficiency (Tingly 2011). This is because the longer shadow exacerbates the problem of CCP by extending expectations of gain and loss further into the future. We also know from the sign effect in behavioral economics that the gains and losses affect the future discount rate asymmetry: i.e. future losses are discounted at a lower rate than gains of the same size. The structure of the bargaining environment, in other words, makes a difference in

terms of the effect of the discount factor. The case under study here is a highly competitive, zero-sum game, with a credible commitment problem. In this context, the higher the likelihood of future interaction, and the higher the weights assigned to future payoffs, the lower the chances of bargaining success, because the higher valuation of future payoffs is reducing the room for concessions today.

To see how the parties' future discount factors impact the bargaining space, consider a few numerical examples below, keeping in mind that discount factor delta $\delta \in [0,1]$ is inversely related to the rate of the discounted present value of the future.

The sum of an infinite stream of payoffs is calculated by dividing its current value by $1 - \delta$. Accordingly, the parties' infinite-horizon discounted war payoffs are:

State 1: $\frac{p}{1-\delta} - c_1$

State 2: $\frac{1-p}{1-\delta} - c_2$;

and since their payoffs from peaceful settlement are also discounted at the same rate, the boundaries of the bargaining zone around p extend between $\left(\frac{p}{1-\delta} - c_1\right) \times (1 - \delta)$ and $1 - \left(\frac{1-p}{1-\delta} - c_2\right) \times (1 - \delta)$.

Observe that if the discount factor was zero, the parties' disagreement points would be the same as before: $p - c_1; 1 - p - c_2$. In a one-shot game, we were simply assuming that the parties were never anticipating another stage of bargaining or had no concern for the future at all ($\delta = 0$). As soon as there is some level of discounting, the bargaining range is effectively narrowing down because although the stakes of victory are enjoyed across many time periods, the costs are only borne once.

Figure 10 below illustrates this narrowing range with selected values for the probability of winning ($p = .6$), costs of fighting ($c_1 = c_2 = .05$), and varying discount factors. The upper graph (10A) corresponds to the original bargaining range under risk neutrality, where the discount factor is zero. In 10B, the parties have a common discount factor $\delta = .2$, which means they are discounting future payoffs at a high rate. This preference is slightly narrowing the bargaining range. And finally, 10C illustrates the shrinking of the bargaining range under higher and divergent discount factors. As the discount factor approaches its upper limit, $\delta \to 1$, the range reduces to p where the parties are indifferent between fighting and settlement.

original bargaining range when $\delta=0$
(at $p=.6$, $c_1=c_2=.05$)

A.

0   .55   p=.6   .65   1

bargaining range under a common discount factor $\delta=.2$

B.

0   .56   .64   1

bargaining range under divergent discount factors $\delta_1=.4$, $\delta_2=.6$

C.

0   .57   .62   1
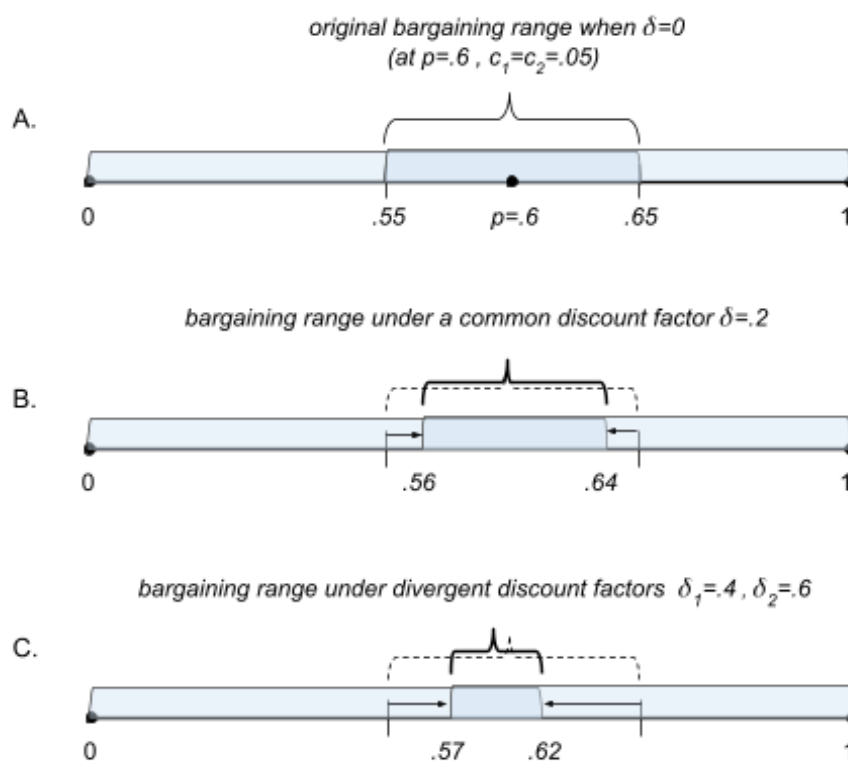
Figure 10. Transformation of the Bargaining Range with Future Discounting

The revision of Fearon's 1996 model below will demonstrate the extent to which higher and differentiated discount factors alter the standard bargaining space. In Fearon's model, not only

the game has an infinite horizon, but the probability of winning is conditional on the distribution of territory in each time period. Each transfer of territory has a consequence for the next stage, as it moves the likelihood of victory in favor of one of the parties to the conflict. In this context, narrowing the bargaining range because of higher (and divergent) time preferences can lead to bargaining failure under reasonable assumptions.

The Model Setup

As noted before, the core model developed here builds on Fearon's (1996) model. Once again, this model formalizes the third type of commitment problem - bargaining over objects that influence future bargaining power. The model assumes no information uncertainties and allows us to concentrate on the power value of the object of the dispute (such as territory). This object constitutes a source of capability that contributes to a future shift in power. As a matter of fact, the model allows for the entire territory controlled by both parties to be subject to bargaining, which makes it difficult to locate any particular target of the dispute other than relative power and control over the adversary.

Consider states 1 and 2 are disputing territory with a simple bargaining protocol of the "ultimatum game." State 1 makes an offer of territorial division $(x_t, 1 - x_t)$ for period t, and threatens to fight otherwise. State 2 either accepts or rejects the ultimatum. We could say that State 1 in this case is the Challenger, while State 2 is the Defender. If the offer is accepted, the parties redistribute territory arriving at a new distribution of resources (BoP) with State 1 in a better position for the next stage of bargaining. In the new period, it is free to make another ultimatum for the following period, and so on. If the offer is rejected at any stage, a costly war ensues. But because the players' probabilities of winning at a given point t are determined by their possession of territory/resources in the previous period $t - 1$, i.e. $p(x_{t-1})$ and $1 - p(x_{t-1})$ for states 1 and

2 respectively, each concession by State 2 reduces its probability of victory in the subsequent stage, implying a weaker bargaining position and potentially greater concessions tomorrow.

i	$player\ i \in \{1, 2\}$
x	$territorial\ division\ with\ outcome\ (x, 1 - x)\ for\ states\ 1\ and\ 2\ respectively,$ $where\ \mathrm{x} \in [0, 1]$
$u_i(x)$	$player\ i's\ utility\ function\ contingent\ on\ x$
p	$probability\ of\ winning\ (p, 1 - p):\ \ p \in (0, 1)$
$p(x)$	$probability\ function\ contingent\ on\ changes\ in\ the\ division\ of\ territory$
c_i	$i's\ costs\ of\ fighting:\ c > 0$
δ_i	$i's\ discount\ factor\ for\ future\ payoffs:\ \delta_i \in [0, 1]$
x_t	$state\ 1's\ share\ in\ the\ division\ offer, at\ time\ t$
$p(x_{t-1})$	$state\ 1's\ probability\ of\ winning\ at\ time\ t$

Table 1. Table of Notations

In line with the original model, $p(\cdot)$ as a continuous, non-decreasing function on [0, 1] (with $p(0) = 0$ and $p(1) = 1$) but various functional forms are possible for $p(x)$ dependent on the effect of changes in force ratio on the probability of winning. Fearon suggests thinking of those differences as representing the offense/defense-dominance vs. the simple ratio form $p(x) = x$. As mentioned earlier, his solution attributes the success of bargaining to the continuity of $p(x)$ - from territory/resources held to the probability of winning. As long as the function is continuous and the territory is infinitely divisible, Fearon demonstrates a gradual adjustment of military odds through sufficiently small demands and transfers, appeasing the challenger. When this is the case, the final distribution depends on the impact of transfers on p, that is, the offense-defense balance. When offense dominates (i.e. small changes or transfers imply a large shift in probability of victory) the initially weaker state is nearly or completely eliminated over time; and when defense dominates (i.e. the likelihood of winning is less sensitive to territorial changes), concessions lead

to a "stable division, or rough 'balance of power'" (Fearon 1996, 1). Bargaining is only inefficient when $p(x)$ is discontinuous or the impact of concessions on the distribution of power jumps, causing a large shift in bargaining leverage.

At the focus of the current revision are not so much the functional forms of $p(x)$ as the gradual appeasement of the challenger with sufficiently small demands leading to a potential elimination.

The parties' expected utilities for war at time t are specified as: $\frac{p(x_{t-1})}{1-\delta} - c_1$ for the challenger and $\frac{1 - p(x_{t-1})}{1-\delta} - c_2$ for the defender.

In the event if the Defender accepts the proposed division of $(x_t, 1 - x_t)$ instead of fighting now, it yields the utility of payoff $u_2(1 - x_t)$ plus the discounted continuation payoff[9] at $t + 1$, which Fearon demonstrates as being necessarily $\geq \frac{1 - p(x_t)}{1-\delta} - c_2$, for the Defender may choose to fight in the following period at $t + 1$. It follows from here that, in equilibrium, the Defender will accept any proposal where this utility is greater or equal to its war payoff:

$$\frac{1 - p(x_{t-1})}{1-\delta} - c_2 \leq u_2(1 - x_t) + \delta\left(\frac{1 - p(x_t)}{1-\delta} - c_2\right) \qquad \text{(1) Fearon model}$$

and that the Challenger will always offer x_t such that the above holds with equality:

$$\frac{1 - p(x_{t-1})}{1-\delta} - c_2 = u_2(1 - x_t^*) + \delta\left(\frac{1 - p(x_t^*)}{1-\delta} - c_2\right) \qquad \text{(2) Fearon model}$$

(1996, 4).

The following passage provides an excellent narrative summary of the result, along with the proofs, to which I will return shortly:

> *"Thus in the game's unique subgame perfect equilibrium war does not occur - the bargaining is efficient despite the states' inability to commit themselves not to increase their demands once they have grown stronger. The keys to this conclusion*

---

[9] The continuation value is the non-discounted amount the Defender will receive if no agreement is reached.

are the assumed availability of infinite set of possible divisions in X and the continuity of $p(x)$, which together imply that state 1 can always find a demand x_t^* that leaves state 2 just willing to grant (or, it turns out, accept) the concession rather than fight. In effect, granting a concession to state 1 has both a good side and a bad side for state 2. On the good side, state 2 gets a period of peaceful enjoyment of the territory $1 - x_t$ while on the bad side it may be less able to resist subsequent demands. ...the good and bad sides together make granting the concession just as attractive as fighting now." (p.5)

Once again, two important conditions that the above solution assumes are the actors' permanent risk neutrality/averseness and their fixed identical rates of time discounting.

Concerning the first, Fearon assumes that the actors' utility functions are strictly increasing and weakly concave, corresponding to risk-averse or, at least, risk-neutral preferences, which he justifies on the grounds that "states (or, more precisely, their leaders) view elimination as *very* bad relative to gaining more territory" (1996, 3). Although the latter expectation is generally very appropriate and states would rather not take risky action potentially leading to their elimination, the justification can hardly extend to situations where states are expected to take action ultimately leading to their elimination! It is easy to see in that extreme example, which happens to coincide with Fearon's equilibrium path, that when the actor can anticipate gradual elimination, risk-neutrality or aversion is no longer a meaningful concept or assumption to hold on to. This is precisely reflective of the theoretical discussion above on deriving preferences from utility rather than pre-defining risk preferences and then deriving utility from those fixed preferences.

Concerning the second, Fearon simply assumes states to have a common discount factor without further justification. And although the harmful consequences of high discount factors are keenly acknowledged, the potential sources of high discount factors or variation in discounting patterns among the parties are not. Lack of theorizing concerning the future discounting factor in nearly all canonical models of bargaining is quite astonishing, given the crucial role of this variable

in terms of allowing room for concessions. Challenger's success in extracting voluntary transfers of territory is almost entirely conditional on Defender's value of future payoffs vs. present payoffs. Assuming a random common discount factor for all the parties would be sensible if the expected future vs. present payoffs were the same for both. But such an approach does not capture valuations associated with future gain and loss. What can be a more effective driver of high valuation of the future than the vulnerability or the concern for the future itself, all the way to an extreme potential elimination prospect? Alternatively, thinking in terms of the "shadow of the future" as the likelihood of repeated interaction, we may say that bargaining is very likely to continue when more gains can be extracted in the future. As in the case of risk preferences above, we are once again dealing with the need to integrate meaningful discounting patterns given the expected outcome of bargaining and not the other way around.

Integrating the new theoretical assumptions requires that actors' risk attitudes and discount factors be conditional on their prospects (of gain and loss) from a current status quo position. I now turn to incorporating those assumptions in the model.

Integrating Risk Attitude Hypotheses

Theoretical assumptions:

− Actors' risk attitudes are not permanently defined by either of the three classical risk-preference curves but are conditional on their expected utility of war or settlement determined largely by relative capabilities and costs. This is supported by the formal assumptions of Prospect Theory (among other sources discussed above) which proposes that "the value function is (i) defined on deviations from the reference point; (ii) generally concave for gains and commonly convex for losses; (iii) steeper for losses than for gains." (Kahneman & Tversky 1979, 279)

- The choice of the reference point obviously has a major impact on the assessment of gains and losses and in real life situations can range from historical high points to future expectations and conceptions of justice and equity. The model discussed here attempts to avoid subjective choices and focus on the realist framework of distribution of resources. Hence, it considers the status quo division (q) as the initial reference point, and the magnitude and direction of change from that reference point to a potential settlement offer (x) conditioned by the expected outcome of war.

- In the original model, the probability of victory at time t is determined by the distribution of territory/resources in the previous period $p(x_{t-1})$. Fearon does not clarify whether this embodies the entire resource capability available to the parties or not, but here we would have to assume that the previous distribution is not the sole determinant of the outcome but only its partial determinant, otherwise there would never be an expected improvement from the previous position. That is, assuming $p(x) = x$, or assuming no additional offense-defense advantages, no party would ever expect to achieve a higher utility by pursuing a military option, since at any time t its expected utility of war would equal $p(x_{t-1}) - c \leq x_{t-1}$. I, therefore, assume that the probability of victory is only partially determinated by the distribution in the previous period.

Let us denote expected gain by γ: $\gamma = x - q$, where q represents the status quo distribution and x is an arbitrary division offer within the bargaining range (which may coincide with p). In the model, the status quo distribution corresponds to x_{t-1} as compared to the division proposal x_t, therefore the parties' gain/loss from settlement would be represented as $\gamma_1 = x_t - x_{t-1}$ for State 1, and $\gamma_2 = 1 - x_t - (1 - x_{t-1}) = -(x_t - x_{t-1})$ for State 2. In other words, the settlement gain

of one party is exactly equivalent to the loss of the other, corresponding to a zero-sum, strictly competitive conflict relationship:

$$\gamma_1 = -\gamma_2.$$

In the event of bargaining breakdown, additional losses add up due to bilateral costs of war.

In the region of expected gain ($\gamma > 0$) actors are risk averse, in the region of expected loss ($\gamma < 0$) they are risk-acceptant, and in stability ($\gamma = 0$) they are expected to display risk-neutral behavior. Expected gain corresponds to the "credible threat" criteria allowing the party to issue a demand, while at the same time imposing a risk-averse behavior. By contrast, expected loss implies "credible resolve," imposing risk-acceptance. An expectation of the stability of the status quo (i.e. neither improvement nor deterioration of positions) undermines the credibility of threats and resolve to fight, inducing risk-neutrality.

As briefly discussed above, contrasting prospects of gain and loss and their corresponding risk behavior patterns are reflected in utility weights. If the parties' risk-averse and risk-acceptant utility curves were symmetrical, we could graphically picture their risk preferences similar to a continuous increasing logistic/sigmoid function with an inflection point where the parties' relative strength and expected utilities are balanced (see Figure 11). Take note that in this case their combined effect in the model would be the same as if both parties where risk neutral (demonstrated by the dashed line). Instead, prospect theory establishes that the curves are asymmetrical in favor of risk acceptance (a steeper utility curve) as in Figure 12. This is because the negative value of each additional increment of loss is felt much more drastically than the positive value of each additional increment of gain.
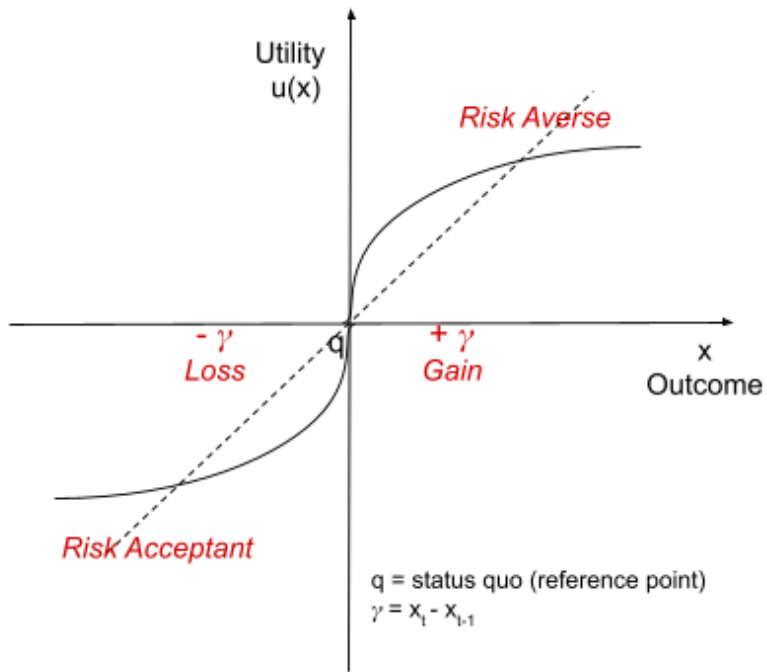
Figure 11. The Reflection Effect without Loss Aversion
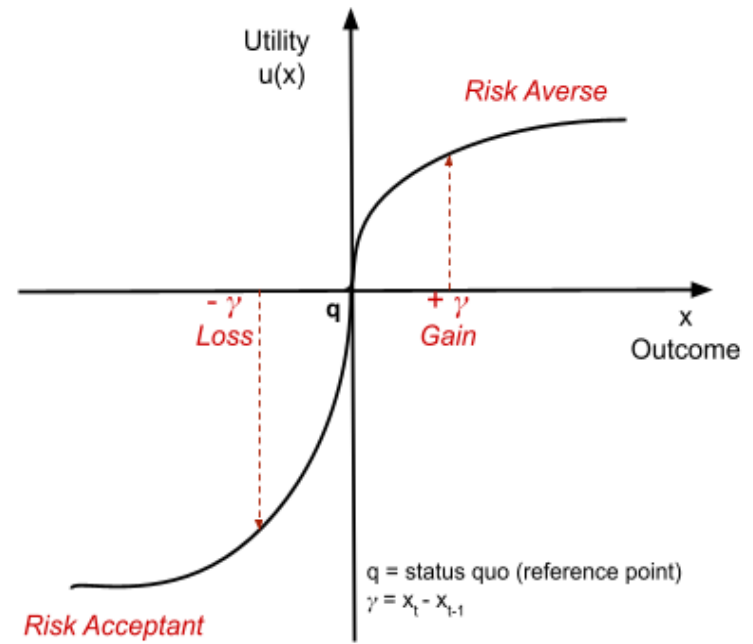
Figure 12. The Reflection Effect with Loss Aversion

More specifically,

while State 1 is more content with its gain than its absolute value:

$$u_1(x_t) > x_t,$$

and State 2 is more dissatisfied with its loss than its absolute value:

$$u_2(1 - x_t) < 1 - x_t,$$

State 2 is much more dissatisfied with its loss than State 1 is content with its gain:

$$u_2(-\gamma) < -u_1(\gamma).$$

In the framework of this rationality, Fearon's assumption of risk neutrality is only applicable to cases where actors' outcome expectations given the distribution of resources are relatively balanced. If so, risk neutrality is not even a useful behavioral expectation for crisis bargaining, because war is hardly conceivable where there is no expected gain and loss. As soon as one of the sides is objectively expecting to gain something as a result of war, the other is necessarily expecting to lose, and the actors' risk behaviors diverge at that point. Fearon's result would certainly apply to cases where both parties are risk neutral, averse, or any combination of risk neutral and risk averse actors, and even when the risk attitudes are opposed but symmetrical. However, neither of these options fit into the above theoretical framework, where expected gains for one party indicate losses for the other with a higher disutility for loss.

Recall that for efficient bargaining, the offer $(x_t, 1 - x_t)$ must be acceptable for both sides, or at least be as good as their disagreement points. Previously it was assumed (under risk neutrality) that in order for state 2 to agree to the offer, inequality (1) must hold:

$$\frac{1 - p(x_{t-1})}{1 - \delta} - c_2 \leq u_2(1 - x_t) + \delta\left(\frac{1 - p(x_t)}{1 - \delta} - c_2\right)$$

In line with the specification $u_2(1 - x_t) < 1 - x_t$ due to the expected loss, State 2's utility of the settlement is actually less than assumed and, therefore, needs to be compensated.

In Fearon's proof (1996, p.18), State 1 can guarantee the acceptance of its offer by setting $x_t = x_t^*(x_{t-1})$ and it wants to do so because its payoff of such acceptance, which is at least

$$u_1\left(x_t^*(x_{t-1})\right) + \delta\left(\frac{p(x_t^*(x_{t-1}))}{1-\delta} - c_1\right), \text{ is greater than its war payoff of } \frac{p(x_{t-1})}{1-\delta} - c_1.$$

From manipulating equation (2) Fearon obtains the following form:

$$\frac{p(x_{t-1})}{1-\delta} = 1 - u_2(1 - x_t^*) - c_2(1-\delta) + \frac{\delta p(x_t^*)}{1-\delta}$$

Plugging this into player 1's payoff inequality, he obtains:

$$1 - u_2(1 - x_t^*) - c_2(1-\delta) + \frac{\delta p(x_t^*)}{1-\delta} - c_1 < u_1(x_t^*) + \delta\left(\frac{p(x_t^*)}{1-\delta} - c_1\right) \qquad (3)$$

with a more simplified version:

$$1 - (c_1 + c_2)(1-\delta) < u_1(x_t^*) + u_2(1 - x_t^*) \qquad (4)$$

which Fearon deems to be true "since c_1, c_2 are both greater than zero and risk-neutrality/risk-aversion implies that $u_1(x_t^*) \geq x_t^*$ and $u_2(1 - x_t^*) \geq 1 - x_t^*$ (p.19), i.e. the right-hand side is greater or equal to 1 while the left-hand side is smaller than 1.

The situation is different when state 1 is risk averse: $u_1(x_t^*) > x_t^*$, while state 2 is risk acceptant: $u_2(1 - x_t^*) < 1 - x_t^*$.

Had these contrasting risk attitudes been symmetrical (i.e. the sum of the parties' utilities equaling 1) or had they been asymmetrical in favor of state 1's risk averseness (i.e. if the sum was greater than 1) ensuring that the right-hand side of inequality (3) does not fall below 1, Fearon's result would continue to hold. In other words, state 1's risk-averseness would provide room to compensate for state 2's risk-acceptance, by settling for a somewhat smaller demand or possibly even neutralizing the threat altogether by making it non-credible. Bargaining would remain efficient in either case. Once again, this would reflect the parties contrasting utilities from division x_t. For State 2, $u_2(1 - x_t) < 1 - x_t$, and this disutility would be pulling x_t toward the status quo

x_{t-1}, requiring a larger share of the division than $1 - \mathrm{x}_t$ to close the utility gap. Luckily, the move would be compensated by State 1's symmetrically high expected utility from the anticipated gain. In this case, the bargain (offered division x_t) would have shifted slightly in favor of the defender, but the chances of war would have remained unaffected.

Contrary to this outcome, when the parties' utility curves are asymmetrical in favor of risk acceptance, breakdown in bargaining is possible when the Defender's disutility of the concession sufficiently outweighs the Challenger's value of gain. That is when risk acceptance empties the bargaining range by pulling x_t beyond the Challenger's disagreement point, while the Challenger's ability to compensate falls short of closing the gap. We could say the former is willing to take a greater risk than the latter is willing to avoid. Or to put it simply, the Challenger is expecting at least some concessions but is not getting any.

This is precisely the case here, as the Challenger's expected utility/happiness associated with the demand is outweighed by the Defender's expected disutility/unhappiness with the concession to be made. This difference between the utility of gain and the disutility of loss: $u_1(\gamma) - u_2(-\gamma)$ remains uncompensated and creates potential for bargaining breakdown. The graph below demonstrates this uncompensated, "excess disutility":
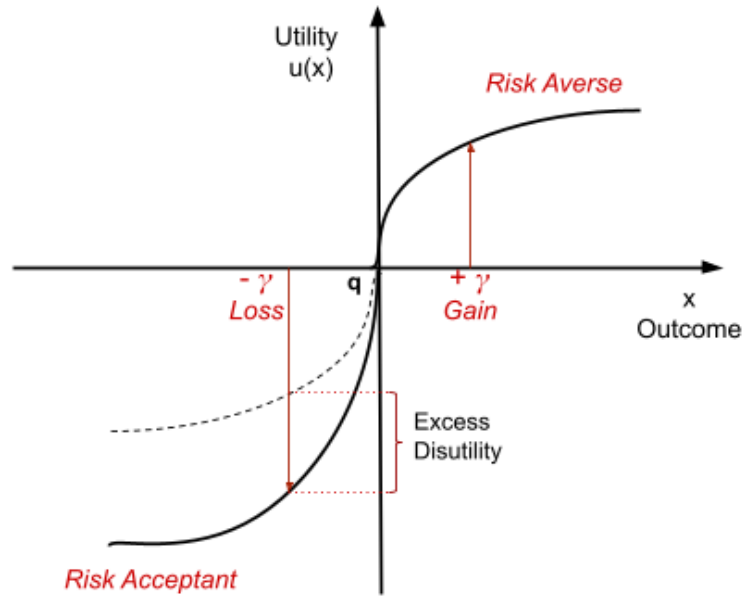
Figure 13. Excess Disutility Arising from Loss Aversion

The graph also allows us to observe that "excess disutility" increases along with the size of expected gain/loss, which essentially represents the mismatch between the status quo distribution of territory vs. current capabilities allowing to revise it. The larger this excess disutility, the higher the potential for bargaining breakdown.

More precisely, **the condition for inefficient bargaining is met when *excess disutility* is greater than the product of $(c_1 + c_2) \cdot (1 - \delta)$.** This is easy to see, by representing the right-hand side of inequality (3) via excess disutility which I designate below with E.

Suppose that the sum of parties' utilities from the equilibrium outcome is $1 - E$, where 1 is simply the symmetric contrast of risk attitudes which would provide for the same outcome as risk neutrality. In this case, inequality (3) will yield:

$$1 - (c_1 + c_2) \cdot (1 - \delta) \; < \; 1 - E$$

$$E \; < \; (c_1 + c_2) \cdot (1 - \delta)$$

Unless E is smaller than this product, Fearon's result for peaceful transfers would not hold.

Recall that these are not the parties' subjective values associated with the particular object of dispute, but the values associated purely with the objective anticipation of gains vs. losses from a current status quo reference point.

Integrating Time Discounting Hypotheses

Theoretical assumptions:

– Actors' discounting rates are conditional on expected utility of war/settlement. They may be treated as identical under conditions of relative stability, but otherwise should be differentiated based on expected gain and loss. This is in line with formal and experimental research in behavioral economics (Frederick, Loewenstein, and O'Donoghue 2002), which has emphasized different processes involved in discounting positive and negative outcomes, like the expectations of prospect theory for risk behavior. Particularly, future gains have been found to be discounted at a much higher rate than losses of comparable size. Thus, expected losses impose greater patience or concession aversion, whereas expected gains impose relative impatience.

– The difference in the rates may be large or small or may change over time. Some experimental studies have demonstrated substantial differences, with discounting exceeding up to ten-fold for gains vs. losses (for instance, in Thaler 1981). For now, let us assume simply that the rates differ, with the State 2 (the Defender) discounting at a lower rate than State 1 (the Challenger) i.e. State 2 has a higher discount factor δ than State 1 due to the inverse relation between the discount rate and the discount factor: $\delta_2 > \delta_1$.

- Among additional patterns of relevance, discount rates have also been demonstrated to be lower for large payoffs as opposed to smaller payoffs. Situations of international conflict touching upon major interests of territory or strategic resources certainly belong in the category of large payoffs, which should be expected to have a greater weight on the discount factor in general.

Let me start by acknowledging Fearon's own observations and intuition regarding the linkage between discount factors, concessions, and their consequences. In his original article Fearon clearly points to the fact that placing a greater weight on future payoffs reduces the amount of concessions all the way to zero, i.e. $\delta \to 1$, $x_t^* \to x_{t-1}$. He observes this by rearranging equation (2) into the following form:

$$1 - p(x_{t-1}) - c_2(1 - \delta)^2 = (1 - \delta)u_2(1 - x_t^*) + \delta(1 - p(x_t^*)).$$

Fearon adds that "intuitively, the more states value future payoffs, the less territory they are willing to give up today due to the consequences of these concessions tomorrow," and anticipates a complete "freezing" of the status quo under discrete rather than continuous issue resolutions, for a large enough δ (1996, 5-6). Interestingly, Fearon's own intuition appears in line with the theoretical assumptions above, concerning the conditionality of discount rates on the consequences the concessions imply for tomorrow. Nevertheless, as long as issue resolutions are continuous and $\delta < 1$, it appears that Fearon anticipates a continuous adjustment of territory, leading to either gradual elimination or a balance, depending on additional circumstances related to offense/defense advantages.

The need for some level of discounting is also evident from the rearrangement of inequality (4). Under conditions of risk neutrality, an equilibrium solution would require that:

$$(c_1 + c_2)(1 - \delta) > 0,$$

necessitating $\delta < 1$, and only that, as long as the sum of bilateral costs is positive.

Recall that the analysis of the risk behavior in the previous section suggests that the product on the left-hand side of the inequality has to be greater than "excess disutility" rather than simply greater than zero, but for a moment let us temporarily assume risk neutrality, and we will return to the combined effect of risk and time discounting preferences later on.

Also note the link between time discounting and costs: the inequality above demonstrates vividly how the level of discounting impacts the value of costs. A higher discount rate always implies a lower valuation of costs. This is very true in the theoretical sense, since the more the party values the future, the more prepared it is to tolerate the costs of war today. Another way of putting this is that concession aversion manifests itself via cost tolerance. At the very extreme, when $\delta = 1$ (i.e. the future is not discounted at all) the party to the conflict is "paying no costs" or in other words is fully cost tolerant.

To repeat, Fearon's efficient bargaining result is very much based on the assumption of equal/identical and fixed discounting rates for both parties. This is certainly a very helpful simplifying assumption, but one that is not theoretically grounded. To integrate differentiated discount factors, I modify the original proof via inequality (3).

Since the result for $\frac{p\,(x_{t-1})}{1-\delta}$ plugged into inequality (3) concerns State 2 and the rest of the inequality concerns State 1, a revision of this inequality requires that all discount factors in the left-hand side of the inequality be assigned to State 2, while the discount factors on the right-hand side be assigned to State 1:

$$1 - u_2(1 - x_t^*) - c_2(1 - \delta) + \frac{\delta p(x_t^*)}{1-\delta} - c_1 < u_1(x_t^*) + \delta\left(\frac{p(x_t^*)}{1-\delta} - c_1\right) \qquad \text{(3) Fearon model}$$

$$1 - u_2(1 - x_t^*) - c_2(1 - \delta_2) + \frac{\delta_2 p(x_t^*)}{1-\delta} - c_1 < u_1(x_t^*) + \delta_1\left(\frac{p(x_t^*)}{1-\delta_1} - c_1\right) \qquad \text{(3) revised}$$

This revised inequality does not simplify as nicely as the previous one considered by Fearon, but nevertheless, it can be reduced to the following form:

$$1 - (c_1 + c_2)(1-\delta) < u_1(x_t^*) + u_2(1 - x_t^*) \qquad \text{(4) Fearon model}$$

$$1 - (c_1(1 - \delta_1) + c_2(1 - \delta_2)) + p(x_t^*)\left(\frac{\delta_2}{1-\delta_2} - \frac{\delta_1}{1-\delta_1}\right) < u_1(x_t^*) + u_1(1 - x_t^*) \qquad \text{(4) revised}$$

Note that the right-hand side of the inequality has remained the same as before, but the left-hand side is somewhat more complicated. Differentiating the discount factors does not have a major impact in the section of costs: as long as at least one of the parties is discounting at some level, the sum of the costs remains a positive number regardless of the difference in discount rates. Concerning the expected outcome of war, recall that the entire section: $p(x_t^*)\left(\frac{\delta_2}{1-\delta_2} - \frac{\delta_1}{1-\delta_1}\right)$ was absent before, because the difference between the discount factors was zero. In the revised form, we have a new picture due to $\delta_2 > \delta_1$, which introduces a complication in terms of the criteria for the inequality to hold.

In order for this inequality to hold under conditions of risk-neutrality, i.e. when $u_1(x) + u_2(1 - x) = 1$, it is now required that the discounted costs be greater than $p(x_t^*)\left(\frac{\delta_2}{1-\delta_2} - \frac{\delta_1}{1-\delta_1}\right)$:

$$(c_1(1 - \delta_1) + c_2(1 - \delta_2)) > p(x_t^*)\left(\frac{\delta_2}{1-\delta_2} - \frac{\delta_1}{1-\delta_1}\right) \qquad \text{(under risk neutrality)}$$

One way to simplify this inequality is by considering a common cost variable for both actors. This is sensible for several reasons. First, even though Fearon's original formula contains a differentiation of actors' costs in notation, this distinction is inconsequential as it does not set any criteria, theoretical distinction, or make use of these differentiated costs. Secondly, there are many other models that standardize costs, even as a common "damage" factor (as in Powell 2006).

Such a simplification allows us to represent the inequality in terms of costs:

$$c\,(2 - \delta_1 - \delta_2) > p(x_t^*)\left(\frac{\delta_2}{1-\delta_2} - \frac{\delta_1}{1-\delta_1}\right) \qquad \text{(with common costs)}$$

$$c > \frac{p(x_t^*)\left(\frac{\delta_2}{1-\delta_2} - \frac{\delta_1}{1-\delta_1}\right)}{2 - \delta_1 - \delta_2} \tag{5}$$

Mathematically, we can determine from the new inequality (5) that bargaining will break down for any costs below this threshold, that is, when:

$$c \leq \frac{p(x_t^*)\left(\frac{\delta_2}{1-\delta_2} - \frac{\delta_1}{1-\delta_1}\right)}{2 - \delta_1 - \delta_2}$$

So this is one way to think of the problem - in terms of costs. Given the multiple interrelated variables on the right side of the equation, it is not excluded that different combinations of these variables may always allow for settlement solutions to exist under *any* positive costs. Simulations run to test these limits demonstrate such a possibility. But what is the likelihood that non-military solutions will be available?

Before moving to the results of simulations, several other properties of the formula can be observed directly from the variables on the right-hand side of the inequality. For instance, observe from the numerator, that both factors of that product: $p(x)$ and $\left(\frac{\delta_2}{1-\delta_2} - \frac{\delta_1}{1-\delta_1}\right)$ directly contribute to the likelihood of bargaining failure by requiring higher costs of fighting. The first is the probability of the Challenger's victory given their resources under control, and the second shows the distance between the deltas. That is, the higher the probability of winning and the further apart the parties are in terms of their discount rates, the worse their possibilities for a peaceful outcome appear to be. Increase in both of these factors requires higher costs of fighting to offset the rising disbalance. Another effect can be observed in the denominator $(2 - \delta_1 - \delta_2)$ where the rise in both deltas contributes to bargaining failure.

Concerning the discount factors, I have only set a minimal condition of some positive difference between the actors' discount factors, $\delta_2 > \delta_1$, but have not determined a particular

distance. Yet, because the increase in δ_2 is theoretically linked to the Defender's expected loss, it is directly enhanced by any increase in $p(x)$ which contributes to a greater expected loss. Which means, a higher $p(x)$ is also an indication of a higher δ_2 and an increasing distance between the Challenger's and Defenders discount factors.

Simulating the Likelihood of War with Variation in Input Parameters

Whereas asymmetrical risk preferences produce a single parameter contributing to bargaining breakdown – excess disutility E, we can see that different time-discounting preferences have a more complex impact on the likelihood of war. Notably, differentiating the discount rates has effectively reinstated, into the inequality (5), the Challenger's probability of victory. This is a new factor contributing to the likelihood of war that was missing from the inequality before. Furthermore, we have two types of effects via the discount factors: via their individual levels and their relative distance. Recall that under opposing risk propensities it was only the relative asymmetry in favor of risk acceptance (i.e. the loss aversion) that mattered for the outcome; the individual risk propensities were otherwise irrelevant. When it comes to the actor-level differentiation of discount factors, there is no neutralizing/compensating effect as in the case of symmetrically divergent risk attitudes. Therefore, it is not only the distance between the discount factors but also the size of individual discount factors that matters for the outcome of bargaining.

The extent to which these factors affect the likelihood of war has been tested by a computer simulation of the model reflecting inequality (5). The input parameters include the situational factors (costs and the probability of victory) as well as the differentiated discount factors for both parties. Output performance (response) of the simulation model measures whether the inequality holds or not as a function of the four variables - $p(x)$, c, δ_1, δ_2. In the simulation, the model is represented via the difference between the two sides of the equation:

$$[c\,(2 - \delta_1 - \delta_2)] - \left[p(x_t^*)\left(\frac{\delta_2}{1 - \delta_2} - \frac{\delta_1}{1 - \delta_1}\right)\right]$$

Bargaining is successful when this difference is greater than zero, and it breaks down when it smaller or equal to zero. Consequently, the overall performance accounts for the probability of success and breakdown, given the variation in input parameters.

The simulation experiment was designed in a way that captures specific values of interest for the situational parameters, while allowing for broad variation in the discount factors. Table 2 provides the range of values for each input parameter that the model was simulated for.

Factor	Range of values
$p(x)$	$\{.6, .7, 1\}$
c	$\{.001, .1, .2, .8, .9, 1\}$
δ_2, δ_1	$[.01, .02, .03, \dots, .99] \ni (\delta_2 > \delta_1)$

Table 2. Parameter Space

The justification for this selection of the parameter space derives from the basic theoretical assumptions. As discussed above, the higher discount factor of the Defender is due to expected loss. Expected gain and loss are still hypothesized in terms of the anticipated change from the status quo potentially involving high or low probabilities of victory for either party. Nevertheless, since a more likely scenario would place the stronger party in the role of the Challenger, i.e. $p(x) > 1 - p(x)$, the $p(x)$ parameter in the simulation analysis was fixed above 0.5. In particular, two main input-factor values were chosen at 0.6 and at 0.7, in order to capture the impact of the Challenger's rising capability on the outcome of bargaining. The upper limit $p(x) = 1$ has been tested in combination with the lowest level of costs to see whether bargaining failure can be predicted under most favorable conditions of high expected gain and low costs of fighting.

The costs of conflict are potentially a more interesting parameter because bargaining success and failure hinges on their size. Bargaining models of war, or at least their visual spatial representations such as those displayed in this chapter, often picture the costs of war as comprising a small part of the bargaining space. If the latter extends to a size 1, the costs are portrayed around .1 or .2, and it appears as though higher costs would ensure a successful outcome.

To see if this is the case or not, we want to test the performance of the model not only against moderate costs but also higher costs approaching and reaching the full scope of the bargaining space. In other words, we want to see if any costs in this spectrum can be considered *sufficient* to prevent the crisis from escalating to war. On the other end of the spectrum, we are also interested if there are minimum values of costs for which bargaining can be efficient when other factors allow for such efficiency. Holding the costs very low (at .001) while varying the discount factors and the likelihood of victory, serves this purpose. Thus, the costs were fixed for a range of values from very small (.001) to moderate (0.1, 0.2) and high (.8, .9, 1) to cover the entire bargaining space. As will be shown, bargaining can potentially be efficient under any costs, however the Challenger's advantage along with the opponent's increasing discount factor are substantially complicating the task.

No limitations were placed for the discount factors which were allowed to vary between .01 to .99 by a mesh size .01, as long as $\delta_2 > \delta_1$.

The simulations were run using Statistical Analysis System (SAS) software, and the distributions were deterministic. The SAS code used in the simulation is provided in the Appendix.

The output performance is summarized below in Table 3.

c	p	Response*
0.001	1.0	0.04 %
0.001	0.6	0.07 %
0.1	0.7	10.6 %
0.1	0.6	12.1 %
0.2	0.7	18.4 %
0.2	0.6	20.6 %
0.8	0.7	42.1 %
0.8	0.6	45.1 %
0.9	0.7	44.3 %
0.9	0.6	47.4 %
1.0	0.7	46.4 %
1.0	0.6	49.4 %

Table 3. Output Performance under Differentiated Discount Factors for Selected Levels of c and p
(*percent time when the inequality holds i.e. the likelihood of peaceful settlement)

The simulation output reveals the following picture: when the parties have unequal capabilities/probabilities of winning and differentiated future discount factors, moderate levels of costs place the likelihood of bargaining efficiency at around 10-20%. Higher levels of costs increase possibilities of success, but with Challenger's relative advantage over the Defender, there is still over 50% chance of bargaining breakdown. Minor costs of conflict sharply reduce possibilities of settlement below 0.1%. In particular, at p(x) = .6 , c = .1, out of nearly 25,000 simulations, the inequality held in 12.1% of cases and in nearly 88% of cases it did not. Which means bargaining would break down in the overwhelming majority of cases under these parameters. When slightly raising the costs to c = .2, the percentage of cases in which the inequality holds rises to slightly over 20%, but bargaining success remains still largely undermined. At c=.8 and above, bargaining is successful for over 45% of cases reaching a maximum of 49.4% for c=1.

Graphical depictions of cases for selected values of $p(x)$ and c are demonstrated on surface plots in Graph 1 accounting for the difference between the two sides of the equation. When that

difference is at a level above zero on the y-axes, the inequality holds. This is certainly a very negligible portion of the overall space, virtually unrecognizable on graphical display. The vast majority of cases fall below the zero plane: bargaining fails.
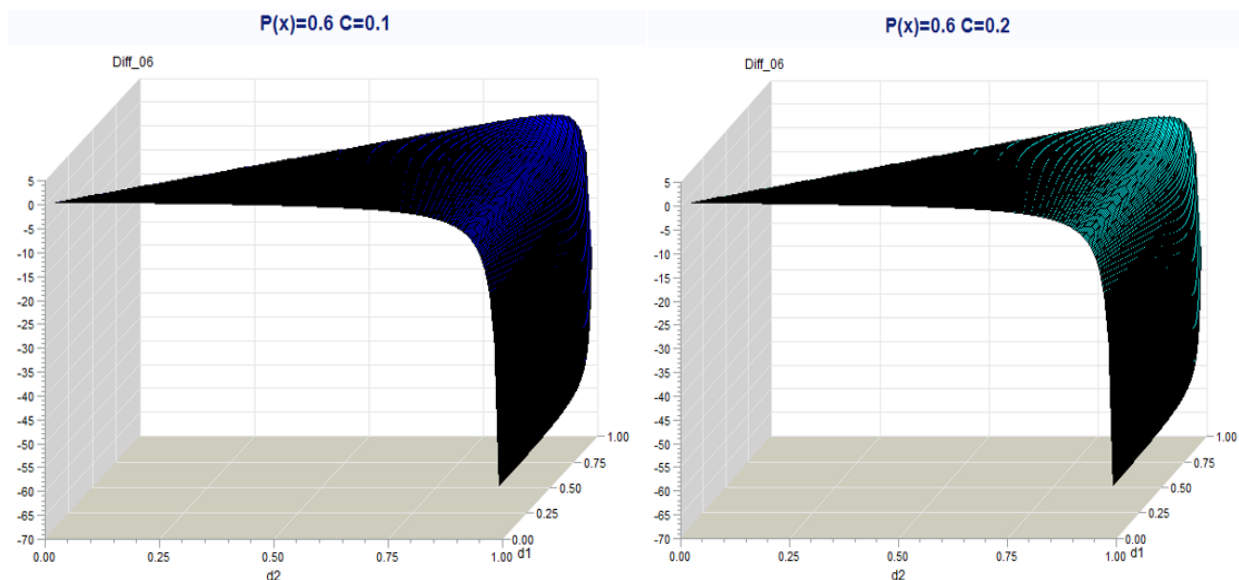
Graph 1. Response Surface Plots: The Performance of the Difference Function for Fixed Input Parameters and Varying Discount Factors

For a more nuanced visual representation, compare the performance of the difference function for two selected levels of δ_2 overlayed on a two-dimensional plot, with varying levels of δ_1, given $\delta_2 > \delta_1$, under fixed values for costs and the probability of winning. Observe on Graph 2, that the threshold of bargaining success is higher for higher values of δ_2. As compared to $\delta_2 = .3$, a higher percent of outcomes under the curve for $\delta_2 = .4$ fall below this threshold, i.e. when player 2 is more patient, war is more likely.
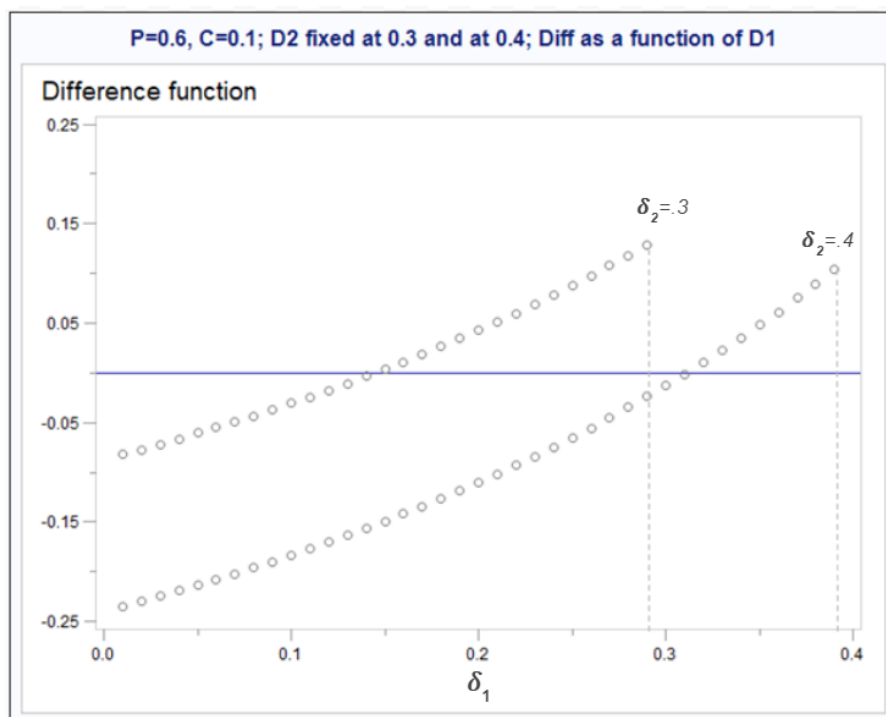
Graph 2. The Threshold of Bargaining Success for Selected Levels of δ_2
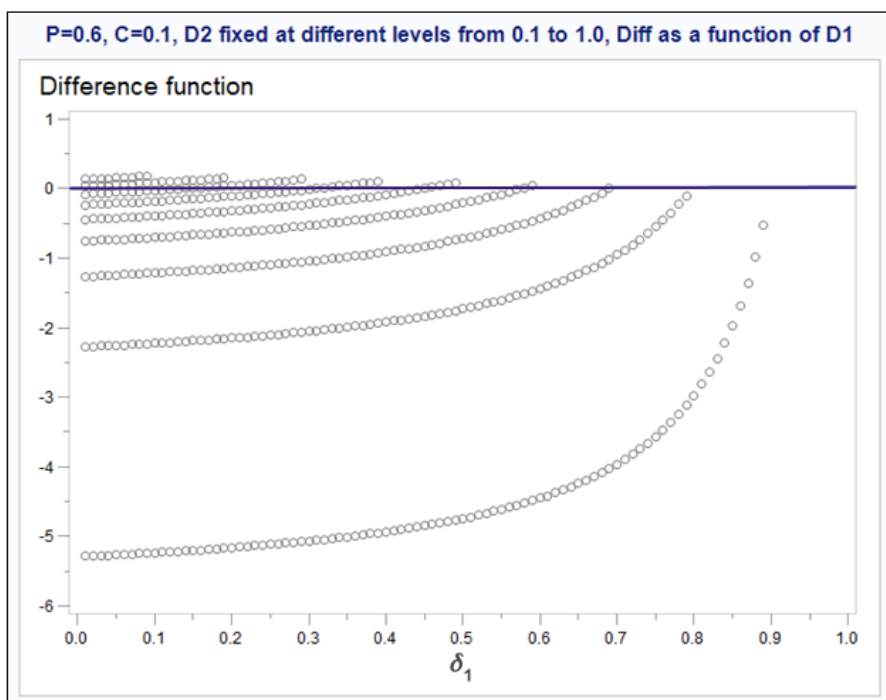
Graph 3. The Threshold of Bargaining Success for a Series of Levels of Discounting

Graph 3 above overlays the results for δ_2 between .1 through .9, where efficient bargaining outcomes can be seen gradually disappearing with increasing discount factors. The higher we move along the horizontal axes, i.e. the higher the deltas for both parties, the greater percentage of outcomes fall below the threshold of bargaining success.

The effect of the distance between the two deltas can be observed by looking into each of those curves individually. We already know from Fearon's model that equal discount factors provide for peaceful settlement options. The two-dimensional plot above allows us to observe how the increasing distance between discount factors gradually deteriorates the chances of settlement. The parties' discount factors are the closest at the very top of each curve, where the likelihood of bargaining breakdown is still minor. Moving down the curves sets the outcome of bargaining further apart from the required threshold. Indeed, the most inefficient outcomes across each of those curves correspond to the greatest distance between δ_1 and δ_2.

The plot allows us to observe maximum and minimum values of δ_2 ensuring successful and unsuccessful outcomes for fixed levels of winning probability and costs. For instance, observe on the plot (Graph 4) that in this particular scenario where p(x) = .6 and c = .1, bargaining success can be guaranteed at a level of discounting below $\delta_2 = .2 \ni (\delta_2 > \delta_1)$ as all bargaining outcomes in this case appear to be above the threshold of success. On the other hand, at a level of $\delta_2 = .8$ and above, all bargaining outcomes are below the threshold, i.e. war is certain to ensue.
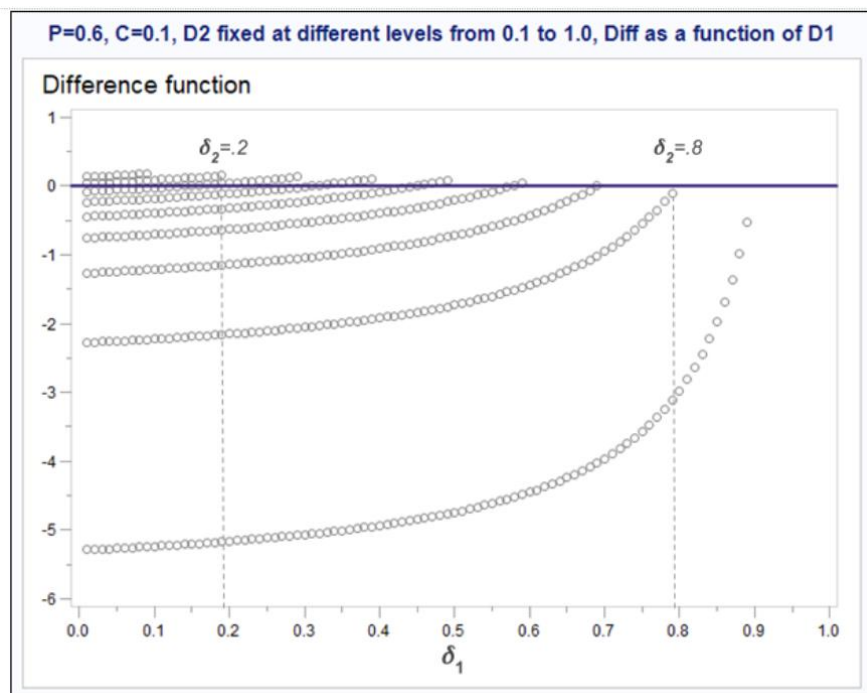
Graph 4. Maximum and Minimum Values of δ_2 Ensuring Successful and Unsuccessful Outcomes under Fixed Levels of p and c

At $p(x) = .7$, the percentage of simulations where the inequality holds effectively reduces. For $c = .1$, it comprises only 10.6% of cases, and for $c = .2$ it reaches up to 18.4%. At c=.8 and above, bargaining is successful for over 42% of cases reaching a maximum of 46.4% for c=1. Graphical representations look very similar.

Obviously higher values of $p(x)$ are going to undermine the inequality, as it has been observed directly from the formula, while higher values of c are going to have the opposite effect.

Finally, a finer simulation with a mesh size of .001, producing up to 2.5 million simulations, has allowed to interpolate the results for a much smaller value of costs, $c = .001$. At a selected $p(x) = .6$, the inequality holds for only .07% of cases, indicating the feasibility of peaceful settlements within this narrow range. At $p(x) = 1$, the simulation produces a positive result in the .04% of cases, but interestingly, possibilities still exist. So we may not necessarily be able to determine the smallest size of costs for bargaining to break down, since even for such a

small size as c = .001, there are efficient solutions under certain combinations of values of $p(x)$, δ_2, δ_1, even though in the overwhelming majority of cases the inequality does not hold. The smaller the c and the higher the $p(x)$, the higher the chances of crises escalating to war.

Recall the additional amplifying effect of increasing $p(x)$: $p(x)\uparrow \Rightarrow \delta_2\uparrow$, $\delta_1\downarrow$.

Due to a lack of a particular functional representation between these factors, this additional effect has not been reflected in the conditions and results of simulations. Obviously, such an effect would further reduce the chances of bargaining success.

The Overall Impact of the Behavioral Parameters

The updated behavioral assumptions were integrated into the model one by one. The combined effect of divergent risk attitudes and time discounting propensities adds another layer of complication, placing an even higher conditionality on bargaining efficiency. Reflecting this combined effect, the revised inequality (6) adds the variable of excess disutility E to the new formula of bargaining efficiency:

$$c\left(2 - \delta_1 - \delta_2\right) > p(x_t^*)\left(\frac{\delta_2}{1-\delta_2} - \frac{\delta_1}{1-\delta_1}\right) + E \tag{6}$$

demonstrating how high the costs of war need to be to ensure a negotiated, non-military outcome.

$$c > \frac{p(x_t^*)\left(\dfrac{\delta_2}{1 - \delta_2} - \dfrac{\delta_1}{1 - \delta_1}\right) + E}{2 - \delta_1 - \delta_2}$$

Consequently, costs below this high threshold would result in bargaining breakdown.

This result suggests that in zero-sum bargaining environments where the parties are essentially negotiating over future bargaining power, and losses at each stage imply a weakening position for the next stage, voluntary concessions are far less likely than previously assumed. In fact, the bargaining range is nearly empty and only when the costs of war are very large, the parties may find a redistribution of resources that is mutually preferable to their expected war payoffs.

Yet, bargaining success cannot be guaranteed by the costs alone. The outcome of bargaining is a finer balance between the combatant's expected costs and their willingness to suffer those costs manifested by their risk-taking and future-discounting propensities, i.e. their dispositional resolve to fight.

Asymmetrical utility functions and differentiated discount factors conditional on expected gain and loss both contribute to this challenge. Taken separately, and especially under their combined effect, opposing risk preferences with loss aversion and especially lower rates of discounting of expected loss create significant room for bargaining breakdown.

Simulations run to this effect demonstrate an overwhelming challenge presented by relatively high and distant discount factors. In the case of risk propensities, opposing expectations have a partially restraining behavioral effect owing to a shift in the bargaining range that somewhat mitigates the demands for concessions, but the overall combined effect of loss aversion and differentiated future discounting propensities substantially undermines the chances of success.

CHAPTER V

THEORETICAL AND EMPIRICAL IMPLICATIONS OF REACTIVE RESOLVE

Taking Stock

The theory of reactive resolve derives its power from the predictive inaccuracy of expected utility theory and the advantages of including the empirical regularities formalized in prospect theory and the sign effect, but it feeds back into a rational model, with still largely prescriptive implications. As noted in the early pages of this dissertation, decisions made with regard to war and peace are highly contingent choices. Many conflicts do not ascribe to the neorealist assumption of absolute anarchy as they evolve under various international, regional, and sub-regional hierarchies. Decision makers are affected by external as well as domestic pressures, and irrationality also plays a role. So, empirically testing this theoretical prescription against actual decisions of war and peace may not necessarily produce the expected results. However, the power of using the theoretical tools of loss aversion or concession aversion as part of a rational choice model of bargaining lies in the improvement of our understanding of what should be expected from actors in crises "all else being equal."

The theory of reactive resolve deviates from standard rationalist models in that it does not extend the *Ceteris Paribus* criteria to the dispositional variables of resolve, i.e. to actors' risk and time-discounting preferences. We have a theoretically relevant method of differentiating these variables to improve the prescriptive (and, potentially, the predictive) accuracy of rationalist models. This method is well established and tested through numerous highly controlled experiments in behavioral economics, based on expectations of *absolute* gain or loss. But it is even more relevant to the context of international crises where one party's gain is perceived to be

the other's loss, and where the strategic environment of anarchy induces *relative* gains concerns. The anticipation of relative gains and losses highlights the conflict-conditionality of actor's value preferences sourcing from the systemic-level distribution of resources and benefits, as opposed to their external, individual nature.

The motivation to fight is not only driven by the incentive or utility of gain; even more so, it is conditioned by the disutility of loss. Standard rationalist models cover the first part of the equation by associating resolve to fight with the Challenger's expected utility given the distribution of power and benefits but fail to account for the Defender's disutility of loss producing asymmetrical loss- and concession-aversion. The failure to account for the effects of both gains and losses on actors' value functions[10] produces peaceful settlement equilibria that ascribe a passive-submissive role to the Defender. In order to reflect the full spectrum of bargaining outcomes, rationalist models must account for the impact of reactive resolve.

With this in mind, I have theorized in Chapter III, that contrasting expectations of gain and loss in crisis bargaining under complete information produce asymmetrical risk-taking and time-discounting propensities, representing actors' valuations of outcomes (present and future) - essentially, their willingness to suffer costs. Integrating these expectations into the model of bargaining over future bargaining power in Chapter IV, I have demonstrated substantial deviations from Fearon's 1996 solution, implying both a shift in the bargaining space, somewhat neutralizing the challenger threat, and a significant shrinking of the range with broad possibilities of bargaining breakdown.

These findings have important theoretical and empirical implications to be discussed next. In this chapter, I summarize the mechanism of crisis bargaining that the theory of reactive resolve

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[10] More specifically, this failure is reflected in a neutral or equal treatment of risk and time-discounting preferences across actors, regardless of the strategic context.

assumes and articulate what that implies in terms of process. Secondly, I review the relationship between the distribution of power and the likelihood of war. Third, I discuss what the theory implies concerning the effectiveness of coercion, in terms of both compellence and deterrence. And fourth, I derive auxiliary implications for third-party mediation of crises. This discussion sets the stage for Chapter VI which explores some of these implications in more depth through case studies that reevaluate classic and contemporary cases of conflict through the lens of the theory of reactive resolve.

The Mechanism of Crisis Bargaining

This dissertation seeks to reveal *how* relative power impacts bargaining outcomes under complete information. There are two components to answering this research question. One relates to the mapping of theoretical assumptions onto a new space of bargaining outcomes, which has led to the identification of a much broader scope of bargaining breakdown than rationalist models have previously assumed. The second component relates to the mechanism or process by which expected gains and losses drive escalation. By and large, the behavioral expectations have been characterized in the development of the theoretical model in previous chapters. In this section, I would like to specify the escalation mechanism as the empirical implication of the theoretical model.

In particular, the reactive resolve model of asymmetrical risk and time-discounting preferences prescribes that, all else being equal, where there is a disparity between relative power and shared benefits such that one side is rationally expecting to improve its status quo position by waging a war (Challenger) and the other is anticipating loss (Defender), the following bargaining process should be observed:

a. Challenger's risk aversion should, at least partially, restrict their demands and selection into crises, i.e. their dispositional resolve to fight. Even though the rational expectation of gain incentivizes demands for concession, it also induces risk averse behavior under uncertainty. If the discrepancy between relative power and benefits is small (lower or equal to the moderating effect of risk aversion), risk aversion may entirely neutralize any demands for concessions. Think of this as latent dissatisfaction with the status quo that is waiting for conditions to improve before materializing into concrete action.

b. Once the discrepancy is greater than the neutralizing effect of risk aversion, the expectation of gain would trigger demands. Such demands would already carry the partially moderating effect of contrasting risk propensities, as the range of bargaining outcomes would be slightly shifted toward the Defender's preferred settlement options. So, the Challenger should be expected to settle for less than what their full potential allows them to secure by force at a given point in time. Nevertheless, the party anticipating gain is always averse to making risky choices. Therefore, even though demands for concession are a likely trigger of conflict, expected gain does not appear to be a major source of bargaining breakdown.

c. Still, bargaining should not be expected to produce automatic adjustments of benefits in line with credible demands for concession. Escalation of crises is likely because the prospect of loss implies higher stakes of the conflict for the opponent, with asymmetrically large utility preferences concerning the outcome of settlement as well as its discounted future value. What this implies about the process of bargaining is that the escalation of conflict is driven by the expectation of loss rather than gain: the more the Defender is pushed into a frame of expected loss, the higher its reactive resolve to fight, leading to escalation and potential bargaining breakdown. Gain- and loss-induced utility functions are the only automatic adjustment we should expect in a

bargaining process. Such value preferences may either shrink or entirely empty the bargaining range, producing war. Simulations run to this effect in Chapter IV demonstrated that the room for breakdown is expansive.

       d.   Furthermore, if escalation is driven reactively by the Defender's risk acceptance due to expected loss, it is evident that de-escalation is driven by the Challenger's risk averseness. The formal model of reactive resolve does not specify a process of de-escalation or say anything about "process" for that matter. It only prescribes behavioral preferences and corresponding bargaining outcomes. The logic of escalation and de-escalation follow naturally. Just as the Defender's risk acceptance drives the process of escalation, the Challenger's risk averseness makes room for de-escalation. How far is the Challenger willing to push the Defender into a losses frame, while at the same time trying to avert a risky war gamble?

       e.   Ultimately, the determinant of war or peace is a more delicate balance between the expected costs of war and the parties' willingness to tolerate those costs. It is the relative weight of these constituents that defines the final outcome of bargaining. The model of reactive resolve contributes to a better understanding of cost-tolerance. It implies a higher cost-tolerance on part of the actor anticipating loss.

    The costliness of war alone is not sufficient to prevent bargaining breakdown because the strategic context of the conflict imposes cost tolerance as well. The fundamental proposition of the bargaining model of war suggesting that the costliness of war always provides for a range of settlements that rational actors prefer to fighting does not really hold, even in the absence of information uncertainties or major power shifts as defined by Fearon and Powell. The threshold for costs is much higher due to the expectations of additional gains and losses and the contrasting value preferences they induce in the shadow of the commitment problem. Had the costs of war

been small, it is very likely that the frequency of interstate conflict would have surged. It is the very large size of direct and indirect costs associated with war that restricts its breakout.[11]

The Relationship between the Distribution of Power and the Likelihood of War

The theory of reactive resolve offers valuable insight concerning a long-standing debate in International Relations on the link between the distribution of power and war, by identifying the second-order impact of relative power on the likelihood of war.

Recall that bargaining theory presents the likelihood of war as completely independent of the distribution of power (Chapter II has discussed the general debate in greater detail). Assuming there are no uncertainties concerning the relative balance of capabilities between the combatants and no major anticipated shifts in power, the BoP only informs the final settlement outcome as parties to the bargaining process adjust their demands and concessions in accordance with their values for war. However, as argued and formally demonstrated in this study, bargaining does not necessarily lead to an automatic adjustment of benefits in accordance with relative capabilities. Such automaticity is neither supported by empirical evidence nor substantiated from a gains vs. losses perspective.

So, what exactly is the relationship between the distribution of power and war?

The formal modeling and simulation of contrasting risk and time-discounting propensities reveals a mechanism whereby the Challenger's greater capability translates into a higher likelihood of war by raising the threshold of costs required to prevent a breakdown. This mechanism can be identified in several ways. Most directly, the linkage is exhibited in the updated model (inequality

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[11] In this context, we could also hypothesize that even though the room for bargaining breakdown is fundamentally expensive due to the anticipation of relative gains and losses, that space is concurrently limited when the Challenger is capable of inflicting greater damage on the opponent. If the general BoP favors the dissatisfied Challenger, the latter's high capability would likely raise both: the Defender's costs as well as their cost-tolerance via reactive resolve. But the balance of costs does not necessarily reflect the balance of expected gains/losses, and rationalist models, for that matter, do not treat the costs of fighting as dependent on relative capabilities.

6, p.110) via the Challenger's probability of victory, itself a function of relative power capability. Introducing divergent future discount rates has essentially reinstated the probability of winning in the formula as an input variable directly affecting the likelihood of war. But this is not the only parameter of relevance in the model. Excess disutility E, higher discount factors and their relative distance - all contribute to a higher likelihood of war by virtue of their conditionality on expected gain/loss, reflecting the disparity between the distribution of capabilities and the status quo distribution of territory/benefits.

Several figures introduced in the modeling and simulation chapter demonstrate this effect the best. In particular, Figure 13 (Chapter IV, p. 96) shows what I have called, the demonstrates, what I have called, the "excess disutility" arising from loss aversion – a key finding of the prospect theory. In the context of crisis bargaining, war ensues when excess disutility reaches a value associated with costs. The graph demonstrates how the size of excess disutility grows along with the increasing size of gain and loss. And the larger the size of excess disutility, the higher the potential for bargaining breakdown.

Graph 4 (Chapter IV, p.109) demonstrates the threshold of bargaining success as produced by the simulations on the likelihood of war under varying discount factors. This is grounded on the assumptions derived from the sign effect, whereby gains are discounted at a higher rate than losses of comparable size. Once again, it can be observed from the graph that the greater distance between the two deltas is associated with the greater size of gain/loss and is visibly leading to a higher likelihood of war.

Thus, the greater a party's capability to improve its position from the status quo, the higher the likelihood of bargaining breakdown. In other words, war is more likely when the gap between the distribution of power and benefits is wider.

Take note, that this is somewhat different from the proposition that war is more likely under a greater imbalance of power among state actors, as the balance-of-power school contends. The model is only pointing to the greater power capability of the party challenging the status quo. Hypothetically, the party challenging the status quo can have a higher, lower, or equal power capability as compared to their opponent. Although it is more sensible for the Challenger to be in a relatively better position than the Defender,[12] this is not necessarily the case; the credibility of their challenge is provided by the gap or mismatch between existing capabilities and territory/benefits controlled, and the incentive to fight is one of filling the gap. But once a credible threat is in place, the Challenger's higher probability of victory - i.e. their greater expected gain from a status quo reference point, or the existing disparity between the distribution of power and benefits - is a source of a higher likelihood of war. This is because the more and the easier a Challenger is expecting to gain, the more the other side is expecting to lose, and the higher their bilateral motivations to fight: for one, to ensure significant gains, for the other, to prevent major loss.

This result is very similar to Powell's 1996 hypothesis (although for very different reasons) where the distribution of power affects the chances of war by interacting with the status quo distribution of benefits. But whereas Powell finds this to be the case under information uncertainty, the integration of reactive resolve provides for this linkage even under complete information. In both cases we can say that the likelihood of conflict is theoretically zero when the distribution of power corresponds to the distribution of benefits, as neither side is expecting to benefit from war.

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[12] One rational explanation why this would be more sensible, is that a more powerful Defender should be expected to inflict greater damage and costs to a Challenger, should the latter decide to attack.

That includes power parity, when the distribution of benefits is similarly balanced, but also other combinations of proportional distribution.

It is important to note that a relative balance of this sort does not necessarily imply a peaceful and harmonious relationship among the actors, but merely an absence of armed conflict. Such a condition of proportional balance in relative power and benefits may represent partnership and cooperation, a cold war, or a frozen conflict - we cannot discern the content of the relationship by simply looking at the model. It is insensitive to its essence. The model only tells us that neither side has a rational expectation of gain. Once there is a gap large enough to overshadow the value of costs and risk-averseness, and only then, does the Challenger's extra power capability (or the larger size of expected gain) provide it with a greater incentive to fight, at the same time imposing on the Defender a dispositional reaction to resist. It is precisely in this context where relative capability increases the likelihood of war, by setting in motion an action-reaction pair of forces described in the theory of reactive resolve.

Real life bargaining situations, with or without the use of military force, closely resemble this logic. Action to revise the status quo is hardly ever met with passive-submissive readjustment of territory on the negotiating table, even when the Challenger's relative advantage is large enough to rule out crucial information uncertainties concerning the likely outcome of war. Aside from attempts to balance overwhelming power with the help of external alliances, we often see state or non-state actors, cornered to submit to power, choosing instead to exploit the risk and uncertainty of conflict at a very high cost, and for extensive periods of time.

In fact, asymmetrical conflicts are among some of the most enduring rivalries in the world today. Take, for instance, the war in Afghanistan, where the United States, along with a coalition of more than 40 countries, all NATO members included, fought the Taliban for two decades and

ultimately withdrew forces in the backdrop of intensified clashes and a failure to achieve a desired outcome despite a tremendous capability advantage. The long-standing Israeli-Palestinian conflict is another case of disparity in relative capabilities, where a rationalist approach would assume compromises by the weaker side. Yet seven decades of conflict, suffering, and third-party mediation have not prepared the parties for a peace deal but contributed to perpetuating reactive resolve. Indeed, the very formation of Palestinian identity hinges on this experience of loss and exile beginning from the defeat in 1948, which the Palestinians refer to as the *al nakbah* - the disaster or catastrophe (Rabinowitz 1994).

Implications for Coercion: Less is More?

It is not enough to say that superiority of power does not guarantee compellence or deterrence. The findings above confirm earlier observations that superiority, insofar as it contributes to an opponent's anticipation of loss from a status quo reference point, is part of the challenge to coercion. Berejikian similarly states the following: "To the extent that deterrent threats contribute to a losses frame, they can produce the very aggression they are intended to deter. A crucial component to a successful deterrent policy is, therefore, to avoid pitching opponents into a losses frame" (Berejikian 2002, 769).

The results of simulations in Chapter 4 additionally demonstrate that the greater size of the power imbalance and anticipated loss significantly increase the likelihood of war by setting in motion an action-reaction pair of forces. Thus, greater anticipated gains and losses in conflict increase the likelihood of war. They do not facilitate a negotiated settlement by compelling a weaker opponent to concede or surrender without a fight. Even though superior capabilities raise the costs of escalation for the adversary, the anticipated settlement losses produce a second-order effect on resolve which can then lead to conflict behavior.

Deterrence is generally less demanding than compellence, as it does not require particular action. It only coerces the adversary to refrain from undertaking one. Even in this case, empirical research has not previously confirmed the sufficiency of superior capability for successful deterrence (Zinnes, North, and Koch 1961; De Mesquita 1981; Jervis 1989). According to a study by de Mesquita (1981), weaker states were responsible for initiating about 33 percent of conflicts in the last century.

In principle, the theory of reactive resolve does not differentiate whether the Challenger is the stronger or the weaker side, despite a greater focus on the former situation in this study. As long as the Challenger anticipates improving their position from the status quo distribution of benefits, the threat is credible, no matter what the balance of capabilities. On the other hand, the weaker side may appear to be the aggressor when it is first to attack but with the aim of preventing further loss. In this case the structure of the game is the same as before since the weaker side is reactively resolved. Even though it has not been subject to a military attack, in the broader bargaining context it is being coerced or pressured to forgo certain stakes. In other words, inaction is going to result in unwanted losses, making the weaker side even weaker.

For instance, a 1991 RAND study on the failures of deterrence points to a large number of cases of weak but highly motivated parties attacking stronger nations, including several Jewish revolts against the Romans in the 1st and 2nd centuries, the Ashanti attacks against the British in Africa in the 19th c., the Indian Sepoy Mutiny attacks against the British in the 19th c., the Dutch revolt against the Spanish in the 16th c., numerous Kurdish insurgencies against Iraq and Iran, and many others, which by and large involved unbearable conditions or perceptions of existential threat (Wolf 1991).

Differentiating the first type of the challenger attack from the second, more defensive, type makes a crucial difference for the effectiveness of deterrence. In the first case, the Challenger aims at ensuring gains and its behavior is prone to risk-aversion and a higher rate of future discounting. In the second case, the Challenger aims at preventing anticipated loss and, therefore, its behavior is prone to risk-acceptance and placing a greater value on the future. Deterrence is much less demanding in the former case, where raising the opponent's costs may deprive them of the rational motivation to fight for gain. It is more challenging in the latter case, where raising the opponent's costs is potentially increasing their anticipation of loss, raising their stakes in conflict and dispositional motivation to resist by taking higher-risk decisions, often with tragic consequences. If "more is more" in the former context, "less is more" in the latter.

In the following chapter, I discuss in detail the challenges to compellence in asymmetrical confrontations between Athens and Melos, Russia and Ukraine, as well as the challenges to deterrence that the U.S. struggled with during the Cuban Missile Crisis, or that India confronted in Kargil. What these divergent crises happen to share in common is the high reactive resolve of the parties anticipating loss and the process of escalation it drives.

Auxiliary Implications for The Effectiveness of Third-Party Mediation

The sources of bargaining failure identified in this study have auxiliary implications for third-party mediation of crises and their potential for success.

Recall, that at the heart of the current research is the problem of credible commitment. Particularly, the commitment problem arising in the context of bargaining over future bargaining power, where the parties are essentially competing for relative advantage. This is a primary source of conflict, and one that is hard to tackle.

As discussed in Chapter II, opportunities for third-party mediators to manage the credible commitment problem by either extracting concessions or enforcing agreements, are quite limited. Empirical analyses by Beardsley and Lo (2013) have demonstrated that mediation only helps extract minor "challenger concessions" facing problems of political cover at home, but not "defender concessions" facing the primary hurdle of commitment. The theory of reactive resolve proposed in this study captures the essence of this dynamic. It allows for a qualitative differentiation between the two types of concessions by providing a formal rational framework for a problem that has been identified through empirical analysis.

Traditional formal models of crisis bargaining do not differentiate between the two types of concession. Both challengers and defenders are seen as possessing expected payoffs, but their utility value is not differentiated in a systematic way. That is precisely what the theory of reactive resolve does. It differentiates the expected utility of the party anticipating gains (the Challenger) from the expected disutility of the party anticipating losses (the Defender). Not only is their order for risk and time-discounting preferences reversed, but it is also reversed in an asymmetric fashion, implying loss aversion or concession aversion on part of the Defender. The latter, in other words, is willing to tolerate higher costs instead of conceding what would otherwise be seen as rationally acceptable compromises.

As proved in Chapter IV, asymmetrical risk and time discounting preferences induced by contrasting expectations of gain and loss shrink the range of mutually acceptable settlements and considerably expand possibilities of bargaining breakdown. The likelihood of war is especially high where the discrepancy between the relative distribution of power and benefits is large. Therefore, asymmetrical distributions somewhat increase the chances of war by interacting with the distribution of benefits. This makes bargaining harder, including for mediators.

Empirical research on the relationship between the distribution of power and the relative effectiveness of third-party mediation offers rich and unusually consistent evidence of higher mediation impact for even distributions as opposed to low or no impact for larger disparities (Chapter II has covered relevant literature in greater detail). It has been argued that the case for the "mutually hurting stalemate" as the most favorable or "ripe" timing of intervention for the mediator also sources from the relative symmetry between the disputants (Richmond 1998). Furthermore, assuming that the conflict is asymmetric "reinforces the proposition that disputants will tend to view mediation as zero-sum. This is because mediation will be viewed as an extension of the disputants' efforts to 'win', or at least to avoid defeat." (ibid., 709)

Whereas the findings of the current study go along with these expectations, they draw a greater attention to the discrepancy between the relative distribution of power *and* benefits, as opposed to just the BoP. They suggest that bargaining would become increasingly challenging when anticipated gains and losses are large. Conditions of this sort would exacerbate the problem of credible commitment and reinforce reactive resolve to fight. It is, therefore, important that the problem of credible commitment and the challenges of bargaining produced in its backdrop, be thoroughly acknowledged and prioritized for the success of mediation and the sustainability of potential bargains.

Formal analyses of mediation often focus on achieving a balance between the parties' *preferences* which does not necessarily address the underlying problem of commitment. That approach accounts for "what" the parties want, not "why" they want it. Does a particular outcome ameliorate or exacerbate the problem of credible commitment? This is possibly the most fundamental question for the mediator to ask.

In other words, what are the motivations behind their demands in terms of the relative security and vulnerability of the parties in question? It is not enough to distinguish "status-quo states" vs. "greedy revisionists" in a conflict, to set their individual utilities accordingly (see, for instance, an example of such typology in Kydd (1997, 374)). It is about how the status-quo and its proposed revisions effect the parties' relative standing and, subsequently, the sustainability of settlements.

Although qualitatively different from the literal meaning of the concept of mediation, sometimes third parties attempt to address the commitment problem by leveraging costs (i.e. offering carrots and sticks, manipulating the opportunity costs of the conflict) or at least *promising* to monitor and enforce a particular deal (Bercovitch 1997; Touval and Zartman 1985). Unfortunately, these mechanisms tend to induce artificial settlement outcomes that are short-lived in the absence of continued influence, and costly long-term external engagements are not necessarily credible to the parties in conflict. Werner and Yuen (2005) and Beardsley et al. (2006; 2008) provide some empirical evidence in this regard, allowing Beardsley (2011) to formulate a key mediation dilemma: leveraging costs can manage the conflict in the short term, preventing the imminent breakout of hostilities, but contributes to, and even exacerbates, instability in the longer term.

What the theory of reactive would imply, in this context, is that "mediation with muscle" need not compensate for Defender concessions, thereby exacerbating the CCP in the absence of continued third-party intervention. It could, however, provide carrots and sticks to compensate for Challenger concessions, without making the weaker side more vulnerable.

Conclusion

What does the model of expected disutility and resolve imply beyond mapping onto a larger space of potential bargaining breakdown? This chapter has discussed its crucial theoretical and empirical implications.

Most fundamentally, it emphasizes a crisis escalation mechanism driven by the expected disutility of loss rather than the expectation of gain. Although a likely trigger of conflict, the expectation of gain imposes risk aversion on a potential Challenger, therefore, does not appear to be a major source of bargaining breakdown. Whereas the expectation of loss imposes risk acceptance or cost tolerance and an asymmetrical reaction on part of the Defender to prevent impending loss. In terms of process, this tendency implies a likely escalation of crises parallel to the perspective of loss.

An important theoretical implication concerns the relationship between the distribution of power and the likelihood of war – a longstanding IR debate. The model demonstrates, specifically, that not every imbalance of power increases the chances of war, but the Challenger's greater capability to improve its position from the status quo reference point does. Both the mechanism of crisis escalation driven by loss aversion as well as the increased likelihood of war under greater expected changes to the status quo, reveal a major challenge to coercion under the expectation of loss. Not only superior capability does not guarantee compellence or deterrence, but it also becomes part of the challenge as greater anticipated gains and losses in conflict increase the likelihood of war.

Finally, this chapter has discussed some auxiliary implications for third-party mediation of crises. With a formal rational framework allowing the qualitative differentiation of Challenger and Defender concessions, the study suggests that mediators need to be more careful with

compensating for Defender concessions and thereby exacerbating the problem of credible commitment in the absence of continued third-party intervention.

The following chapter exemplifies the above described mechanism of crisis bargaining as well as the challenges it entails for compellence and deterrence in several case studies.

CHAPTER VI

CASES OF COMPELLENCE AND DETERRENCE

To argue that Russia's reaction to NATO expansion was based on "resentment" … is to trivialize the country's motives. Fear is at the root of Russia's opposition to the prospect of Ukraine becoming a Western bastion on its border. Great powers always worry about the balance of power in their neighborhoods and push back when other great powers march up to their doorsteps.

—Mearsheimer, *Faulty Powers: Who Started the Ukraine Crisis?* (2014)

Process Tracing as a Tool of Causal Inference in Crisis Bargaining

The problem of correlational studies like the Correlates of War, attempting to reveal patterns of interstate conflict but lacking an "integrative" understanding of war, was raised by David Dessler already in 1991. Dessler suggested that future research on the question of war should be focused on developing a "causal theory" involving the kind of "integrative causal reasoning" that is found in natural sciences (Dessler 1991, 337).

Capturing the dynamics of power- or loss-induced behavior involved in crisis bargaining via large-N quantitative analysis is even more challenging. And the primary reason for this is the problem of causality. We may put together data about relative capabilities and anticipated gains and losses from the status quo reference point, as input variables, and compare those to the outcome of bargaining, as a way of measuring the "success" of compellence or deterrence. But would this be sufficient to assess the purported effect or demonstrate causality? It would certainly not allow us to observe the mechanism of escalation in which coercion operates. What decisions did political leaders take from among the available options they had, and what influenced their choices? Can we even agree on what constitutes "success" (in the form of a data observation) when outcomes are interpreted to suit the audience of your choice?

Case studies of decisional behavior, on the other hand, allow one to connect the structural causes with the behavioral effect by offering greater insight into decision-makers' intensions, the choices presented to them, their preferences for particular courses of action under various circumstances, as well as other actors and influences involved in a complex decision-making process. When evidence of decision-making is opaque, it can be supplemented by *process tracing*, involving the examination of the causal chain of decisions (Gerring 2007, 173). This method of qualitative research is often employed to complement and cross-check formal methods, as a piece of evidence about how the world works (ibid). I use this method to similarly complement the formal results obtained in this study, taking into account recent advances in methodology.

A former approach, highlighted in the influential 1994 study by King, Keohane, and Verba on scientific inference in qualitative research, has viewed process tracing as primarily a descriptive tool. However, more recent analyses have revised the methodology and its value in contributing "distinctive leverage in causal inference" via the discovery of "causal-process observations" i.e. insight about context, process or mechanism (Collier, Brady, and Seawright 2004, 277; George and Bennett 2005). Building on these authors, Mahoney (2010) has identified three types of theory-testing causal-process observations (CPOs), one of which relates directly to the testing of mechanisms. According to Mahoney, mechanism-testing CPOs require observation of data concerning intervening *events* and *processes* posited by the researcher. In this context, he has argued that leverage in causal inference is derived from an "implicit Bayesian approach" rather than the frequency of observations (Mahoney 2010, 128-129). Similarly, Collier describes process tracing as analyzing "trajectories of change and causation" and sequential processes (Collier 2011).

A critical review by Waldner (2015) has further strengthened the criteria of causal inference with the mechanism of "invariant-causal principles." Waldner argued that instead of

looking simply for intervening events, we should be looking for "mechanisms-as-invariant-causal principles" that generate effects and connect the elements in a causal chain (242). Instead of employing the Bayesian logic of prior and posterior probabilities, Waldner's standard for the process tracing method is continuity. "All the intervening steps in a case must be predicted by a hypothesis, or else that hypothesis must be amended," he quotes George and Bennett (2005, 24). Waldner's "completeness standard" toward causal inference involves the following steps: first, he suggests that process tracers should articulate or draw a causal graph as a "complete statement of the causal relations," as well as specific graphs representing the event-history maps with unit-level effects for each case study. Once these graphs are constructed, the researcher can check their correspondence via descriptive inferences and causal inferences, by demonstrating that the causal connections in the first graph are instantiated as linkages between the events in the second graph (247-249).

Adopting the Waldner Standard for Completeness

In this chapter, I use process tracing to reveal the mechanism of crisis bargaining and the process of escalation it implies, in several international crises. Where sufficient insight is available, I attempt to follow Waldner's high "completeness standard" for causal inference. As a minimum standard, I collect causal-process observations with a focus on the sequence of events and trajectories of change, as suggested by Collier.

The respective statement of causal relations follows the mechanism of crisis bargaining outlined in Chapter V and is displayed in a corresponding causal graph below (see Graph 5). That mechanism (we may call it the mechanism of "invariant-causal principles" described by Waldner) assumes opposing risk-taking preferences induced by the expectations of gain and loss given the distribution of power and benefits. The nodes identify the actors, i.e. the Challenger anticipating

gain and the Defender anticipating loss. The arrows indicate their corresponding risk propensities - risk aversion and risk acceptance, accordingly.

The causal graph suggests that even though the Challenger is anticipating gain, it is constrained by risk aversion, which is why it is likely to either push for demands (straight dashed arrows) or retract them altogether (downward dashed arrows), but refrain from risky choices escalating the conflict to war. And while the Defender is anticipating loss, it is more likely to opt for higher-risk decisions by responding in kind or escalating the conflict asymmetrically (upward arrows) attempting to avert loss. For visual clarity, Defender's "reactive resolve" is highlighted to emphasize that the Defender is not particularly choosing from among various courses of action but reacting to pressure. It is escalating almost by default, owing to risk acceptance.
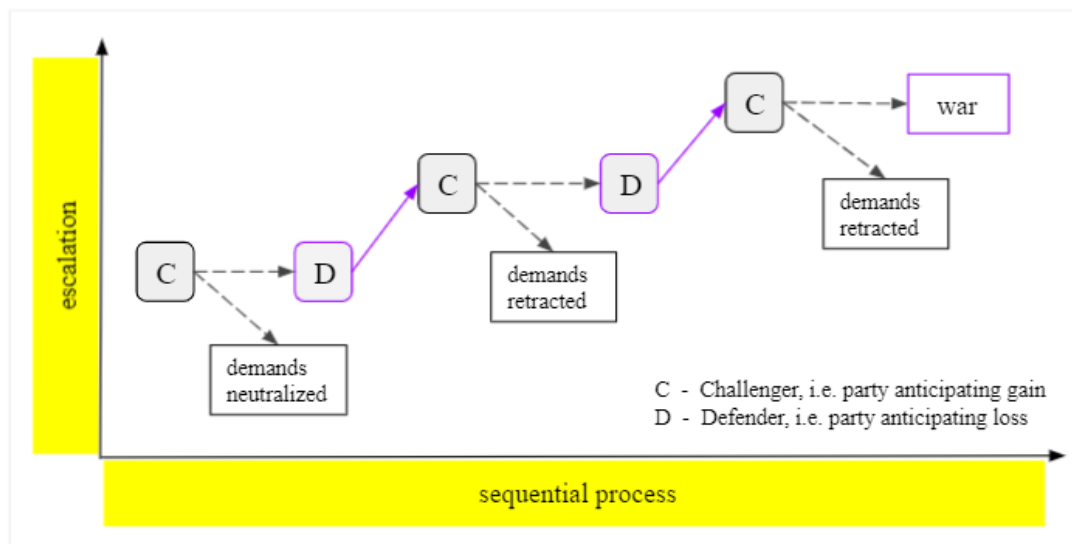
Graph 5. The Causal Mechanism of Crisis Bargaining and Escalation

Process-wise, the graph demonstrates the path of crisis escalation driven by the Defender's expectation of loss and risk acceptance. Because escalation occurs reactively, de-escalation is in the hands of the Challenger anticipating gain. How far is it willing to pressure a weaker but

asymmetrically resolved opponent in order to secure gains on the one hand, and avert a risky war gamble on the other? Or how far is it willing to tolerate Defender's reactive resolve? These are the crucial questions the Challenger confronts. The answer to those questions is ultimately shaped by the size of benefits or gains anticipated. Because the party anticipating gain is not particularly cost tolerant, the gains must be large enough to justify continued pressure. The larger the anticipated gains from a status-quo reference point, the higher the likelihood of crisis escalation to war. Fewer gains would necessitate departure from demands, ultimately leading to de-escalation.

The number of steps in escalation is only indicative in the graph. In any given crisis, there may be one or more cycles of escalation. The causal-process graph only reflects the mechanism of crisis behavior already identified. Once again, the labels "Challenger" and "Defender" are used generically throughout this research, indicating solely the parties' anticipation of gain or loss, regardless of who may be viewed or assessed as an "aggressor" in a particular conflict. The challenge is presented by the motivation to secure gains when gaps between the balance of capabilities and the distribution of benefits are present.

This is the general or "ideal" causal mechanism, operating under the strategic environment of anarchy. Some of the cases, like the Cuban Missile Crisis discussed in this chapter will use this standard of comparison. However, the overwhelming majority of interstate conflicts are fought under various international and regional hierarchies of power, with a chain of cascading power relationships. For instance, recent conflicts in the post-Soviet space, such as the Russo-Georgian war or the ongoing conflict in eastern Ukraine, have a clear external dimension. It would be impossible to make causal inferences by simply looking through the narrow prism of those conflicts at the local level and overlooking the dynamics of the Russian-Western rivalry. In this

case, the collective "West" is a crucial outside actor from whom the chain of power relationships cascades.

The corresponding causal graph requires one additional actor to be added in the chain. At the top of the hierarchy is still the Challenger anticipating gain (in this case, the West). The pivot in the chain is occupied by the central actor who has both challenger and defender qualities (in this case, Russia, defending from loss to the West while challenging Ukraine). Although expecting to win a local military campaign with overwhelming force, it sees the conflict as part of a higher-level competition where its chances for success are modest. At the bottom of the hierarchy is the second Defender anticipating loss (in this case, Ukraine). Both Russia and Ukraine are seeking to prevent potential losses, but to different competitors (see Graph 6). As before, escalation occurs via reactive resolve, in the exact same pattern, and de-escalation is in the hands of the party anticipating gain. How far is it willing to press with demands under risk aversion? In each specific case, the outcome is informed by the gap between relative power and the scale of anticipated benefits of escalation.
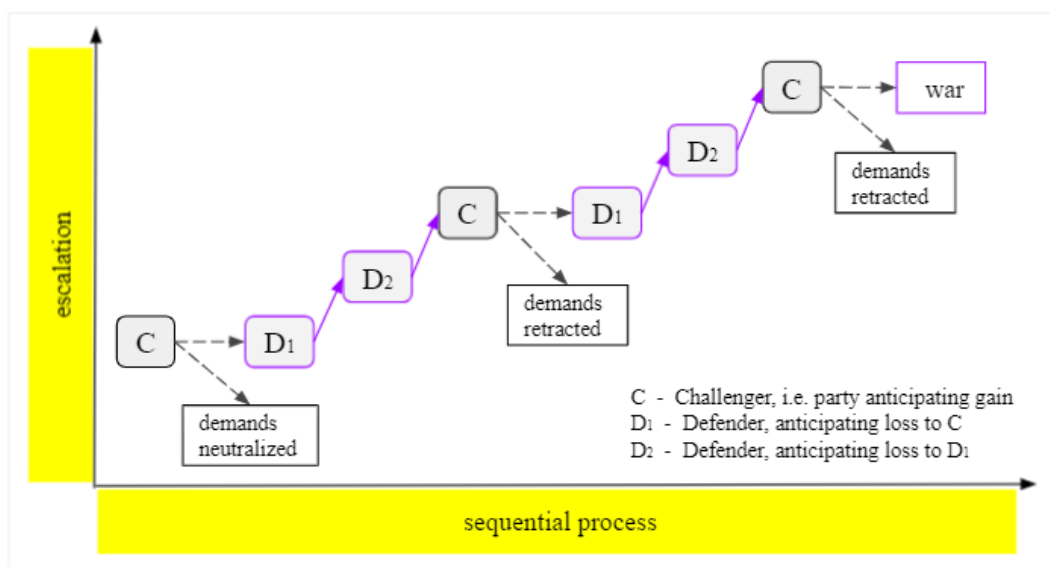
Graph 6. The Causal Mechanism of Escalation as a Chain Reaction

Incidentally, chain reactions happen to be some of the most revealing examples of loss-induced risk-seeking behavior producing bargaining breakdown in asymmetrical conflicts. They represent powerful tests of the theory for two reasons. First, there are more than one actors anticipating loss in a single case, allowing us to observe loss-induced behavior at two levels instead of one. More significantly, the unique positioning of the central actor allows us to observe differences in behavior, if any, by the very same actor, toward distinct counterparts, driven by opposing motivations of gain and loss.

As I run through the cases of compellence and deterrence in the sections below I articulate several *event-histories* which are then mapped on the causal diagrams above. Those maps reflect on key events and decision-making processes that have changed the trajectory of the crises in question.

The Challenge to Compellence under the Fear of Loss

I begin with brief narrative evidence from the dramatic negotiations between Athenians and Melians in the History of the Peloponnesian War. For obvious reasons, a closer investigation of the bargaining process beyond the rendering offered by Thucydides is impossible. Yet seemingly minor pieces of evidence allow us to delineate a similar chain of cascading power relationships and patterns of behavior, described above, ultimately leading to an escalation of crisis in Melos.

The Melian Dialogue

The Melian Dialogue, rendered by Thucydides and better known among IR scholars for foreshadowing the eventual Spartan defiance of Athenian imperialism, is also valuable from a crisis escalation perspective. The broader context of bargaining between Athenians and Melians is defined by their relationship with Sparta. For Athens, this is not simply a war to conquer the island.

Controlling Melos is an important step toward its naval dominance against the powerful land rival. The utility of victory in Melos grows higher for Athens particularly in the context of this overarching rivalry, where Athenians are concerned about a potential defeat by Sparta. According to Kagan (1981)and Garst (1989), an earlier Athenian military campaign in Melos in 426 BC, a decade before the siege, had been abandoned as not worthy of the effort. At the time, Athens and its Delian league were still relatively successful in countering the influence of the Peloponnesian league led by Sparta. But coalitions against Athens strengthened soon after, and its allies began deserting the Delian league. As polarization grew between the two leagues, so did the Athenian intolerance with Melos, "for the Athenians now deny, even during a period of nominal peace, that any space exists for free movement between the Athenian and Spartan blocs" (Garst 1989, 15).

Absent that overarching and intensifying rivalry between Athens and Sparta, in other words, the anticipated gains in Melos did not appear significant enough to motivate an Athenian resolve to fight or vindicate a cruel campaign against the islanders. What really defined the Athenian motivation to take over Melos and escalate the conflict with the Peloponnesian league, was the growing fear of loss to Sparta, rather than the anticipation of victory over the island owing to an overwhelming Athenian capability advantage. Surely, the profound Athenian superiority over Melos must have facilitated the attack. But superiority neither described the source of Athenian determination, nor it compelled the Melians to surrender without a fight. The trajectory of change is provided by the evidence of differentiated behavior under two different structural conditions: in the first case, the Delian league led by Athens was relatively successful and it chose not to escalate the conflict; in the second case it was facing the nearing prospect of loss as allies were moving closer to Sparta.

At the lower chain, the Defender is Melos. The Melian Dialogue provides an important reference to the rationale behind the Melian decision to stand up to formidable power. This argumentation is broadly constructed on the uncertainty of war and the excessive risk that Melians are willing to take to prevent their loss of sovereignty. It is a perfect junction of crude power and risk acceptance.

Every appeal put forth by the rulers of Melos, their calls for justice and honor and hope for foreign help are shut by the Athenian emissaries with the sole notion of the futility of Melian resistance against invictable Athenian power. "The strong do what they can and the weak suffer what they must," the Athenian narrative prominently conveys, advising the islanders to think about their very survival: ."..the contest not being an equal one, with honour as the prize and shame as the penalty, [it is] a question of self-preservation and of not resisting those who are far stronger than you are" (Thucydides 1914, trans. Crawley, 394). To which Melians argue that "the fortune of war is sometimes more impartial than the disproportion of numbers might lead one to suppose; to submit is to give ourselves over to despair, while action still preserves for us a hope that we may stand erect" (ibid. 396). A glimmer of uncertainty in the outcome of war provides sufficient reasoning for Melians to resist, and they only surrender 'at discretion', under siege, when the tragic ordeal unfolds.

In the broader context, it was Sparta that was more cautious or risk-averse and in no hurry to clash with Athens. As tension between the two leagues built up and its ally Corinth was driven into the conflict, Sparta still came forward with offers of peace proposals hoping to avoid a direct confrontation. But just like their Melian counterparts Athenians rejected those offers choosing, instead, to fight until capitulation.

The role of expected gains and losses in shaping conflict behavior potentially risks oversimplifying the complexity of decision making, neglects unit-level factors and the role of leadership among other things, but also allows to extrapolate a simple causal logic across time and space. This logic, exemplified briefly in the Melian dialogue above, sketches a process of crisis bargaining driven by the expectation of loss. Both, aggressive offensive action by Athens as well as dangerous defensive reaction by Melos manifest high-risk behavior under the fear of loss. The expectation of gain, by contrast, does not encourage a high resolve to fight, but merely facilitates swift action once such determination is present. Absent the anticipation of loss, relative advantage induces a more cautious, risk-averse behavior (as in the case of Sparta or Athens in an earlier instance). Notably, this case demonstrates that resolve to fight is not a static individual quality. It matures along with the fear of loss in reaction to the circumstances the actors face. Athens did not always display the same level of resolve in confronting Melos; it moved from being relatively cautious to demonstrating outright brutality when its prospect of loss closed in parallel to intensifying polarization and antagonism between the two leagues.

As noted above, a similar chain of power relationships underlies contemporary conflicts in Russia's 'near abroad'. Moscow has long treated the former Soviet space as its traditional sphere of influence and viewed the dual expansion of NATO and EU institutions into this space as a threat and a source of humiliation. This is only part of a broader set of contested issues between Russia and the West, including arms control and the deployment of NATO missile defense systems in South-Eastern Europe. Russia's fear of loss of influence has grown in parallel to the intensifying political polarization, breaking out into open confrontations at several important junctures in which former Soviet states sought closer cooperation with NATO and/or the EU. One of those crises escalated into the Russo-Georgian war in August 2008, few months after the NATO alliance

pledged that Georgia and Ukraine would eventually become member states at the summit in Bucharest. Another crisis, this time with Ukraine, followed the planned EU Association Agreements with four post-Soviet "buffer" states of Ukraine, Moldova, Georgia, and Armenia in late 2013.

The next section looks into the case of Ukraine in greater detail. The selection of this case is associated with several factors. First, the length of the conflict allows one to observe the repeated failure of bargaining, to trace the sources of tension or escalation throughout, and the behavior of actors involved in terms of their risk-taking propensity. Secondly, this is not an isolated crisis but one instance in a similar population. In fact, all above-mentioned post-Soviet states have been the targets of the Kremlin's strategy of "managed instability" (Kuznetsova 2005) since their independence 30 years ago. And lastly, this is an ongoing conflict where theory's implications offer important repercussions for its likely development path.

The Conflict in Ukraine

There is no lack of analytical perspectives on the causes of the conflict that started with Russia's 2014 annexation of the Crimean Peninsula and intervention in a hybrid war in Eastern Ukraine. Proposed causes range from motivations of geopolitical expansion, historical and legal factors, to concerns of national identity and even domestic economics (Kuzio and D'Anieri (2018), Mykhnenko (2020), among many others). It has also been argued that the crisis in Ukraine is a case of a gray zone conflict involving greater complexity concerning the parties involved, the presence of irredentist and separatist elements, and the use of covert tactics which don't always cross the threshold of war but make warfare "exceptionally resistant to resolution" (Carment, Nikolko, and Belo 2019, 126). Nevertheless, the timeline of events leaves little doubt that the

broader context of the conflict is part of the Russian-Western rivalry and is closely tied to regional integration processes.

Ukraine openly pursued NATO membership and engaged in an "intensified dialogue" after the 2005 Orange Revolution, until its bid for a Membership Action Plan (MAP) was blocked at the Bucharest summit in 2008. While Ukrainian aspirations for membership were welcomed, the alliance, clearly, was not willing to extend a MAP as of yet. Government changes that followed in Ukraine subsequently restored the country's former "non-bloc" status. In 2010, Ukraine's parliament passed a law that declared the country's non-aligned status a foreign policy principle, but the weight leaned heavily toward the Russian side. President Yanukovych went on to extend the lease of the Russian Black Sea Fleet in Crimea for another 25 years and refused to finalize an Association Agreement (AA) Ukraine was planning to sign with the EU in 2013 which included a deep and comprehensive free trade agreement (DCFTA) with European states. In fact, all four of EU's Eastern Partners planning to sign such Association Agreements came under intense pressure in the second half of 2013, as Moscow was simultaneously pushing for the enlargement of a new rival customs union – the Eurasian Economic Union - among the former Soviet republics.

With this in mind, I begin to lay ground for the construction of an "event-history map" with the first causal-process observation (CPO) of relevance – (1) the EU Eastern Partnership summit in Vilnius of November 2013 – an embodiment of the Kremlin's fear of loss to the West.

Along with each defining event, I will trace the sequential, causal processes involving the three key actors of the conflict. For the West, the CPOs are mainly represented by events or statements reflecting the evolution of policy involving eastward enlargement plans, such as NATO and EU summits, other high-level statements of importance. For Russia, these are primarily military mobilizations and key statements by the Kremlin. Russia's quadrennial military exercises,

and especially their scale of mobilization, have been an important indicator throughout. Not necessarily a prelude to an invasion, military exercises have continuously demonstrated Russia's resolve and combat readiness to generate and deploy new units on a larger scale (Mazyka 2021). And for Ukraine, the CPOs represent domestic changes in government and legislation defining Kyiv's policy towards regional integration.

To emphasize why the EU summit in Vilnius represented a moment of transformative change, mind that between the 2010 formalization of the non-aligned status and the 2014 Euromaidan Revolution, Ukraine was, essentially, "Finlandized" (Budjeryn 2014). The planned EU AA had revived its Western trajectory and provided an opportunity to drift away from the Kremlin's sphere of influence. In an attempt to prevent such a scenario, Moscow raised the stakes ahead of the EU summit pressuring President Yanukovych to suspend the pact. But Yanukovych's refusal to sign the long-negotiated agreement with the EU fueled nationwide protests at home. He was ousted in February 2014, fled to Russia, and was found guilty of treason by a court in Ukraine several years later. The planned AA, followed by the overthrow of a Ukrainian leader loyal to the Kremlin, presented a revision of the status quo that Russia could not forgo. Russia's asymmetrical resort to force should be seen precisely in this context of preventing loss.

More specifically, in September 2013, ahead of the EU summit where the AA agreements were due to be signed, Russia and Belarus held joint "Zapad" (West-2013) military exercises mobilizing around 90,000 troops (Brzezinski and Varangis 2015) instead of the announced 12,000. This number grew to 150,000 by February-March 2014, when Russia made large-scale deployments along the border with Ukraine as a 'snap combat exercise' and an "anti-terror" simulation. Although these forces were never used for a large-scale invasion, according to Järvenpää (2014), the annexation of Crimea as well as the forces used in Russian operations across

the south-east "possessed the same sets of capabilities and skills practiced in the 'Zapad-2013' exercises."

The covert invasion and annexation of Crimea followed shortly in the wake of the Euromaidan Revolution. Validating the annexation in a public address, President Putin directly blamed the West for continuously "lying" to Russia by expanding NATO eastward, by deploying military infrastructure, including missile defense systems, at Russia's borders, and when it came to Ukraine, he said, "western partners have crossed the line" (The Kremlin. Address by the President of the Russian Federation March 18, 2014). In addition to seizing Crimea, Russia also waged a "proxy war" in Eastern Ukraine, by supporting separatism in the majority Russian-speaking region of Donbas. The undeclared war that is currently ongoing for the eighth year, has resulted in over 14,000 deaths, several million refugees and IDPs, large-scale destruction, costly international economic sanctions and counter-sanctions, but has not produced a mutually acceptable settlement despite extensive international negotiations.

Far from compelling Ukraine to give up its Western integration course, this show of capability has since elevated Ukraine's resolve to fight for its sovereignty and driven the country ever closer to EU and NATO partnership. When Russia was still incorporating Crimea as a subject of the Russian Federation in March 2013, the Ukrainian government moved with confidence to sign the political part of the EU AA. A few months later, when the battles were raging in Donbas, Ukraine's newly elected President moved to sign the economic part of the agreement. By the end of the year, the parliament renounced Ukraine's non-aligned status, in anticipation of closer partnership with the West.

A crucial distinction that must be noted is that no major escalations appeared to follow Ukraine's domestic statements of policy, which the Kremlin likely never treated with due respect.

By contrast, policy statements or changes coming from NATO/EU were met with fierce reactions. The next such opportunity arrived in July 2016, when Ukraine received an assistance package from NATO, aimed at reforming its security and defense sector – a second defining event that appeared to have renewed the conflict Donbas. (2) At the 2016 NATO summit in Warsaw, in addition to common expressions in support of Ukraine's sovereignty and territorial integrity, the Alliance welcomed its intentions to deepen the partnership and endorsed a "Comprehensive Assistance Package" for Ukraine to enhance its security and defense sector.

It is also important to clarify here, that since the 2014 escalation and with the exception of a few important flare-ups – three of them, to be more precise – the war in Donbas had run on a low intensity. Despite many fears, Russia continuously refrained from a direct offensive, choosing instead to threaten with military build-up, supporting separatists to run a low-level conflict, and using a wealth of non-military tactics to consolidate its control over the regions concerned. And although the Minsk Agreements signed in 2014 and 2015 with OSCE mediation, and subsequent ceasefire measures in 2018 and 2019, did not effectively stop the fighting, for the most part, the conflict disappeared from the headlines internationally.

Invading Ukraine arguably never was part of the plan. But Russia did not fail to escalate the conflict reactively when presented with new evidence of Western policy toward Ukraine. Without such evidence, it appeared content with its overall destabilization strategy. On the one hand, the continued territorial conflict served an impediment to NATO integration. On the other hand, a sustained military campaign sought to pressure the government in Kyiv to integrate the proxy republics with a power of veto on Ukraine's crucial policy-making (Gressel 2021).

While fighting continued to be local, Ukraine's very sovereignty and its free choice of alliances was at stake. Therefore, no settlement concession short of relinquishing that sovereign

power would suffice the Kremlin. It is in this context that NATO's collective expression of support to Ukraine's sovereignty and territorial integrity (which would generally appear to be harmless) and a new allocation for reforms in the security sector (which could generally span for decades in a post-Soviet society without tangible results), should be assessed.

The first most significant escalation since the Minsk agreements took place in August 2016, closely following the summit in Warsaw. Russia claimed a group of Ukrainian saboteurs attempted "acts of terrorism." The Ukrainians rejected the accusations, fearing that Russia was looking for a pretext for escalation amid another round of military exercises. The accusation was followed by "special logistical supply exercises," as well as massive snap exercises that mobilized nearly all Russian strategic military commands in advance of the planned quadrennial drills (Felgenhauer 2016). The *Kavkaz-2016* (Caucasus-2016) followed in early September, for the first time integrating Crimea in the drills. Once again, fears that Russia would attack did not materialize, but its determination to do so, if necessary, was communicated in the most credible manner. Yet again, it did not compel Ukraine to change course. As the drills were still ongoing, President Poroshenko of Ukraine reconfirmed that Entry into NATO remained an unwavering strategic goal "like the Polar Star in the sky" (Eurasia Daily news September 6, 2016).

The timeline of conflict escalation leads to the subsequent (3) 2018 NATO summit in Brussels. Although marred by a crisis within NATO itself under the Trump Administration, the new summit declaration recalled the decision taken at Bucharest in 2008 concerning the future NATO membership of Georgia and Ukraine and expressed continued support for Ukraine's renewed aspirations for membership. President Putin's warning to NATO followed a few days later. Talking to ambassadors at the Kremlin, he said, NATO colleagues "trying to aggravate the situation, seeking to include, among others, Ukraine and Georgia in the orbit of the alliance,

should think about the possible consequences of such an irresponsible policy" (The Kremlin. Meeting of ambassadors and permanent representatives of Russia July 19, 2018). A few months later, Russian warships seized three Ukrainian vessels near the Kerch Strait and detained their sailors, scaling up Russia's control over the Sea of Azov.

No major escalations took place since then, and it appeared as though the war in Donbas had turned into another protracted conflict in the region, until the change of leadership in the U.S. effectively renewed Ukrainian hopes for a NATO MAP as well as Russia's resolve to prevent any steps in this direction ahead of the approaching NATO summit in Brussels. The fourth causal-process observation is, therefore, (4) the 2020 change of the U.S. government.

To be clear, neither the new Biden Administration nor NATO's forward-looking report "NATO 2030: United for a New Era" released at about the same time of government change, demonstrated any intention to actually deliver on Ukraine's aspirations for membership. Yet the language in reference to that aspiration had become increasingly supportive, aiming at the expansion and strengthening of partnership with "vulnerable democracies" such as Ukraine and Georgia, seeking membership. Earlier in 2020, Ukraine was included in NATO's group of "enhanced opportunity" partners and Biden assured the U.S. would be a more reliably ally under his administration. In January 2021, the U.S. Navy reported the participation of a Arleigh Burke-class guided-missile destroyer USS Porter in interoperability exercises with Ukraine's Navy in the Black Sea, which the U.S. Embassy in Kyiv assessed as an excellent example of that partnership (Hefron 2021). In early February, NATO Secretary General Jens Stoltenberg welcomed the Ukrainian PM to NATO Headquarters to discuss the security situation in the region, stressing that cooperation would deepen, and that NATO had stepped up its presence in the Black Sea.

President Zelensky spared no effort to push Biden to support Ukraine's bid for membership, on his part launching a crackdown on pro-Russian media broadcasters and sanctioning some of Ukraine's most prominent pro-Kremlin oligarchs already under Western sanctions. These efforts intensified ahead of the NATO summit in June 2021 as well as during his long-awaited visit to the Oval Office a few months later. In one instance, Zelensky even "overstated" NATO's commitment, tweeting that Alliance leaders had "confirmed" his country would become a member – a claim Biden promptly denied (Kumar 2021).

Fighting re-escalated in Donbas from early 2021, and in February-March Russia amassed over 100,000 soldiers near Ukraine's north-eastern borders and within Crimea. It also effectively restricted the navigation of foreign warships along the Crimean coastline, while its warships began maneuvering in the Black Sea. Part of the troops were later removed, but a significant number remained in the neighborhood in a state of readiness, along with equipment, ahead of the next quadrennial "Zapad-2021" military exercises in September. As before, it appeared that Russia was not interested in invading Ukraine.

To understand the renewed escalation, one should merely translate Zelensky's high enthusiasm for potential change of policy into an even deeper distrust and fear of loss on part of Putin. This does not imply in any way that the reaction is justified on grounds of international norms and principles, but merely descriptive of the asymmetric response to the expectations of loss, prescribed by theory. The entire timeline of the conflict in Ukraine illustrates how escalation was driven by Russia's loss expectation, triggered by key moments in NATO/EU policy making concerning eastward enlargement. In Putin's own words, crossing red lines would trigger an "asymmetrical, swift, and tough" response from Russia (The Kremlin. Presidential Address to the Federal Assembly April 21, 2021). Deployments of over 100,000 troops in districts near Ukraine's

border, significant positioning of equipment, improvements of logistical support, accelerated trainings on interoperability, and numerous joint drills with Belarusian military units in the runup to the "Zapad-2021" demonstrated this ability very clearly.

This time, however, it appears that Russia's dangerous mobilization ahead of the June 2021 NATO summit in Brussels may have had an impact on the West by changing its policy trajectory. I therefore designate (5) the 2021 NATO Summit in Brussels as the fifth and last CPO in the crisis thus far. Socor (2021) describes not one but four setbacks to the collective Western credibility in Ukraine by June. Unexpectedly, the Biden Administration and NATO have toned down their endorsement of Ukraine's future membership in the Alliance, while Germany and France apparently indicated their weakening position against Russia in the negotiations over Donbas. In fact, the meetings of NATO-Ukraine and NATO-Georgia commissions were removed from the summit in Brussels altogether (ibid). The communiqué of the summit called on Russia to "reverse its military build-up, stop restricting navigation in parts of the Black Sea…. the Sea of Azov and Ukrainian ports," adding that NATO was seeking "to contribute to de-escalation" NATO (NATO Summit Communiqué 2021). Washington also decided to waive sanctions and gave green light to Gazprom's Nord Stream Two project, citing U.S. national interests and Europe's energy security.

The event-history map for the ongoing crisis in Ukraine involves five major cycles of escalation thus far. Each of these cycles begins with a defining causal-process observation, represented by different formats of closer EU/NATO engagement with Ukraine, followed by Russia's demonstration of reactive resolve, and by Ukraine's reaction to the latter. (1) The 2013 EU EaP summit in Vilnius with the planned Association Agreement set stage for a series of reactions by Russia and Ukraine leading to the annexation of Crimea and a separatist conflict Donbas. The low-intensity conflict was then escalated at specific junctures, corresponding to

NATO summits in (2) 2016 and (3) 2018, leading to massive military mobilizations by Russia and a greater control of the Sea of Azov. (4) Change of government in the U.S. set in motion the next cycle of escalation, this time bringing Russia dangerously close to an invasion perspective. And finally, (5) the 2021 NATO summit toned down the Alliance's endorsement of Ukraine's entry in the uncertain future, attempting to contribute to de-escalation.

Each of these cycles of escalation followed exactly the patten of the causal mechanism identified earlier in this chapter (i.e. risk-averse action by Challenger followed by a demonstration of high resolve by the Defenders) and involved close linkages between the sequence and logic of events as detailed above via specific references to documentary evidence and statements at the highest level. The diagram below maps this event history onto the causal graph, with a repeating pattern of escalation cycles, until the recent Western de-escalation attempt (see Graph 7).
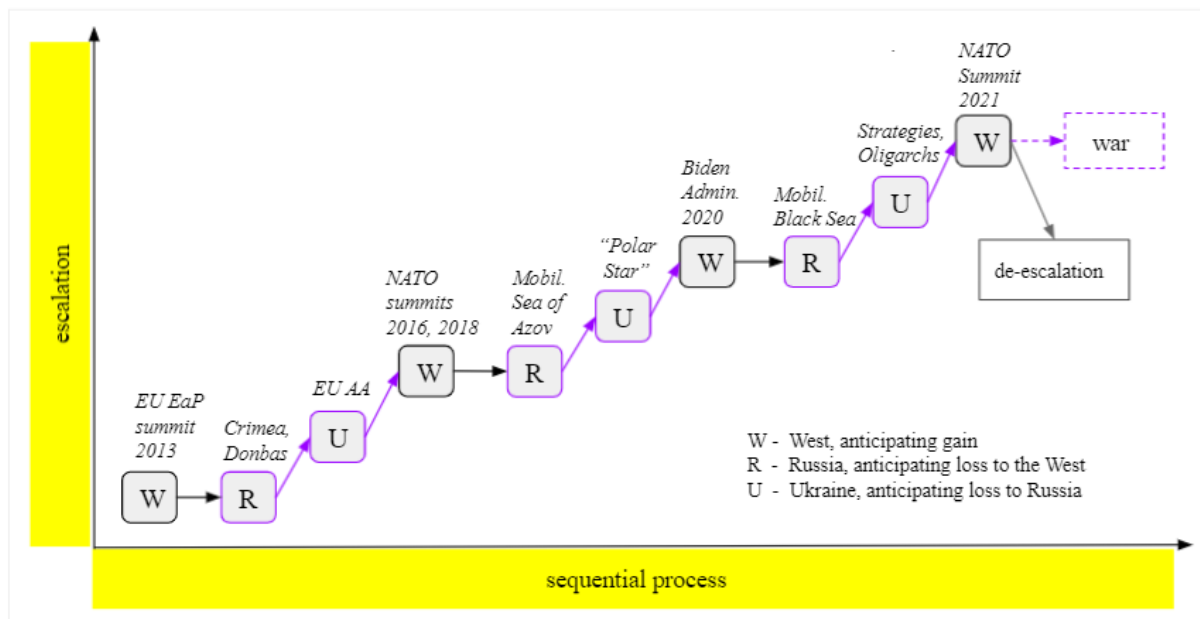
Graph 7. The Escalation of the Conflict in Ukraine[13]

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[13] The graph combines two of the escalation cycles in 2016 and 2018, as the pattern is repeated.

Patterns of Risk Behavior

An additional point to be elaborated is whether Russia's risk behavior can be differentiated at local and global contexts. In fact, it is quite reasonable to conclude that such differentiation exists. In terms of its local military engagement with Ukraine, Russian interference has been somewhat cautious and risk averse, using unconventional tactics, especially in the early stages of the conflict. For some time, the Kremlin denied that the soldiers without official insignia (dubbed as "little green men") who quickly seized control of key sites in Crimea were even Russian, before finally admitting that its military stood behind the local forces of "self-defense" and congratulating them on the "return" of Crimea. It approached Crimea as a separatist conflict, similar to Donbas, with the declared goal of protecting the Russian-speaking population, then turned into irredentism. In other words, even though Ukraine did not pose a major military challenge and did not possess the necessary political or economic leverage against Moscow, support for separatism was undertaken in a relatively non-provocative manner.

By contrast, if we are looking at the broader context and the implications of such intervention for Russia's relationship with NATO and the EU, where its position is clearly inferior in terms of overall capability, Russia has taken a major risk in confronting the West. Its annexation of Crimea and continued military involvement in Donbas have undermined and challenged the European security order based on the 1975 Helsinki Accords and established Russia's reputation as a revisionist power. This has raised questions about the Baltic states of Latvia, Lithuania, and Estonia as likely future targets of hybrid warfare (Haines 2016) and the challenge such tactics may present to the provisions of the NATO Charter on collective defense (USASOC 2015). The Russian security threat has been subsequently elevated in NATO as well as the EU, necessitating a strengthening of their deterrence and defense postures. Coordinated Western financial-economic

sanctions have cost Russia a reduction of economic growth by an estimated 2.5-3 percent every year since 2014, additionally distracted foreign investments, and personally hit the country's wealthy kleptocrats (Aslund and Snegovaya 2021).

Of course, none of these measures have forced Russia to reverse course from its strategy in Ukraine. Quite the contrary. It seems as though Russian patience with Ukraine has run thin. For the time being the conflict may be on the path of de-escalation, however the war in Ukraine is not over yet. The ultimate question for the West is how far is it willing to press for enlargement or, alternatively, shape its policies in Ukraine (and the broader neighborhood) based on Russia's strategic interest there? Russia may well escalate the conflict if Ukraine's Western integration course isn't reversed, in which case a much heavier military offensive can be expected as opposed to the simmering local conflict in the East. This might be a fateful decision, akin to the Athenian siege of Melos, raising Russia's own risks of conflict with the West. But risk-aversion is the tendency of the more powerful side - in this case the NATO/EU institutions - not that of Russia anticipating losses either way!

The West is, arguably, not risking anything at all. When Russia imposed a de facto blockade of the Ukrainian ports in the Sea of Azov in 2018 and Ukraine turned to partners in NATO referring to Germany, Ms. Merkel responded that the conflict had no military solution (Kramer 2018). When Ukraine turned to Biden for a clear decision on the MAP in 2021, the President responded that "school's out" on Ukraine's progress. Certainly, at no point has the Alliance communicated a readiness to intervene in support of Ukraine militarily. Repeated statements in support of Ukraine's sovereignty and territorial integrity, various modalities of closer partnership and cooperation, access to NATO programs and learning, and even financial-military

assistance have been far from what Ukraine needed the most, i.e. security guarantees. Over time, the West has demonstrated typical behavior in anticipation of gain, constrained by risk-aversion.

Meanwhile, Ukraine has carried the full weight of consequences of escalation but has been willing to pay a heavy price in an effort to prevent its loss of sovereignty. Not only has Kyiv demonstrated a determination to fight, it has also taken an incredibly risky path to respond to Russia's demands. In the course of the war, it has formally joined the EU AA, amended the Constitution strategically committing to becoming an EU and NATO member state, and adopted a new National Security Strategy in 2020, declaring Ukraine's full membership in EU and NATO the nation's strategic course. With foreign assistance and advice, Ukrainian authorities also attempted to reform the military to meet NATO standards in order to both improve defense capability as well as to prepare for an unlikely NATO membership one day. Whether these reforms have succeeded is another matter. Apparently not.[14] That successful reforms would not warrant accession to the alliance is another inconvenient reality. The fact of the matter remains, however, that Ukraine took the riskiest path forward to defend itself against Russia.

It was April 12, 2021. Russia had amassed its troops near Ukraine's eastern border and Vladimir Zelensky was visiting the trenches on the front line to show Ukrainian troops his support. There, again, he conveyed to a CNN reporter the importance of actually admitting Ukraine as a NATO member state for security assurance. The reporter reminded President Zelensky that the chances were slim, "amid concerns that moving Ukraine closer to NATO membership would provoke Moscow, possibly fueling a broader conflict." "Maybe you are right," Zelensky responded, "but what now is going on? What do we do here? What do our people do here? They

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[14] At the time of writing this dissertation, reports indicate that Ukraine is still facing a challenge of defense sector management and quality leadership (Havrylov 2021), that military reforms "have gone nowhere" and the US "Gold Standard" assistance "has not had any noticeable, let alone quantifiable, return on investment" (Grant 2021).

fight" (Chance, April 13, 2021; Ukraine's President heads to the trenches as Russia masses its troops).

The Challenge to Deterrence: The Nuclear Superiority Hypothesis Revisited

As discussed in the previous chapter and demonstrated in the cases above, superior capability does not necessarily succeed in compelling opponents to concede or surrender without a fight. The relationship between the distribution of power and war is more complex and conditional on expected gains and losses from a status quo reference point, in which relative advantage tends to generate the opposite effect. The very same causal mechanism operates in the case of deterrence. As a matter of fact, Russia's effort in Ukraine can be seen as a case of both – compellence, against Ukraine, and deterrence, against the dual NATO/EU enlargement. So far, its strategy is more successful in deterring the West than compelling Ukraine to change course, albeit the superiority hypothesis would favor the latter.

Similar implications can be observed in nuclear crises, where the vulnerability of state parties is extremely high and they are said to engage in a contest of "risk taking." In particular, the nuclear brinkmanship theory argues that games of risk are won by the "nerve" or the "balance of resolve," by the party willing to accept or "bid" the highest risk of a nuclear war, and not by strength or nuclear superiority (the BoP) (Schelling 1960, 1966; Jervis 1976, 1984; Snyder and Diesing 1977; Powell 1990). From the perspective of the theory of reactive resolve, this is very intuitive because (a) in conflicts between nuclear states all sides anticipate major losses in case of escalation, and (b) expected losses impose risk-taking preferences. There are no winners in a nuclear war. Everyone is in the losses frame regardless of asymmetric capabilities. It is this bilateral anticipation of loss and vulnerability that triggers a contest of risk-taking.

But which party is more likely to take the highest risk of war?

The logic of deterrence is based on two components: the *capability* and the *credibility* of carrying out a deterrent threat. To the extent nuclear deterrence is effective, it is not simply because both sides are risking near-annihilation, but also because the credibility of escalation is real. Once the parties have deterrence capability, the crux of deterrence shifts to the problem of credibility. So, the decisive question that arises in a nuclear crisis is the same as before. It has to do with the relationship between relative power capability and risk-taking propensity. Which side has the upper hand in a game of risk - the one with superior or inferior capability?

All else being equal, the theory of reactive resolve prescribes that the side expecting the greatest loss has the highest risk-taking propensity, not the side capable of inflicting the greatest harm. A potential nuclear exchange entails unacceptable losses to both sides, but the *credibility* of raising the stakes favors the side anticipating greater loss. From this perspective, military superiority does not contribute to effective deterrence in a nuclear crisis. On the contrary, it is likely to provoke reactive resolve to fight if perceived as a source of potential loss. This implication runs contrary to hypotheses favoring nuclear superiority for successful deterrence.

Proponents of nuclear superiority have long advocated for the "prudence" of greater escalation dominance or control through costly arms races, and "flexible" response options via gradations of nuclear force (Payne and Schlesinger 2014; Payne and Foster 2015; Borden 1946). The object of interest here is not the potential attainability of a viable defense or "deterrence by denial" through superior strategic weapons (e.g. the reasoning behind Reagan's Strategic Defense Initiative in early 1980s), but the decisive role attributed to nuclear superiority in settling crises in favor of states with strategic advantage. Scholars like Marc Trachtenberg (1985) and Glaser (1990) have pointed to weaknesses in the logic of argumentation around the crucial role of nuclear

superiority. However, more recent advocates of this approach have attempted to fill the logical gap.

According to Matthew Kroenig, even though nuclear crises are competitions in risk taking, superiority of one's nuclear arsenal over the opponent "increases the level of risk that a state is willing to run in a crisis" presumably because "states that enjoy a nuclear advantage over their opponents possess higher levels of effective resolve" (Kroenig 2013, 143).

Kroenig's thesis is the exact opposite of the one proposed in this dissertation. While resolved actors are commonly characterized as more risk-seeking, the underlying contradiction is over the interpretation as to which side is more resolved in a dispositional or behavioral sense. The mechanism of loss-induced risk and time-discounting preferences in crisis bargaining, modeled and analyzed carefully throughout this study is consistent across various theoretical perspectives and tested extensively in behavioral economics. Risk acceptance is not a sign of strength. Quite the contrary, it is a sign of weakness. So, what are the grounds to claim that a state with superior weapons would be more willing to accept greater risks?

Kroenig argues that a nuclear superior state has a "greater payoff of disaster" relative to their opponent (p.152). However, this calculus only informs us about the state's expected actual returns, in the sense of calculated incentives, not their utility value. Assuming that a nuclear superior state has greater expected returns from some level of nuclear war than its counterpart does not justify a risk-seeking preference in escalation. If such "payoff of disaster" would at all be conceptualized as anticipated "gains" of a nuclear exchange, then a relative gains' frame could be an indication of risk-aversion, in accordance with the logic of prospect theory. It is not clear, however, why a party relatively more confident about the "payoffs of disaster" would take greater risks of a nuclear war. Unless a mechanism is laid out to explain such causality, we can not

designate a party with higher capability as the more "resolved" combatant, willing to take higher risks. Payoffs determine the basic incentive to fight, not the actors' determination or risk behavior (a second-order parameter).

To exemplify his hypothesis, Kroenig details two historical cases where nuclear superior states have purportedly enjoyed coercive advantage by escalating nuclear crises to their benefit. Those are the United States during the 1962 Cuban Missile Crisis, and India during the 1999 Kargil crisis. In the sections below I analyze these very cases of nuclear deterrence to argue against Kroenig's justification. I do so by carefully tracing the events, sequential processes, and their causal relations throughout the evolution of these crises. I compare the resulting event-history maps with the causal mechanism articulated above, in order to draw conclusions about the mechanism or interplay of relative advantage and risk-taking propensity for these cases of nuclear crises.

The Cuban Missile Crisis

The case of the Cuban Missile Crisis is convincing to Kroenig because this is a time where the Soviet Union already had the ability for a nuclear attack, but the U.S. still retained a favorable advantage in the nuclear balance. Kroenig's argument for the victory of superiority jumps directly from the premise of superiority to the outcome of the crisis: ultimately the U.S. managed the withdrawal of Soviet missiles from Cuba. The intervening variable is "resolve." Because the author views the crisis as a competition in risk-taking where advantage is gained through higher levels of resolve, he suggests the U.S. "victory" must have been a demonstration of a willingness to take a greater risk, owing to superior nuclear force.

Attempting to substantiate the causal influence of nuclear superiority in decision-making, Kroenig makes brief references to arguments raised by senior U.S. government officials. For

instance, he quotes a memo from the Chairman of the Joint Chiefs of Staff, General Taylor, reminding Secretary of Defense McNamara about the US strategic advantage and adding that "this is no time to run scared" (quote borrowed from Gaddis (1982, 229)). Remarkably, two out of three direct quotes from government officials chosen by Kroenig are pointing to the theme of tackling fear among decision makers, which does not lead to a conclusion that US leaders were highly motivated and empowered by their awareness of strategic superiority. Indeed, McNamara, being reminded of the American superiority did not believe that larger numbers of strategic weapons could be translated into "usable military power" to serve political objectives.[15]

On the other hand, Kroenig argues that Soviet leaders were similarly "cognizant of their nuclear inferiority and that this may have encouraged them to withdraw the missiles from Cuba" (Kroenig 2013, 151). This assumption raises questions. If the Soviets were forced to retreat and withdraw missiles due to their recognition of inferiority, why did not that same recognition prevent them from escalating the conflict and moving the missiles all the way to Cuba in the first place? Ultimately deterrence, owing to strategic superiority, had partially failed until that point. What changed its trajectory and compelled Khrushchev to take a step back?

The event-history map for the crisis begins with a key trigger, which is at the heart of the context of crisis bargaining: In late 1961, following the failed Bay of Pigs invasion in Cuba, the United States completed the installation of a total of 45 intermediate-range ballistic missiles (IRBMs) in Turkey and Italy. These deployments were part of earlier agreements made by the Eisenhower Administration, aimed at strengthening the NATO alliance after the launch of Sputnik (which, in turn, had raised concerns in the West about a potential technological gap). Despite

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[15] Transcript of a Discussion about the Cuban Missile Crisis, June 28, 1983, pp. 1-2, Alfred Sloan Foundation, New York. Referenced in Trachtenberg (1985).

conflicting interpretations of the significance of these missiles, it can be argued that both the U.S. and European allies were cognizant of their political consequences. In fact, all NATO allies in Europe except Turkey and Italy refused to host the missiles fearing a Soviet reaction (Bernstein 1980). There is also evidence that the incoming Kennedy Administration had seriously considered backing down from the agreements, by instructing a committee review at the National Security Council, but that most likely President Kennedy did not want to appear weak and offend NATO allies after the agreements were made (ibid).

In response to the deployments of Jupiter missiles as well as the opportunity provided by Cuba's interest in deterring potential future American threats, in the summer of 1962, the Soviet Union began constructing a number of facilities for launching medium- and intermediate-range ballistic missiles from Cuba and began the shipment of missiles overseas. The American side. first detected the presence of a ballistic missile in Cuba on October 14, marking the beginning of a tense thirteen-day crisis.

Four major U.S. decisions can be traced throughout the crisis, in response to Soviet action:

The first decision concerned the choice of action in response to Soviet installations and deployments. Presented with potential courses of action, including targeted air strikes of the missile bases, an invasion of Cuba, a blockade of the island, or further diplomatic effort, (1) President Kennedy chose a carefully balanced and worded strategy of a "naval quarantine." Such a decision allowed the U.S. leadership to prevent the transportation of Soviet offensive weapons without excessively elevating the risks of a nuclear war, as well as buying more time to negotiate the withdrawal. "If we invade, we take the risk, which we have to contemplate, that their weapons will be fired," Kennedy told the congressional leaders (May and Zelikow 1997, 266, referenced in Powell (2015)). At the same time, an October 22 letter from the White House to the Kremlin

informed that the U.S. was "determined" to remove the grave security threat to the Western

Hemisphere and that the action taken was "the minimum necessary" in that process but one that

should not be misjudged (JFK Library online archival collection October 22, 1962).

The second decision concerned the actual implementation of the quarantine in the face of

Soviet opposition. Responding to Kennedy on October 24, Khrushchev accused him of threatening

the Soviet Union through an ultimatum to which, he argued, he could not yield. Khrushchev

warned that he would take the measures necessary to defend USSR's "freedom of navigation in

international waters and air space" (Atomic Archive online document October 24, 1962). On

October 25, a Soviet oil tanker "Bucharest" neared the zone of quarantine. (2) Kennedy again

reacted cautiously by allowing the tanker to proceed, citing its "status as a tanker with no

contraband cargo" (NSC Executive Committee Meeting October 25, 1962).

On October 27, the Soviet military shot down an American U-2 spy plane. (3) Fearing the

crisis could spiral out of control, the U.S. President, for the third time, refrained from escalating

it, by concluding that the attack could not have been ordered by the Soviet leadership. A

declassified cable from the Soviet Ambassador in Washington to his Foreign Ministry issued on

the same day described in detail his meeting with Robert Kennedy, who directly conveyed JFK's

concern and proposals to the Soviet side. In particular, the telegram explained to Khrushchev that

the American government had been under "strong pressure" to respond with fire if its

reconnaissance flights were fired at, but that it recognized such a response would create a chain of

reactions, which is why Kennedy had stressed the importance of halting construction work in Cuba

and de-escalating the crisis (Atomic Archive online document October 27,1962).

The remaining part of the cable provides valuable insight into a fourth (4) U.S. government

decision in response to Soviet demands for withdrawal of Jupiter missiles from Turkey and Italy:

"In exchange the government of the USA is ready, in addition to repealing all measures on the "quarantine," to give the assurances that there will not be any invasion of Cuba and that other countries of the Western Hemisphere are ready to give the same assurances-the US government is certain of this.
"And what about Turkey?" I asked R. Kennedy.
"If that is the only obstacle to achieving the regulation I mentioned earlier, then the president doesn't see any unsurmountable difficulties in resolving this issue," replied R. Kennedy. "The greatest difficulty for the president is the public discussion of the issue of Turkey. Formally the deployment of missile bases in Turkey was done by a special decision of the NATO Council. To announce now a unilateral decision by the president of the USA to withdraw missile bases from Turkey-this would damage the entire structure of NATO and the US position as the leader of NATO, where, as the Soviet government knows very well, there are many arguments. In short, if such a decision were announced now it would seriously tear apart NATO.
However, President Kennedy is ready to come to agree on that question with N.S. Khrushchev, too. I think that in order to withdraw these bases from Turkey, we need 4-5 months," the cable from Dobrynin reads (ibid.).

A formal letter from Kennedy to Khrushchev later that day provided assurances against an invasion of Cuba as well as the prompt removal of the quarantine but omitted the question of Jupiter missiles in Turkey or Italy (Atomic Archive online document October 27, 1962). The U.S. compromise was concealed from its domestic audience as well as from NATO allies, yet five months later the missiles were dismantled from both sites. Nash (1997) discusses in detail the diplomacy of U.S. withdrawal under the pretext of "modernization" or the planned future replacement of the "expensive" and "dangerous" ICBMs with Polaris submarines to ensure the Mediterranean deterrent, in view of Italian and Turkish resentment. "Only a handful of observers charged Kennedy with having concluded a secret trade or viewed the dismantlement as a surrender to Soviet demands," Nash recalls (ibid., 166).

The observed causal process of escalation of the Cuban Missile Crisis does not deny that the U.S. succeeded in resolving this extraordinary crisis. Whether that result can be qualified as the "victory of superiority" is another matter. It suggests a very different mechanism or interplay

between structural circumstances and resolve or risk-propensity than what has been suggested by the proponents of nuclear superiority.

In a detailed account of the influence of nuclear weapons in the Cuban Missile Crisis, Trachtenberg concluded that even though the strategic balance mattered, the existing evidence did not support the argument that superiority directly influenced US policy:

> *"The "balance of resolve" was ... crucial. ... The balance [of resolve] was unequal, but not so unequal that it makes sense to view the crisis as a simple "contest" with a clear victor. ... The Kennedy Administration's fears of escalation substantially cancelled out, in its own mind, whatever benefits it might have theoretically been able to derive from its "strategic superiority." The American ability to "limit damage" by destroying an enemy's strategic forces did not seem, in American eyes, to carry much political weight. ...the strategic balance mattered in 1962. Does this conclusion have "hawkish" or "pro-nuclear" implications? Its real meaning is more complex."* (Trachtenberg 1985, 162-163)

That complexity can be explained through the prism of the theory of reactive resolve.

In fact, the balance of resolve was not simply unequal, it was also *unstable* throughout the various stages of the crisis, unlike the balance of capabilities. Therefore, it could not be crucially influenced by the count of nuclear warheads. Although relative strategic disadvantages could have influenced the Soviet anticipation of loss, the costs of nuclear exchange were sufficiently high for both sides to be intolerable. In this case, however, there were additional expectations of loss that directly informed the balance of resolve, as well as the ultimate resolution of the conflict.

Before the U.S. leadership demonstrated resolve to confront the Soviet challenge, it was the Soviet leadership that exhibited asymmetrical risk-acceptance and resolve when it began the process of placing ballistic missiles in Cuba in response to the deployment of American Jupiter missiles in Turkey and Italy. Khrushchev was always aware of the Soviet position of strategic inferiority, but this did not prevent him from effectively constructing facilities capable of launching offensive weapons of mass destruction, when he was pushed into a new losses frame

which he did not want to accept. Meanwhile, the U.S. awareness of its nuclear superiority never encouraged a greater risk-taking propensity. As the closer examination of government decision-making has revealed above, the key source of American determination to rise to the Soviet challenge lied with the excessive Soviet reaction itself and the heightened expectation of loss that it generated for the American people in close neighborhood. Allowing for the deployment of the missiles in Cuba would have constituted an unacceptable concession which the U.S. leadership could not forgo.

However, at no point during that thirteen-day confrontation – beginning from the spotting of the Soviet installations on October 14 to their withdrawal on October 28 – did the U.S. hawkishly rush to escalate the crisis owing to its advantage of relative superiority. Meanwhile, evidence of the opposite tendency of risk aversion is substantial. The history of the escalation of the Cuban Missile Crisis mapped onto the causal graph below confirms, once again, that the escalation of the crisis was driven exclusively by the Soviet expectation of loss and a high risk-taking propensity imposed by that expectation. By contrast, the U.S. government continuously chose more cautious, risk-averse strategies as it imposed a quarantine, responded to provocative actions and, finally, gave in to Soviet demands.
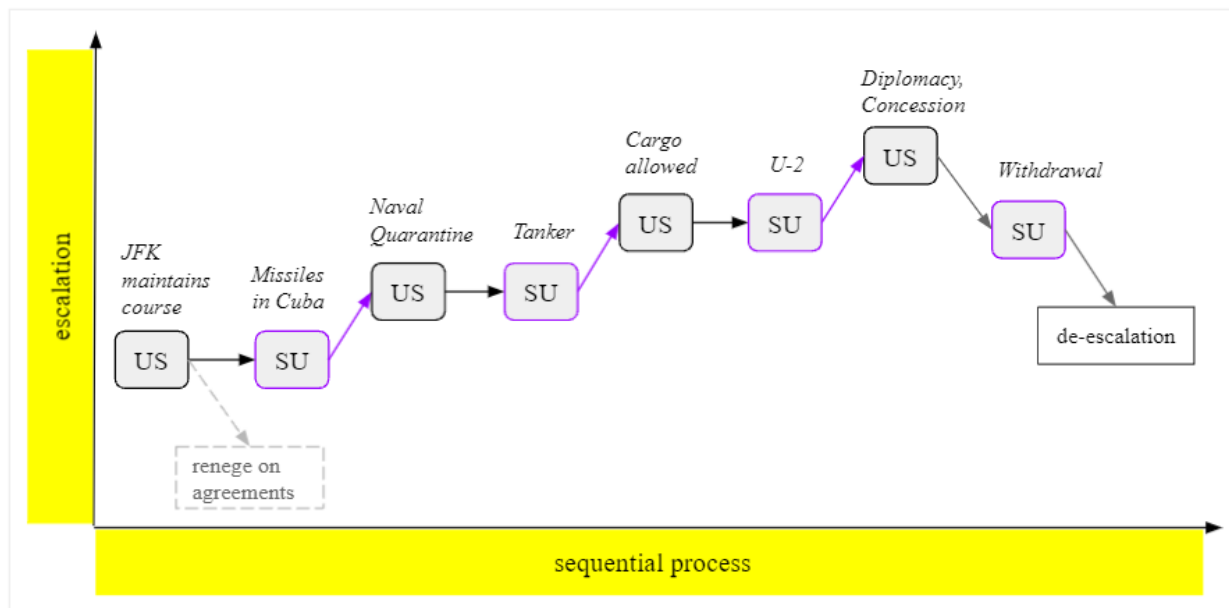
Graph 8. The Escalation of the Cuban Missile Crisis

From the lens of the theory of reactive resolve, coming from a position of strength, the U.S. had the *benefit* of responding with greater caution or risk-aversion, ultimately leading to de-escalation. In that sense, relative advantage could have had an important role in resolving the crisis, but not via a 'victory of superiority' Kroenig implies. Had the U.S. raised the crisis to producing additional losses for the Soviet side, a nuclear exchange could have been more likely. Instead, it allowed the Soviets to save face and secretly agreed to remove the Jupiter missiles from Turkey and Italy as part of the deal. If Kroenig's argument of motivation by a "greater payoff of disaster" were plausible, the American side would have not missed at least three opportunities of raising the stakes for the opponent with inferior capabilities and would have certainly not tried to meet their own demands for dismantling the missiles in the Soviet neighborhood.

The Kargil Crisis

Another case brought up by Kroenig is the 1999 Kargil crisis between India and Pakistan - the only case of a conventional war between two nuclear powers.[16] The war in Kargil was instigated by an infiltration of Pakistani troops across the line of control (LOC) in Kashmir and the capture of important high-altitude positions on the Indian side of the ceasefire line. At the time both states were already in possession of nuclear weapons but with significant Indian nuclear superiority. In fact, the intrusion took place less than a year after Pakistan's first known nuclear tests. India could not accept the move and launched a conventional attack to force the Pakistani troops out of Indian positions. Again, Kroenig suggests that it was India's strategic advantage that ultimately "induced caution in Pakistan's leaders" without much further elaboration (2013, 151). "[India] may have lost part of its population, but Pakistan may have been completely wiped out," he quotes Indian Defense Minister George Fernandes in support of the argument for strategic superiority (ibid.).

Indeed, Pakistan eventually withdrew its irregular forces from the region. However, both the Pakistani behavior throughout the conflict and the Indian tactics used to achieve withdrawal deserve a closer look.

Take note that in this case as well, the weaker side is the one displaying risk-seeking behavior and provoking an unprecedented conflict between nuclear states, despite the opponent's strategic advantage being three to one. Once again, strategic superiority turned out to be ineffective in deterring a major provocation by an inferior competitor. Unlike the bipolar world in which the U.S.-Soviet confrontation took place and where no external actors could wield pressure on the

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[16] The only other case where two nuclear powers have clashed thus far is the India-China border dispute in the Himalayan region, which escalated to a deadly skirmish between the troops in Galwan valley on June 15, 2020.

parties' individual decision making process, here, Pakistan was being pressured to pull out by major powers and allies around the world. The list included the United States, the European Union, China, the G8, and other organizations.

Furthermore, a closer look into the evolution of the crisis reveals that when confronted with an Indian conventional attack, Pakistani forces did not yield "out of caution" but put up a hard resistance in response to artillery and air attacks and imposed heavy casualties on the Indian side, including at least 522 Indian soldiers (Government of India Web Archive 2002). By the time the Pakistani side turned for external help to de-escalate the crisis and was requested by President Clinton to pull back forces and restore the former line of control, Indian forces had reportedly recaptured up to 80 percent of intruded positions by force (Anand 1999). This number surpassed 95 percent at the time when the Indian and Pakistani military leaders met to discuss the modalities of withdrawal (ibid). That is to say, the Pakistani infiltration had almost completely failed on the ground.

Finally, three years after the standoff, former White House aide Bruce Riedel published an article in which he described, in detail, President Clinton's meeting with Prime Minister Sharif in Washington that produced an agreement on Pakistan's withdrawal. Riedel disclosed that the U.S. had received "disturbing evidence that the Pakistanis were preparing their nuclear arsenals for possible deployment" (Riedel 2002, 8). This piece of information was not of last concern to the U.S. President, who stood firm on his demand for unconditional withdrawal.

Little, if anything, in Pakistani conflict behavior indicated "caution" induced by Indian nuclear superiority. In fact, at no point during the crisis did Pakistan yield to Indian demands. It dared to attack a superior competitor, demonstrated firm resolve to fight, was defeated on the

ground and isolated internationally, yet was preparing to deploy nuclear tipped missiles for a possible attack on India, until it met American resistance.

And how did India respond to the crisis from a position of strategic superiority?

In a study on military power and nuclear brinkmanship, Robert Powell sheds light on several key decisions taken by the Indian Government in response to the incursion:

> *"First, they ordered Indian ground forces to stay on the Indian side of the LoC and not to expand the war elsewhere by crossing the international border. Prohibiting horizontal escalation in this way reduced the risk of nuclear escalation. But this decision also meant that Indian troops would fight under very adverse conditions which lowered the probability of success and raised the cost. Dislodging the Pakistanis required Indian forces to fight at high altitudes above 15,000 feet, often uphill against dug-in positions.*
> *Second, Indian authorities allowed the use of air power but limited operations to the Indian side of the LoC. India had not used air power against Pakistani forces since the 1971 war, and Indian political leaders turned down the initial request to use it, at least in part because of concerns about escalation.[See Ganguly and Hagerty 2005, Malik 2006, Gill 2009] Indian authorities subsequently decided to accept this risk and approved the use of air power after initial attempts to take the Pakistani positions failed. But these leaders were willing to go only so far. Requiring the air force to remain behind the LoC limited its effectiveness against the Pakistani positions. Both of these key decisions reflect Indian efforts to balance a higher probability of success if the conflict remained limited against a higher probability that the conflict would escalate and 'go out of control'."* Powell (2015, 590)

India's conduct during the war closely resembles the U.S. response to the Cuban Missile Crisis in its determination to resist unacceptable loss and risk aversion at the same time. Far from entertaining the idea of greater relative "payoffs of disaster" for escalation, the Indian Government chose to pay significant additional costs of fighting required to prevent the conflict from escalating beyond a limited standoff.

In this case, the crucial change of Pakistani behavior was caused by the outcome of the limited conventional war on the ground (i.e. a conventional defeat), a cautious Indian control of

escalation, in combination with multilateral external pressure. There is no evidence, throughout the event-history of this war, that India's nuclear superiority had any tangible positive influence on Pakistani behavior.

Reflecting on both of these crises, among others, Powell notes an apparent trade-off between the use of power ("bringing more power to bear") and the risk of escalation. Actions leading to a higher effectiveness (e.g. attacking the Soviet missiles in Cuba or crossing into Pakistani positions in Kargil) appeared to increase the risk of escalation. He theorizes that actors try to balance this trade-off depending on the balance of resolve. They bring less power to bear if they believe their opponents are likely to have higher resolve, and they bring more power to bear if their own stakes are higher (Powell 2015).

Clearly, both U.S. and Indian decisions to bring less power to bear (than they would have otherwise) could not indicate that the U.S. or Indian governments perceived their opponents to have lower resolve to fight. Powell does not analyze whose resolve would be theoretically higher, but he does conclude with the following explanation for various state preferences of nuclear doctrines: "A state that expects to be weaker but more resolute than its adversary has an incentive to adopt doctrines and deploy forces that make the use of force riskier and thus easier to transform a contest of military strength into a test of resolve. A strong but less resolute state has the opposite incentive" (620).

This conclusion aligns perfectly with the theory of expected disutility and resolve. For lack of a better strategy, the weaker side is much more prone to exploiting risk under uncertainty, because it is already on a path of loss. The stronger side, by contrast, does not have to lose anything at all, and is more inclined to choose safer strategies, avoid risk and protect its benefits. Two of

the most dangerous nuclear crises thus far - the Cuban Missile Crisis and the War in Kargil - demonstrate this tendency infallibly.

Conclusion

In this chapter I have analyzed cases of compellence and deterrence to demonstrate existing challenged to both types of coercion in the context of anticipated gains and losses. Via a detailed process tracing mechanism, I have argued that loss expectation has been the most crucial driving force of crisis escalation from Melos to Donbas, in Cuba and Kashmir. In all these cases, I have focused on the sequence of most crucial events and trajectories of behavioral change in crisis to demonstrate causal inference. For the conflict in Ukraine and the Cuban Missile Crisis, I followed Waldner's high "completeness standard," by articulating event histories and mapping them onto the causal mechanism of escalation prescribed by the theory of reactive resolve. How expectations of gain and loss have determined the value preferences or risk attitudes of the parties to the conflict, and how these behavioral preferences regulated the process of escalation, has been consistently and continuously in line with the prescription of the theory.

Parties expecting the greater loss have consistently demonstrated higher risk-taking propensities. Either they took enormous risks by heroically withstanding attacks by stronger challengers – as the Melians and Ukrainians did, or they deliberately took provocative action and challenged superior states attempting to present them with a fait accompli – as the Soviet and Pakistani authorities did. Western partners, promoting the enlargement of EU/NATO institutions, were certainly not resolved to fight for those potential gains. Similarly, Russia's determination to fight was not driven by a conventional superiority over Ukraine, but the loss of influence to the Euro-Atlantic alliance. Crisis escalation cycles throughout the war in Donbas were directly linked

with key Western policy-making events and processes that touched upon Ukraine's EU or NATO integration path.

In neither of these cases did superiority generate resolute, risk-seeking behavior. Fear of loss did. In that sense, the empirical findings based on causal inference entirely reject the alternative hypothesis that nuclear advantages provide higher levels of effective resolve. The detailed process-tracing in the two most significant cases of nuclear crisis to date – the very same cases invoked in support of that hypothesis – reveal, an opposite mechanism of escalation has been operating. Confronted with the Soviet deployment of missiles in Cuba, the U.S. leadership consistently refrained from taking any risks that could lead toward an unwanted escalation, and it only managed to de-escalate by pushing the Soviet side out of the losses frame. Similarly, confronted with the Pakistani infiltration, the Indian side preferred to pay higher costs of conflict on the ground so that not to cross dangerous territory on the Pakistani side of the LOC. Its sensitivity to the opponents' concern for loss, not the advantage in nuclear warheads, made de-escalation of the crisis possible. These dynamics are not easily observed from a traditional rationalist bargaining framework.

CHAPTER VII

CONCLUSIONS

Concluding Remarks

This study may appear provocative to traditional rationalist and behavioral IR theorists alike. On the one hand, it questions the very rationality of rationalist models when it comes to their assumptions of predefined and exogenous value preferences. On the other hand, it sidelines individual or sub-systemic sources of behavioral divergence by emphasizing their structural sources based on expectations of relative gains. Doing so, it provides a new theoretical framework of bargaining that is both parsimonious and, at the same time, accounting for second-order behavioral effects.

Does the framework predict outcomes of crises? Not necessarily. International crises are highly contingent processes. Yet, it helps improve the prescriptive and predictive accuracy of bargaining models relying on the same set of factors as before – the actors' expected payoffs of war. The expected gains and losses from a status quo reference point are the same endogenous shifts in power associated with the credible commitment problem in bargaining. These shifts may potentially overshadow the bargaining surplus, as rationalist models describe, but they also induce opposing, asymmetrical utility functions that must be accounted for.

The theory of reactive resolve reveals the behavioral mechanism of bargaining in which action is followed by reaction, rather than accommodation. It demonstrates how sustained pressure for concessions may escalate crises to war due to Defender's reactive resolve induced by the expectation of loss, and how crises may de-escalate owing to Challenger's risk averseness induced by the expectation of gain. Contrasting, asymmetrical value preferences imply a crucial pattern of

interaction that is otherwise absent in a rationalist framework. As opposed to traditional models where payoffs of war determine outcomes of bargaining automatically, here, the payoffs impact value preferences, which generate a pattern of interaction i.e., crisis behavior. Bargaining outcomes are then produced as a result of the dual impact of relative power: cost-benefit analyses and value preferences.

The distribution of capabilities, costs, and benefits of conflict remain the fundamental determinants in crisis bargaining. However, the second-order behavioral effects they generate are potentially more crucial to bargaining than the material calculus they rely upon. The second-order effects inform us about cost-tolerance! That's where the conflict dynamic lies. That's what the actors negotiate about - how much risk they are willing to take under uncertainty, what they have at stake, and how they assess its value over time. In short, how much cost they are willing to suffer. These preferences may be manipulated individually, but their credibility is contingent on structural constraints. Parties anticipating loss take greater risks and have greater valuations of future payoffs than those anticipating gain.

Short of these behavioral effects, traditional rationalist models exhibit a tendency of automatic adjustment of benefits which fails to capture the essence of conflict. It also motivates inaccurate hypotheses about superiority by assigning greater "resolve" to a challenger anticipating gain, while assuming passive-submissive conduct on part of the defender anticipating loss. In reality, relative gain/loss expectations induce the opposite behavior. The process-tracing mechanism employed in the previous chapter reveals that parties anticipating loss have consistently exhibited greater risk-taking propensies, while parties pushing for gains have consistently refrained from taking greater risks. Confronted with the Soviet deployment of missiles in Cuba, the U.S. leadership exhibited risk-averse behavior at every step in decision-making,

fearing from escalating the conflict out of control. Confronted with a Pakistani infiltration in Kargil, the Indian side chose not to cross dangerous territory on the Pakistani side of the LOC, significantly complicating its chances of military success. In Ukraine, the West pushed for enlargement of EU/NATO institutions but refrained from providing security. Meanwhile parties anticipating loss continuously demonstrated their resolve to fight and chose risky paths of escalation despite the odds of war.

Limitations of the Study

Any parsimonious theory has limited power to explain specific policy outcomes and the theory of reactive resolve is not an exception. The study suggests a likely pattern of escalation and de-escalation given the second-order effects, but it also recognizes that the world is more complex, that there are many more individual, regional influences that may play out in each particular conflict. The causal mechanism of the "chain reaction" identified in Chapter VI attempts to account for a slightly more complex setting than two actors facing one another under anarchy. Other contexts may be more convoluted. Increasing regionalization of conflicts in places like Libya, Yemen, and Syria have contributed to their intractability. These conflicts often involve multiple fragmented state and non-state actors among whom the relationships of power are not as clear cut and the application of the theory could be more challenging.

Another limitation of the study concerns empirical testing. The study tests the mechanism of bargaining under reactive resolve against a small number of case studies. This number can potentially be expanded to include more cases of international crises where structural conditions are explicit and there is sufficient information about decision-making to supply a process-tracing methodology. Unfortunately substituting detailed process tracing with larger-scale data analysis

would not allow to capture the behavioral effects. So, this methodology appears to be the most effective tool available. However, it is not perfect either.

Information about high-level decisions made behind the scenes, their sources of influence, and alternatives forgone may not always be readily available. When events are traceable, attribution of risk propensity may not be unequivocal. Here is one such challenging example from this study: Gathering the CPOs for the Cuban Missile Crisis, I came across the information that the Soviet leader had not given the order to shoot down the American U-2 spy plane. Now, there is no question that the downing of the plane drastically escalated the crisis, essentially firing the first shot. But did the Soviet authorities really intend to take that risk of escalation or was the decision commanded at the lower level? Does it matter? Several sources indicate that Khrushchev did not give the order himself. On the other hand, if the purpose of the U-2 mission was to test whether Soviet surface-to-air missiles had become operational and whether Soviet military officials running the sites had permission to fire, in that case, the mission was "accomplished." Sensitive questions of this sort may raise concerns of accuracy or validity of measurement, leaving the researcher to exercise best judgment. In that specific case, I deemed that the operational capability along with actual implementation qualified for risk acceptance, although short of Khrushchev's direct command (if that was the case) the risk-taking propensity may have been lower.

The study has argued that potential concerns of external validity, with regard to the use of experimental findings from behavioral economics in IR, are negligible by virtue of limiting the scope of "exported" theories to a minimum set of core assumptions that are highly compatible and relevant for the neorealist IR context. The level-of-analysis debate in Chapter II has reflected on

this theme in greater detail. The findings from the case studies of international crises in Chapter VI, provide additional support for this claim.

Contribution to Existing literature

This study contributes to advancing ideas of structural realism in guiding international conflict behavior. Dissatisfaction with how structural models explain variations in outcomes has led to a significant shift in literature away from the systemic to the state-societal/individual levels of analyses. Unlike those efforts, this dissertation attempts to revise the rationalist bargaining model of war and improve its explanatory power by linking actors' behavioral preferences to their structural determinants in situations of crises. Aided by findings from behavioral economics, the theory of reactive resolve connects the roots of loss aversion back to the structural conditions of distribution of power and benefits under anarchy, while still maintaining the parsimony of the rationalist bargaining model.

More broadly, the research highlights the connection between rationalist epistemology and behaviorism. Empirically identified regularities or patterns of behavior expose important clues about their rational sources. These regularities can be theoretically modeled to improve the accuracy of rationalist models. In this context, the analysis touches upon the theme of rational utility maximization. What comes first, expected utility or value preferences? The dissertation does not claim sufficient expertise in assessing the von Neumann and Morgenstern axioms for utility maximization but attempts to reverse the order of construction in line with a pre-existing approach of Bernoulli, by assuming preferences derived from expected payoffs. It contends that not every anomalous behavioral deviation from expected utility theory constitutes a violation of rational choice.

The study contributes a new approach to formal modeling of crisis bargaining which systematically accounts for the behavioral effects of expected gains and losses. Once again, the dissertation has not aimed at replicating the findings of the behavioral revolution. Such examples exist. They tend to focus on prospect theory and attempt to replicate it into the bargaining context as a whole, along with individual/subjective framing and pseudocertainty effects, well beyond rational choice (e.g. Butler 2007). This research has emerged from questioning the impact of relative power on crisis bargaining and its theoretical contribution lies in an improved understanding of that mechanism. It has proposed dual impact: incentives of relative gain motivating demands for concession, and disincentives of loss generating a reaction, as opposed to automatic adjustment of benefits. Overwhelming evidence from behavioral and experimental economics has come to support the latter claim in two strands: the findings of prospect theory as well as other findings, e.g. on rent-seeking contests, reinforced the sources of asymmetrical risk attitudes, while the sign effect supported the gain/loss-induced differentiation of discount factors. I then adopted only a minimal set of compatible assumptions from these theories, by integrating them as manifestations of reactive resolve to demonstrate how the second-order impact of relative power can be accounted for in formal analysis. Contrasting value preferences tend to restrict demands for concession, but once demands are sought, reactive value preferences considerably shrink the bargaining range and proliferate possibilities of failure.

The theoretical distinction of offensive vs defensive types of challengers, grounded on their anticipations of gain or loss, offers foreign policy implications with regard to compellence and deterrence. Whereas increasing costs to an offensive type may be an effective coercion strategy, forcing a defensive type into a greater anticipation of loss may produce the opposite effect by increasing their reactive resolve. If "more is more" in the former context, "less is more" in the

latter. This framework also allows to differentiate between two types of concessions – challenger and defender concessions – which go along with an important empirical distinction in conflict mediation literature that defender concessions, facing the hurdle of commitment, are harder to achieve (Beardsley and Lo 2013).

In terms of methodology, the dissertation revolves around formal analyses of bargaining, but cultivates the use of additional methods that are suitable to revealing bargaining mechanisms. It is supported by a simulation exercises which helps demonstrate the limits of successful bargaining under a range of values for select parameters. And it is tested via a qualitative process-tracing mechanism as an important tool of causal inference in crisis bargaining.

As discussed in previous chapters, the new findings also contribute to the IR debate concerning the distribution of power and the likelihood of war. They suggest that not every imbalance of power increases the chances of war: the likelihood grows along with the gap between the distribution of power and benefits. This result is very similar to Powell's 1996 finding but arrives at the same outcome via a different path - given asymmetrical value preferences. Under these conditions, the same linkage is evident even in the absence of information uncertainties.

Future Directions of Research

The current research focuses on integrating reactive resolve (i.e. the impact of the expected disutility of loss on actors' risk and future discounting behavior) into a particular formal model on bargaining over future bargaining power as described by Fearon (1996). As a next step, this approach can be used to incorporate an additional commitment problem arising from an anticipated external shift in power potentially precipitating preventive war, i.e. if the actors' relative capabilities are advancing at different speeds. This can be done both formally or, potentially, in an agent-based environment that is better placed to accommodate dynamic change. Different growth

rates tend to prompt concerns of relative gains and losses over time, however, projections about how relative growth rates will evolve in the future are never certain. Introducing some randomness in the growth rates could allow to observe overall system behavior in a dynamic agent-based setting.

The model can further be advanced to incorporate information uncertainties or additional parties to the conflict. Those could be additional direct parties to the conflict, such as the empirical example with a cascading chain of power relations described in the case studies above. Those could also be third-party mediators, seeking to contribute to conflict settlement. Exploring the agent-based modeling environment could be especially advantageous for incorporating additional parties to the bargaining process, as game-theoretic models with multiple players tend to become increasingly complex. For instance, a number of states have laid territorial claims in the Arctic, with divergent capabilities and anticipated growth trends. A dynamic model with multiple players and varying expectations of gain and loss may potentially inform about their behavioral preferences and the range of bargaining outcomes to be expected.

Another direction of potential research could evolve along the lines of the stability-instability paradox, in light of the implications of reactive resolve. In cases where the relative balance of capabilities deters direct military conflict at the higher level (whether by nuclear or sufficient conventional capability), how do conflicts play out at lower levels of competition? Can reactive resolve explain U.S. relations with China or their competition for regional influence in south-east Asia, the Indo-Pacific, or elsewhere given their expectations of gain and loss in lower-level contests?

Further research would certainly benefit from exploring potential cases where the logic of decision-making contradicts with the one proposed in this study. Where such cases are evident, it

would be important to understand the underlying sources of opposing behavioral patterns. While advancing the case study approach, it would also be useful to formulate reasonable criteria for the attribution of behavioral patterns so that to increase the accuracy and validity of measurement, highlighted as one of the challenging aspects in the section above.

The external validity of the model can be strengthened by additional empirical analyses, including new case studies, potentially very carefully-designed data analysis, as well as experimental research. This could help address the limited number of case studies empirical testing the theory of reactive resolve. The theory derives its key incites from experimental research in behavioral economics conducted at the individual level. Unfortunately, we can not experiment with state decisions, but we can try to mitigate the challenges of external validity by designing surveys with individuals representing direct parties to unresolved conflicts and seek to identify their behavioral preferences given anticipated gains and losses in conflict. A clear distinction of preferences derived from a large pool of participants would provide additional support for the theory of reactive resolve.

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APPENDIX

SAS CODE APPLIED IN THE SIMULATION OF THE LIKELIHOOD OF WAR

```
/*create a simulation / cartesian product of p(x)/c/d1/d2 combinations*/
data step1;
      do p_x= 0.6 to 0.7 by 0.1;
            do d1=0.01 to 0.99 by 0.01;
                  do d2=d1 to 0.99 by 0.01;
                        do c=0.1 to 0.2 by 0.1;
                                          Diff=c*(1-d1)+c*(1-d2)-p_x*(d2/(1-d2)-
d1/(1-d1));
                                          Ind_Diff=(Diff>0);
                                          if d2>d1 then output;
                        end;
                  end;
            end;
      end;
run;

/*for all p(x) and c combinations, sort by "inequality holds" indicator,
followed by "how close the left/right sides of the inequality are"*/
proc sort data=step1 out=step2;
      by p_x c descending  ind_diff  descending Diff;
run;

/*Calculate percentages when inequality holds vs. doesn't hold*/
proc summary data=step1 nway missing;
      class p_x c ind_diff;
      output out=calc_combs(drop=_type_ rename=(_freq_=cnt));
run;
proc transpose data=calc_combs out=calc_combs2(drop=_:) prefix=ind_;
      by p_x c;
      var cnt;
      id ind_diff;
run;
data calc_combs3;
      set calc_combs2;
      format Interpolated_Percent Percent8.1;
      Interpolated_Percent=ind_1/(ind_1+ind_0);
run;
proc print data=calc_combs3(drop=ind_:);
title "Percent time when inequality holds";
run;

/*draw a 3D surface of Difference (right side minus left side) as a 2-
variable function of d1 and d2*/
title1 "Difference - as of a function of d1 and d2";
%macro Aivazovski(p,c,ctop,cbottom);
title2 "P(x)=&p C=&c";
proc g3d data=step2(where=(p_x=&p and c=&c)) ;
      plot d1*d2=Diff_06 / ctop=&ctop cbottom=&cbottom grid
```

```
       zticknum=16

       zmin=-70

       zmax=5;
run;
%mend;

%Aivazovski(0.6,0.1,blue,red);
%Aivazovski(0.7,0.1,purple,green);
%Aivazovski(0.6,0.2,cyan,orange);
%Aivazovski(0.7,0.2,green,brown);




%macro Aivazovki_test;
      %do i=0 %to 5 %by 1;
      %do j=0 %to 5 %by 1;
            %let rot=%eval(-5-&i*5);
            %let tlt=%eval(5+&j*5);
                  title "Diff as a function of d1 & d2: Rotate=&rot
Tilt=&tlt";
                  proc g3d data=step1(where=(p_x=0.6 and c=0.1)) ;
                        plot d1*d2=Diff_06 / ctop=blue cbottom=red
name="plot0601" rotate=&rot tilt=&tlt  grid

                                          zticknum=22

                                          zmin=-60

                                          zmax=3;
                  run;
      %end;
      %end;
%mend;

%Aivazovki_test;




/*create a simulation / cartesian product of p(x)/c/d1/d2 combinations*/
data step1;
      do p_x= 0.6 to 0.7 by 0.1;
           do d1=0.01 to 0.99 by 0.01;
                do d2=d1 to 0.99 by 0.01;
                     do c=0.8 to 1 by 0.05;
                               Diff=c*(1-d1)+c*(1-d2)-p_x*(d2/(1-d2)-
d1/(1-d1));
                               Ind_Diff=(Diff>0);
                               if d2>d1 then output;
                     end;
                end;
           end;
      end;
run;
```

```
/*for all p(x) and c combinations, sort by "inequality holds" indicator,
followed by "how close the left/right sides of the inequality are"*/
proc sort data=step1 out=step2;
      by p_x c descending  ind_diff  descending Diff;
run;

/*Calculate percentages when inequality holds vs. doesn't hold*/
proc summary data=step1 nway missing;
      class p_x c ind_diff;
      output out=calc_combs(drop=_type_ rename=(_freq_=cnt));
run;
proc transpose data=calc_combs out=calc_combs2(drop=_:) prefix=ind_;
      by p_x c; var cnt;
      id ind_diff;
run;
data calc_combs3;
      set calc_combs2;
      format Interpolated_Percent Percent8.1;
      Interpolated_Percent=ind_1/(ind_1+ind_0);
run;
proc print data=calc_combs3(drop=ind_:);
title "Percent time when inequality holds";
run;



goptions reset=global gunit=pct border cback=white
         colors=(black blue green red)
         ftitle=swissb ftext=swiss htitle=6 htext=4;

title1 "P=&p_x, C=&c, D2 fixed at different levels from 0.1 to 1.0,
Diff as a function of D1";

%macro symbol_m;
      %do i=1 %to 9;
      symbol&i value=circle
        color=gray
        interpol=none
        height=1.5;
      %end;
%mend;
%symbol_m;

%macro plot_m;
      %global Diff1;
      %let Diff1 = Diff_d1_01*d1;
      %do i=2 %to 9;
          %let j=%eval(&i-1);
          %global Diff&i;
          %let Diff&i = &&Diff&j Diff_d1_0&i*d1 ;
      %end;
%mend;
```

```
%plot_m;

%put ..&Diff1..;
%put ..&Diff9..;

/* Define axis characteristics */
axis1 order=(0 to 1 by 0.1) offset=(0,0) label=("d1") minor=(n=1)
value=(height=2.5);
axis2 order=(-6 to 1 by 1) offset=(0,0) label=("Difference function")
minor=(n=1) value=(height=2.5);

proc gplot data=step2_2d;
   plot &Diff9
                                        / overlay vref=0 lvref=1
cvref=bib wvref=50
                                          haxis=axis1 vaxis=axis2;

run;
quit;
```

VITA

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MA, Political Science, American University of Armenia, 2003
BA, Political Science, Yerevan State University, Armenia, 2001

Research Assistance
ODU Asian Studies Institute: 2017-2021
ODU Research Grant: Summer 2021
Virginia Modeling, Analysis, & Simulation Center (VMASC): Summer 2019

Conference Presentations
ISA Annual Convention: (virtual) April 2021
ODU GPIS Graduate Research Conferences: March 2018, March 2019, February 2021
ISA South Annual Conference: Ashland, VA; October 2018
EISA PEC18 12th Pan-European Conference on IR: Prague, Czech Republic; Sept 2018

Publication
"War to Continue in Nagorno-Karabakh until Turkey's Appetite is Suppressed." *The National Interest*. Oct. 21, 2020.

Professional Experience
United Nations (UN) Coordination Specialist, Senior Advisor/Consultancy positions: 2014-2016
Council of Europe (CoE) Political Officer, Armenia: 2010-2014
Organization for Security and Cooperation in Europe (OSCE) Senior Human Rights Assistant, Armenia: 2006-2007

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English, Russian, Armenian (native)