Bargaining and Rationalist Explanations for War

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The traditional division between crisis bargaining and intrawar bargaining lacks sound theoretical grounds and, therefore, fails to capture the nature of using force in international politics. Instead, I propose to integrate traditional crisis bargaining and intrawar bargaining into a continuous process. The difference between a crisis and a war is captured by their bargaining costs and risks in each round of bargaining. The application of the integrated model demonstrates that with complete information the status quo can be revised even if both states are satisfied.

Key words: crisis bargaining, intrawar bargaining, international conflict, international crisis

I. Introduction

Of all the efforts to explain war, the rationalist approach refers to a broad array of attempts to explain war as a consequence of leaders' rational decision after they weigh up relevant costs and benefits. The basic rationale is straightforward: war happens only when both participants are convinced it is preferable. However, traditional rationalist explanations, as Fearon (1995) pointed out, fail to address the *ex post* inefficiency of war. That is, given the fact that a war always involves formidable costs and great risks, why did not rational leaders opt for more efficient alternatives (such as negotiated settlements) in working out their conflicting interests? Instead, Fearon contended that the puzzle of war can be resolved by three mechanisms, namely, informational problems, commitment problems, and issue indivisibilities.

Recent formal studies on the causes of war always resort to a bargaining approach. While this approach usually assumes various forms in the literature, generally speaking, war is analyzed in a dynamic context of interstate bargaining, in which states (or

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bargainers) are assumed to make their decisions on the basis of the observed as well as expected responses of their rivals. Correspondingly, their decisions reflect the equilibrium (or one of the equilibria) of such interaction. Analytically, because in such a bargaining process a state's rational selection of war amounts to a rational denial of peace, in principle rationalist explanations generated from the bargaining approach should illustrate both sufficient and necessary conditions for war. Furthermore, because the outcome ultimately hinges on how "well" the adversaries bargain in particular circumstances, in theory almost all major factors discussed in the literature on war can be integrated into the bargaining process as different parameters. For instance, using the bargaining approach, scholars have examined all three mechanisms proposed by Fearon (Filson & Werner, 2002, 2004; Powell, 1999, 2004a, 2004b, 2006; Wagner, 2000; Slantchev, 2003a, 2003b, 2005).

Based on the way war is conceptualized, common bargaining models fall into two major groups: crisis bargaining models that see the outbreak of war as a bargaining breakdown and intrawar bargaining models that treat war as a bargaining process *per se*. Generally speaking, crisis bargaining models focus on war onset, and the intrawar bargaining approach generates insights into the duration and termination of war. Intuitively, the two approaches should complement each other and in combination draw a full picture of the onset, duration, and termination of war. Unfortunately, what we have observed in the current bargaining literature is a quite controversial relationship between these two approaches. On the one hand, the crisis bargaining approach is always criticized to have thrown away too much significant information about states' intrawar negotiations (Powell, 2004a). The fact that most wars in history ended in some negotiated settlements indicates states can continue bargaining while fighting. Some even argued that the ignorance of intrawar bargaining could lead to "misleading" explanations for the inception of war (Wagner, 2000, 2007). On the other hand, opening the "black box" of intrawar bargaining creates some new problems. The first is the relationship between prewar crisis bargaining and intrawar bargaining. Current intrawar bargaining models take crisis bargaining and intrawar bargaining as two subsequent yet independent stages. This gives rise to some empirical as well as theoretical puzzles. Empirically, for instance, how can we identify the two stages of bargaining in reality? Singer and Small's (1994) well-known definition of war in the Correlates of War (COW) Project usually comes to mind as one possible solution.[1] Yet it is less persuasive to conceptualize a military contest with 1,000 causalities as something

1. Singer and Small defined an international war as "a military conflict waged between (or among) national entities, at least one of which is a state, that results in at least 1,000 battle deaths of military personnel."

essentially distinct from one leading to 999. At any rate, to explain the onset of war is not to explain why the 1,000th soldier is killed. Theoretically, from the perspective of the *ex post* inefficiency of war, the most significant function of both crisis and intrawar bargaining is to solve informational problems.[2] Thus, to explain the initiation of war, the intrawar bargaining approach must justify not only why the costly and risky intrawar bargaining is necessary to reveal private information but also why the relatively efficient crisis bargaining fails to achieve that goal. Unfortunately, the latter is largely disregarded in the intrawar bargaining literature, as if crisis bargaining never matters.

The second problem is more serious. Students of international relations have long been taught about war's multiple functions, most notably, using Clausewitz's (1975) terms, the difference between absolute war to disarm the enemy and real war to reveal information or to change relative power (e.g., war with limited territorial goals). Since these wars play quite different roles in international interactions, it is natural to ask how they differ in their onset, duration, and termination. Yet most intrawar bargaining models pay no attention to this issue.[3] While some studies focus on absolute wars, what others deal with are actually real wars. As a consequence, although some intrawar bargaining models assert to account for war onset, duration, and termination, these problems mean the rationalist explanation for war is still incomplete.

This essay tries to address these inadequacies and establish a bargaining model that can integrate pre- and intra-war bargaining into one continuous costly process. Instead of relying exclusively on the intensity of fighting, I contend to model war based on its nature and function in international interactions. While some types of war can be modeled as a bargaining process, others are more properly thought of as a costly lottery that ends the bargaining process. The distinction between those wars as a bargaining process and traditional crisis bargaining is captured by their different bargaining costs and the risk of breakdown. Compared to standard crisis bargaining models, the integrated model incorporates states' wartime negotiations; compared to existing intrawar bargaining models, it offers a much simpler solution to including states' prewar negotiations. As I will demonstrate below, the integrated bargaining model also sheds new light to the rationalist explanation for war.

2. Note that with complete information, according to Powell (1999), even crisis bargaining is not necessary.
3. According to my knowledge, the only exception is Wagner (2000, 2007), which will be discussed below.

II. Crisis bargaining or intrawar bargaining?

Current bargaining models conceptualize war either as a costly lottery that ends the prewar bargaining process or as a bargaining process *per se*. In the former account, following the example set by Bueno de Mesquita (1980), the crisis bargaining approach models war as a gamble, a costly lottery that ends with either victory or defeat. The winner takes all the disputed interests, and the chance to win is usually thought to relate to the distribution of power. Because the crisis bargaining model views the outbreak of war as the breakdown of prewar crisis bargaining, it fares better than traditional rational choice models in addressing the inefficiency of war (Fearon, 1995). Those factors contributing to the failure of reaching agreements are essential in explaining the outbreak of war (Morrow, 1989; Bueno de Mesquita & Lalman, 1992; Fearon, 1995; Powell, 1999; Slantchev, 2005).

Despite its contribution to our understanding of war, the weakness of the crisis bargaining approach is under close scrutiny in recent literature. Most criticism is centered on the way war is conceptualized, namely, the costly lottery assumption. For instance, Powell (2004a) admitted that by modeling war as a costly lottery, his famous crisis bargaining model (in Powell, 1999) completely ignores how states fight and terminate war. Wagner (2002, 2007) went even further and questioned the empirical and theoretical tenability of the crisis bargaining approach. Empirically, most wars in history ended with some negotiated settlements rather than a winner-take-all scenario. Theoretically, if a war occurs because two states "agree" to fight in the sense that war represents a more preferable option, these states might also "agree" to terminate the war when the process of fighting has changed their calculations. Thus, when a state expects the intrawar bargaining can produce a more preferable settlement, Wagner reasoned, the existence of a prewar negotiated settlement is unable to preclude states from initiating a war.

The first criticism should not be surprising given the fact that crisis bargaining is designed to account for war onset. If the costly lottery of war can be re-conceptualized as states' prewar expectations about their benefits or losses in fighting and/or post-war settlements, the likelihood of intrawar bargaining and its outcomes will not affect the explanation for the start of war.[4] However, the second criticism should be treated more seriously. If Wagner is right that states might go to war even if a mutually preferred prewar settlement is attainable, the crisis bargaining actually generate neither sufficient nor necessary conditions for war. According to Wagner, war can be fought for

4. This actually is to use a compound lottery to replace a simple lottery. For a formal example, see Wagner's formation of "absolute war" (2000, pp. 473-4).

various purposes: (1) absolute war to disarm the enemy, (2) real war to reveal information about relative power, and (3) real war to alter relative power (by means of inflicting costs or occupying territory). Wagner contended that while the crisis bargaining approach may be able to explain the initiation of absolute wars, it does not help account for why real wars take place.

Now, as we can see, the key to Wagner's criticism rests on whether crisis bargaining models can explain the initiation of those real wars. The foundation of the crisis bargaining approach is the *ex post* inefficiency of war: while a mutually preferable peaceful settlement always exists, war occurs and recurs just because states are unable to either locate such settlement (due to private information) or enforce it (due to commitment problems or issue indivisibilities). Obviously the origin for wars to reveal information is a sort of informational problem. Such type of war will be unnecessary if relative power is common knowledge. Wagner may be right by arguing that fighting an actual war is the most efficient way to reveal true relative power. But this is more a question about what type of war will take place and how it ends, than one about whether such war occurs in the first place. The origin of wars to change the relative power is more complicated, which could be either an informational problem (about leaders' resolve: How much a war would cost each party?) or a commitment problem (also known as the salami strategy: Does the redistribution in the settlement motivate the beneficiary to request more in the future?). But in either case the answers affect merely the duration and outcome of a war, not its beginning. Various crisis bargaining models have demonstrated how private information about relative power or leaders' resolve, or commitment problems make war more likely (Fearon, 1995; Powell, 1999, 2006).

To conclude, the limitations of the crisis bargaining approach should not be exaggerated too much. Although the costly lottery assumption cuts off a bargaining process that would continue after the outbreak of war, crisis bargaining remains a valid conceptual model to account for states' decision to start a war. Wagner's criticisms are relevant only in the sense that crisis bargaining models tell us nothing about which kind of war occurs and accordingly how it continues and ends, which are the main topics of intrawar bargaining models.

The debate over the costly lottery assumption triggered what Powell (2004a) called "a second wave of formal work on war" (345). Scholars started modeling war as a process, a costly intrawar bargaining process in which states can negotiate some settlements while fighting (Wagner, 2000; Filson & Werner, 2002; Slantchev, 2003b; Powell, 2004a; Smith & Stam, 2004). For instance, Powell (2004a) modified his famous crisis bargaining game (1999) by changing a state's decision to fight from an outside option to an inside one. That is, rather than automatically terminating the bargaining, the

option of fighting merely creates "a risk of collapse" (346), a risk that one or both adversaries may "collapse" due to the costly and risky nature of war. If neither side collapses, states will repeat the process in the next round of bargaining. Most intrawar bargaining models, on the other hand, adopt a war-of-attribute approach (Filson & Werner, 2002; Slantchev, 2003b; Smith & Stam, 2004). In particular, they saw the process of intrawar bargaining as a sequence of indecisive battles. Although each battle is like a lottery, it is less costly in the sense that the losing side does not necessarily "collapse." War persists until an agreement is concluded or one or both states have worn out all the resources.

Despite the contribution the intrawar bargaining approach has made to our understanding of the duration and termination of war, current intrawar bargaining models have some serious drawbacks. The first is about the way a war is modeled. Although Powell did not clarify the theoretical implications of a state's collapse in his costly-process game, it is quite clear that it refers to the same outcome as his crisis bargaining model—the outcome of a war to disarm the enemy. The additional possibility that neither bargainer collapses does not change its nature of a costly lottery. Therefore, those criticisms on the costly lottery assumption still apply: As long as a state does not "collapse" overnight, the collapsing side is always rational to make enough concessions to avoid the collapse.[5] In a strict sense, Powell's model is more properly called postwar rather than intrawar bargaining. The outcome of war is determined by chance instead of by bargaining. According to this model, negotiated settlements are not an alternative to war, and most wars in history end in negotiated settlements just because the participants were lucky (not to collapse) to have a chance to negotiate a settlement. In contrast, while those war-of-attrition models provide a more valid explanation for states' "collapse," they bring about some new concerns. The statement that a war cannot be terminated until at least one of the states has exhausted its resources seems too strong to many historical cases that a state was defeated but short of defenselessness (consider, for instance, those wars with limited territorial goals such as the Falklands War and the Russo-Japanese War). Using the terms of Wagner (2000), what Powell (2004a) discussed is "absolute war," that is, "a contest in which each side tries to render his opponent defenseless by disarming him" (472), whereas what is modeled war-of-attrition models are "real wars," wars "in which states do not risk complete disarmament" (472). Nevertheless, a complete rationalist explanation for war requires a comprehensive bargaining model that is able to analyze both absolute and real wars.

5. For instance, the expected payoff for state D is $k_S\ (1–k_D)+qk_S\ k_D=k_S–k_S\ k_D+qk_S\ k_D$; for state S is $k_D\ (1–k_S)+(1–q)k_S\ k_D=k_D–qk_S\ k_D$. As long as k_D and k_S are small enough, there always exists a bargaining range.

The second drawback regards the relationship between crisis and intrawar bargaining. In each intrawar bargaining model, the process of intrawar bargaining is preceded by a process of crisis bargaining. On the surface, it seems to offer an integrated model to cover war initiation, duration, and termination. However, a close examination reveals a puzzling relationship between crisis and intrawar bargaining. Current intrawar bargaining models, without exception, consider the prewar crisis bargaining as a costless process of cheap talk, which contributes nothing to the solution of informational problems.[6] But this is apparently not the international crisis we usually observe. Severe conflicts that include military contests of varying levels of intensity are by no means rare in international crises. Studies also demonstrated that costly signals states send during international crises have the hands-tying effects by creating domestic audience costs to political leaders (Fearon, 1994, 1997). If the function of intrawar bargaining, namely, to reveal information or alter the relative power, is quite similar to that of an international crisis, the intrawar bargaining approach has to figure out under what conditions states are rational to engage in a costly intrawar bargaining in lieu of a less intensive crisis bargaining. The inability to answer this question reveals the inability of the intrawar bargaining approach to account for war onset. If the criticisms on crisis bargaining are right that we cannot explain how war starts if we do not how it ends, a similar problem puzzles intrawar bargaining: how can we understand the duration and termination of a war if we have no idea when and why it starts in the first place?

To summarize, although various intrawar bargaining games have been established to address the inadequacy of traditional crisis bargaining models, current efforts either conceptualize war in an inconsistent way or fail to clarify the theoretical distinction between an international war and an international crisis.[7] As a consequence, our understanding of war is still incomplete. The above analysis also suggests that any complete rationalist account for war must be founded on an integrated model that is able to integrate both crisis and intrawar bargaining. The theoretical foundation and method to establish such a model will be discussed in the next section.

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6. See Fearon (1995) for a formal proof on the influence of cheap talk (costless signal) in bargaining with private information. In reality, I think the pre-crisis tacit bargaining between states, if exists, resembles this costless process of cheap talk. However, such pre-crisis bargaining will not influence the dynamics of crisis or intrawar bargaining.
7. This partially explains the fact that the crisis bargaining approach is still widely employed in most recent rationalist studies on war (Slantchev, 2005; Powell, 2006; Kurizaki, 2007; Leventoglu & Tarar, 2008).

III. Integrating crisis and intrawar bargaining

In my view, the deficiencies in current bargaining models stem from the divergence between their research objectives and model formulations. While their research question explores states' intention to use force, the models are established on the basis of the intensity of military contests. Yet how hard a state fights tells little about the state's real intention. In this section, I propose a bargaining formulation based on the nature and function of military contests. The most significant feature of this formulation is that a military contest, regardless of its intensity and casualties, is modeled as either a costly processes or a game-ending lottery, depending on its nature and function. The difference between traditional crisis bargaining and intrawar bargaining (to reveal information) is captured by such parameters as bargaining costs as well as the risk of bargaining breakdown.

To the best of my knowledge, Wagner (2000) offered the most thorough discussion about the nature of war in the construction of a bargaining model. He posited that all wars fought in history can be seen as consisting of two sequential stages: a stage of "real war" followed by a stage of "absolute war." These two terms are borrowed from Clausewitz's classical *On War* (1976), in which war is distinguished between its pure form—absolute war aiming to "throw his opponent in order to make him incapable of further resistance" (75; emphasis in original)—and real wars that assume concrete forms. According to Wagner, the major function of various real wars is to reveal private information or to alter states' relative power. Absolute wars, on the other hand, are wars fought to the finish. Although states can still bargain over some settlements during an absolute war, they are subject to some risk of "collapse." Wagner used a Rubinstein bargaining game with a risk of breakdown to analyze the costly bargaining during an absolute war. After states reveal their private information in real wars, Wagner argued, the ensuing bargaining of absolute war usually proceeds with complete information. Therefore, most intrawar bargaining ends with some negotiated settlement in the first round rather than a state's collapse.[8] This explains why we have observed so many real wars but few absolute wars in history.

Wagner's real war—absolute war model stands for a significant departure from other intrawar bargaining models in that his model is built exclusively on the function of war. Unfortunately, like other intrawar bargaining models, Wagner ignored crisis bargaining. Neither did he formalize his theoretical framework, not to mention a

8. Under complete information, the bargaining game with some risk of breakdown has a unique subgame perfect equilibrium, in which the offer from player 1 is accepted immediately (See Osborne & Rubinstein, 1990).

solution in terms of equilibrium (this is why his work is sometimes considered informal by some bargaining literature). Most seriously, the division between real war and absolute war does not provide a sound foundation to formulate prewar and intrawar bargaining. According to Wagner, the most crucial distinction between absolute and real war is that while the former can end with some sorts of negotiated settlement, the latter is a simple lottery and there is no way to prevent it. However, even if the inevitability of real wars to reveal private information is justifiable on the ground that private information increases the possibility of (real) war,[9] many real wars to alter relative power (i.e., wars with limited territorial goals or to destroy enemies' natural and human resources) actually ended with negotiated settlements (for historical examples, consider the Falklands War, the Russo-Japanese War, and the first Sino-Japanese War). In the rest of this section, I will try to address these inadequacies. In particular, my efforts are focused on two major issues: the relationship between crisis and intrawar bargaining and the formulation of wars with different functions.

Wagner's failure to include prewar crisis bargaining in his real war—absolute war model causes some conceptual inconsistency. According to Wagner, for instance, the major function of real war is to reveal private information, and "bargaining (of absolute war) does not occur until states no longer have an incentive to reveal information by fighting" (472). Nevertheless, he further argued that "[r]eal wars therefore have much the same relations to absolute war that crises are commonly believed to have to war" (481). If both arguments are true, most real wars should be avoided because crisis bargaining seems to be more efficient in removing uncertainties than intrawar bargaining. Since both crisis bargaining and intrawar bargaining perform the same function of revealing information, there is no reason to model them as two separate processes. The difference between a crisis and a real war is like the difference between one real war and a fiercer one. Therefore, I argue that both crisis bargaining and intrawar bargaining can be integrated into a continuous process, and the difference in intensity of fighting can be captured by the bargaining costs and the risk of breakdown in each round.

Multiple functions of war entail multiple formulations of war. While some types of war can be properly modeled as a costly process, others can be readily formulated as costly lotteries. It is interesting to point out that even though almost all intrawar bargaining models are quite critical of the costly lottery assumption, none of these studies completely abandon this "problematic" game-ending move. The only difference is that while a costly lottery is treated as a deliberate decision (an outside option) in crisis

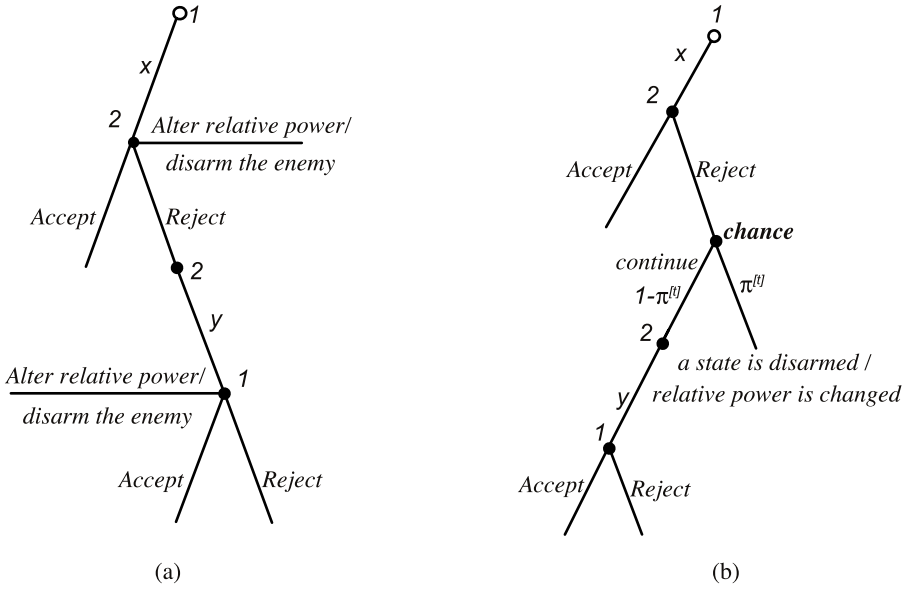
9. As I am going to discuss shortly, even this argument is not always tenable because it is based on the false assumption that crisis bargaining is cheap talk (that contributes nothing to the revelation of private information).

bargaining models, it is usually considered as a pure incident in intrawar bargaining. The reason seems straightforward: even after the lengthy, costly process of prewar and intrawar bargaining, there are wars in history that were fought to the finish if states fail to reach an agreement. Then the question is not whether to model war as a costly lottery but which ones. Based on the specific functions of war in international interactions, I contend two types of war can be appropriately modeled as a game-ending costly lottery.

The first type includes those absolute wars, i.e., wars fought to disarm the enemy. In his analysis of the nature of war, Clausewitz underscored that war is not simply any political instrument but one with a natural tendency to disarm the enemy and a natural course following the rule of extremeness. In theory, when the political object is quite close to or can only be guaranteed by the disarmament of the enemy, the path of war and its natural course converge. A nuclear war might be taken as such an example. While such wars are not frequent in reality, the unconditional surrender of Germany (and arguably Japan) during WWII in many respects echoes the natural course of war. The second type contains those real wars to change relative powers, i.e., wars with limited territorial goals or aiming to destroy enemies' natural and human resources. While a real war to reveal private information merely imposes some costs on both sides, a real war to alter distribution of power, like an absolute war, can be fought to the finish. To avoid confusion, I use Schelling's (1960) terms "limited war" and general war to distinguish between those wars that can be modeled as a costly lottery and those as a costly process. In his ground-breaking study, Schelling used "limited war" to describe a situation he called "tacit bargaining," in which fighting states share at least one common interest—to avoid a mutual disaster of a general war. In stark contrast with Wagner's argument that real war is a process in which "states do not risk complete disarmament" (2000, p. 472), Schelling (1960) stressed a link between limited war and general war. Even though limited war is basically tacit bargaining, he reasoned, such a war is not completely immune from the possibility of escalating into a general war as a consequence of some accidents. Waging war, even entirely for the purpose of revealing information, allows the law of probability to creep in. The probability is in proportion to the intensity of fighting: the more intensely a limited war is fought, the greater the risk that the war escalates out of control into a general war. These two revisions suggest a method to unify the divided literature between crisis and intrawar bargaining. Next, I will put forward a formal representation of this method.

Figure 1.a and 1.b sketch out my basic research design. At first sight, they resemble typical bargaining games with outside option and a risk of breakdown. But these bargaining formulations are based fully on the function of military contests. In Figures 1.a, only military contests to disarm the enemy or alter relative power are modeled as an outside option, which results in a winner-take-all outcome. In contrast, military

Figure 1. The Integrated Bargaining Approach



contests to reveal information are conceptualized as costly process during which states can exchange offers. Figure 1.b underlines another origin of general war. While in Figure 1.a a general war is a result of a state's deliberate decision to cease bargaining, the source of general war in Figure 1.b is the law of probability. A general war could be inflamed by some accident even if neither side intends to do so. In Figure 1.b, whenever a request is turned down in the *t*th round, there is a probability ($\pi^{[t]}$) that a general war may break out as a result of some unexpected event. Lastly, notice that the distinction between traditional crises and limited wars is not disregarded. In Figure 1.a and 1.b, it is reflected in particular parameters in the bargaining game. In Figure 1.a, I use $c_i^{[t]} > 0$ to denote state *i*'s bargaining costs in the *t*th round of bargaining (t=1, 2, …), $c_i^{[t]}$ is a function of the intensity and casualties of a military contest.[10] Suppose a threshold value c_i^* can be located corresponding to the traditional difference between a crisis and a war (e.g., 1,000 battle deaths in the COW project), intrawar (limited war) bargaining are characterized with $c_i^{[t]} \geq c_i^*$ and crisis bargaining with $c_i^{[t]} < c_i^*$. Note that the condition $c_i^{[t]} > 0$ indicates even crisis bargaining is no more cheap talk and is able

10. In this paper, superscripts are used both as exponents and indexes of round. To avoid confusion, I put the index of round in bracket. For instance, $c_i^{[2]}$ means state *i*'s bargaining costs in round 2, while $c_i^2 = c_i \cdot c_i$.

to send costly signal. In Figure 1.b the difference is reflected into $\pi^{[t]}$, the probability of breakdown after the tth round. Like $c_i^{[t]}$, $\pi^{[t]}$ is also positively related to the intensity of military contests. In words, compared to international crises, limited wars are more likely to trigger general war inadvertently.

Figure 1 offers an easy solution to integrating crisis and intrawar bargaining. Since both crisis and limited war are utilized to send costly signal to the rival, they are combined into a continuous costly process. To traditional crisis bargaining models, this means they can be easily extended to include wartime negotiations. To current intrawar bargaining models, it suggests a much simpler way to incorporate crisis bargaining. Another advantage of combining crisis and intrawar bargaining is that it allows us to pursue a complete account for the initiation, duration, and termination of both limited and general wars. For general wars, it is to explain why the outside option is selected. For limited wars it is equivalent to explaining states' decision to start, continue, or end a more costly round of bargaining ($c_i^{[t]} \geq c_i^*$). Last but not least, in the integrated approach illustrated in Figure 1, researchers are granted flexibility in designing their particular bargaining games. Based on their specific research question, researchers can focus on either states' intentional decision to end bargaining or states' perception of the risk of unintentional breakdown, or both. Furthermore, note that there are no restrictions on the relationship between the sequence of bargaining (numbering of rounds, t) and the value of bargaining costs ($c_i^{[t]}$) and risks of breakdown ($\pi^{[t]}$). This means it is possible for a crisis to occur after a (limited) war. To researchers, this is a powerful tool to model actual military contests whose intensity can change dramatically over time.

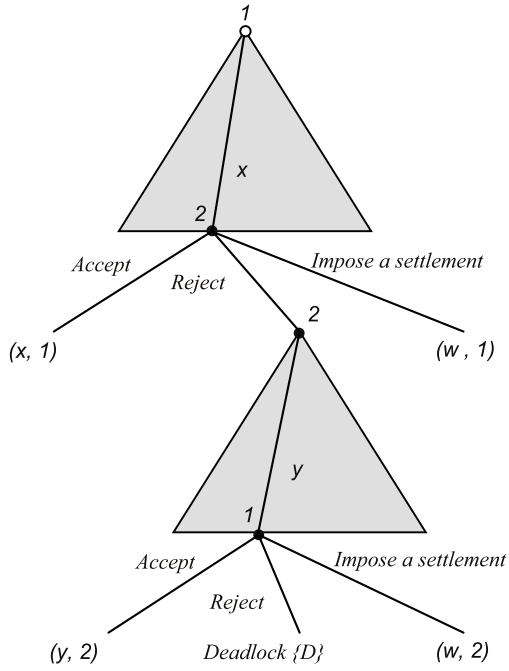
IV. Application: Crisis and War between Satisfied States

Each formulation in Figure 1 can be fully developed into particular bargaining models.[11] In this section, I use Figure 1.a as the example to demonstrate how to develop a particular integrated bargaining model and how this model contributes to the rationalist explanation for war.

Figure 2 presents a simple two-stage bargaining game with (general) war as an outside option. Suppose two states (states 1 and 2) are bargaining over some international goods. The total interests at stake are normalized to 1 in each round. The status quo is denoted (q, 1–q) where $0 \leq q \leq 1$. In the first round, state 1 demands a division (x, 1–x). State 2 can (1) accept it, ending the game with (x, 1–x) becoming the new

11. Of course, these two sources can be present together in the same crisis bargaining.

Figure 2. An Integrated Bargaining Game



status quo; (2) fight a war to impose a settlement (i.e., a war to disarm the enemy or to alter relative power); or (3) reject it, and the bargaining enters the next round. The second round starts with state 2's counteroffer (y, 1–y), which can be either accepted or rejected by state 1. If the counteroffer is accepted, the game ends with (y, 1–y) in round 2. If the counteroffer is rejected, the bargaining is said to end in deadlock. Finally, state 1 can select to end the bargaining by imposing a settlement.

Note that in this model the outside option exclusively refers to the decision to wage a general war. The bargaining process includes both traditional international crisis and limited war. Their distinction is captured by their respective bargaining costs: $c_i^{[1]}$ and $c_i^{[2]}$. The integrated bargaining game can end in one of three outcomes: (1) an agreement in round 1 or 2, written as (x, 1) and (y, 2); (2) a general war occurred in round 1 or 2, written as (w, 1) or (w, 2); or (3) deadlock, denoted by $\{D\}$.

The preferences of the two states are defined as follows. First, if an agreement is concluded, state 1 and 2's utility functions are

$$U_1(x,1)=(1+\delta_1)x \quad (1)$$
$$U_1(y,2)=q-c_1^{[1]}+\delta_1 y, \quad (2)$$

$$U_2(x,1)=(1+\delta_2)(1-x), \quad (3)$$
$$U_2(y,2)=1-q-c_2^{[1]}+\delta_2(1-y), \quad (4)$$

where $0 < \delta_i < 1$ denotes i's discount factor and $c_i^{[t]} > 0$ is state i's bargaining costs in round t (t=1, 2). Second, because a general war is modeled as a costly lottery, the two states' utility payoff is

$$U_1(w,1)=(1+\delta_1)(p-k_1), \quad (5)$$
$$U_1(w,2)=q-c_1^{[1]}+\delta_1(p-k_1), \quad (6)$$
$$U_2(w,1)=(1+\delta_2)(1-p-k_2), \quad (7)$$
$$U_2(w,2)=1-q-c_2^{[1]}+\delta_2(1-p-k_2), \quad (8)$$

where p is state 1's chance to win the general war (hence $1-p$ for state 2) and k_i ($k_i > 0$, i=1, 2) is their costs in the general war. Finally, I define two states' payoff to the outcome of deadlock $\{D\}$ as (d_1, d_2).[12] Therefore,

$$U_1(\{D\})=q-c_1^{[1]}+\delta_1(d_1-c_1^{[2]}), \quad (9)$$
$$U_2(\{D\})=1-q-c_2^{[1]}+\delta_2(d_2-c_2^{[2]}), \quad (10)$$

Note that this two-stage game can be readily extended to scenarios of multi-round (even infinite horizon) bargaining. Furthermore, because the intensity of conflict is represented by bargaining costs $c_i^{[t]}$, this formulation allows us to simulate military contests with various levels of intensity. The integrated crisis bargaining game sheds new light to rationalist explanations for war. Now I use this model to re-examine Powell's canonical crisis bargaining game. Through the lens of integrated bargaining game, some of his famous conclusions no longer hold.

In his famous study on international crises, Powell posited that with complete information if both states are satisfied in the sense that they cannot benefit from revising the status quo by waging a war,[13] "neither can credibly threaten to use force to

12. In the economic literature on bargaining, deadlock—the state that bargainers fail to reach an agreement—is usually considered as the "worst outcome" (Osborne and Rubinstein, 1990). However, in traditional crisis and intrawar bargaining, it is always treated as a special agreement: the temporary maintenance of the status quo. Since a thorough analysis of states' payoff to deadlock is beyond the scope of this paper, I treat deadlock in a flexible way: the state 1 and 2's payoff is variable (d_1, d_2) that may assume variant values.
13. Using the notations of my integrated bargaining model, states 1 and 2 are satisfied when $U_i(w,t) < U_i(\textit{status quo})$.

revise the status quo and the status quo goes unchanged" (1999, p. 97). The rationale seems straightforward: in any international crisis if one state is aware that the opponent is not rational to wage a war, it can always reject any request from the adversary with a counteroffer to maintain the status quo. When this becomes the public information, no state has the incentive to start the bargaining in the first place. This statement that satisfied states cannot negotiate to revise the status quo lays the foundation for current bargaining literature. Subsequent studies almost exclusively focus on the dispute between a satisfied state and a dissatisfied one.

However, this conclusion is irrelevant to many historical events. On the one hand, even if the level of satisfaction is public knowledge, we repeatedly observe that "satisfied" states (whose expected payoff to a general war is obviously smaller than that to staying with the status quo) challenged the status quo and triggered international crises or conflicts in history (for example, Argentina against the U.K. in the Falklands war, the People's Republic of China against the U.S.–Taiwan coalition during the First and Second Taiwan Strait Crisis).[14] On the other hand, military contests not only occurred between satisfied states, but also resulted in redistribution of international goods between them from time to time. For instance, mutually assured destruction (MAD) creates a typical dyad of satisfied states, which, according to Powell, should preclude any crisis or war between nuclear powers with the second-strike capacity. Unfortunately, once and again, the second Berlin Crisis (1961), the Cuban Missile Crisis (1962), and the Sino-Soviet border conflicts (1969) remind us this is not the case. Although Powell's model explains their termination (with some kinds of negotiated settlements rather than a disastrous showdown), it fails to predict their beginning. With the integrated crisis bargaining, I will demonstrate why these international crises can occur and the status quo can be revised in agreement between two satisfied states.

The subgame perfect equilibrium (SPE) of this integrated bargaining game between two satisfied states (with complete information) is summarized in the following proposition. (Details of proof are presented in Appendix.)

> ***Proposition***. *With complete information, when the second round of bargaining is costly enough* ($d_1+d_2 \leq 1+c_1^{[2]}+c_2^{[2]}$) *the bargaining has a unique subgame perfect equilibrium (SPE) in which the status quo can be revised. Otherwise, state 1 is not motivated to initiate the bargaining. In particular*,

14. See Christensen (1996) for details of the first and second Taiwan Strait Crisis in 1954 and 1958.

(a) when $\delta_1 > \delta_2$ *and* $q - \frac{c_2^{[1]}}{\delta_2} \le d_1 - c_1^{[2]} \le q + \frac{(1+\delta_2)c_1^{[1]} + (1+\delta_1)c_2^{[1]}}{\delta_1 - \delta_2}$*, the status quo is revised to* $(x^*, 1-x^*)$ *in round 1, where* $x^* = \frac{q + c_2^{[1]} + \delta_2(d_1 - c_1^{[2]})}{1+\delta_2}$.

(b) when $\delta_1 \le \delta_2$ *and* $d_1 - c_1^{[2]} \ge q - \frac{c_2^{[1]}}{\delta_2}$*, the situation is the same as in (a).*

(c) when $\delta_1 \le \delta_2$ *and* $d_1 - c_1^{[2]} > q + \frac{(1+\delta_2)c_1^{[1]} + (1+\delta_1)c_2^{[1]}}{\delta_1 - \delta_2}$*, the status quo can be revised to* $(y^*, 1-y^*)$ *in round 2, where* $y^* = d_1 - c_1^{[2]}$.

The strategic profiles suggested by the SPE are illustrated in Table 1, which specifies what offer each state would make and accept. What do we know from the SPE about the interaction between the two satisfied states? According to the proposition, if the bargaining process is really costly (i.e., $d_1 + d_2 \le 1 + c_1^{[2]} + c_2^{[2]}$), there are totally three possible outcomes between two satisfied states, depending on state 1's payoff to deadlock (d_1) and her bargaining cost in the second round ($c_1^{[2]}$). First, no state is motivated to challenge the status quo. Second, the status quo can be revised without provoking a crisis or limited war (part a and b). Finally, the status quo can be revised and crisis or limited war can occur (part c). The last part of the SPE may seem coun-

Table 1. Strategic Profile of the SPE

	State 1		State 2	
Scenario (a) and (b)				
Strategy	Propose	$(x^*, 1-x^*)$	Propose	$(y^*, 1-y^*)$
	Accept	$y \ge y^*$	Accept	$x \le x^*$
Outcome	$(q, 1-q)$ is replaced by $(x^*, 1-x^*)$ in round 1 $x^* = \frac{q + c_2^{[1]} + \delta_2(d_1 - c_1^{[2]})}{1 + \delta_2}$, $y^* = d_1 - c_1^{[2]}$.			
Scenario (c)				
Strategy	Propose	$x > x^*$	Propose	$(y^*, 1-y^*)$
	Accept	$y \ge y^*$	Accept	$x \le x^*$
Outcome	$(q, 1-q)$ is replaced by $(y^*, 1-y^*)$ in round 2			

terintuitive: if state 1 knows 2 is going to offer y^* in round 2, she can always offer x that makes 2 indifferent between accepting and rejecting in the first round, thereby avoiding paying the cost of delay. The reason lies in the costliness of bargaining. As stated in part (c), when some specific conditions are met, state 1 is rational to delay the agreement for one round (by making an offer that is unacceptable to state 2, see Table 1, scenario c). Part (c) of the proposition explains why, with complete information, it is still possible for a crisis or limited war to happen and last for some time between satisfied states.

Powell's model only analyzes the first outcome. Revision of the status quo and delay in reaching an agreement between satisfied states are typically attributed to informational problems. As discussed above, its inadequacy is largely due to the treatment of crisis bargaining as costless cheap talk. If delay carries no cost, states would be indifferent between the status quo and deadlock. By contrast, the dynamics of bargaining are completely different in the integrated bargaining game. The difference in states' bargaining costs and levels of patience (and consequently the payoff to deadlock) justifies not only the redistribution of the disputed goods between satisfied states, but also multiple means to achieve the redistribution. Although some in-depth case studies are needed to determine the level of uncertainty and how it affects the actual decision making in those events, the comparison exemplifies the contribution of the integrated bargaining approach to the rationalist explanation for war.

V. Conclusion

This study revisits the debate between traditional crisis bargaining and intrawar bargaining models. My analysis demonstrates that because such artificial division of labor lacks sound theoretical grounds, it fails to reveal the nature of using force in international politics. Instead, I propose to integrate traditional crisis bargaining and intrawar bargaining into a continuous process. The traditional difference between a crisis and a war is captured by their bargaining costs and risks of losing control. Because the integrated model is based on the nature and function of war in international politics rather than the intensity and casualties of using force, it provides a new perspective to the ongoing debate about crisis bargaining and intrawar bargaining. The contribution of this new approach is exemplified by the reexamination of the renowned statement that with complete information, the status quo cannot be revised between satisfied parties. Using a simple two-stage bargaining game, my integrated bargaining model demonstrates that if crisis bargaining is really a costly process, sometimes it is rational for a satisfied state to not only make some concessions to another satisfied adversary,

but also to intentionally delay an agreement.

An elegant theory that it is, the bargaining approach offers a formal and rigorous instrument to delve into states' intention and calculation to use force during international crises. The equilibrium of their interactions implies both the necessary and sufficient conditions for states to go to war or commit to peaceful negotiations. While both traditional crisis bargaining and intrawar bargaining approach generate great insight about states' rational calculation during international crises and war, the current detachment between them hampers our ability to establish a consistent account for war's inception, duration, and termination. In this sense, the current study represents some primary effort to build a general theoretical framework in our understanding of international war.

Appendix

Note that if both states are satisfied, we have by definition U_i (w, t) < U_i (*status quo*). In words, it suggests any no state is rational to fight a war. With complete information, this is public knowledge. The bargaining game illustrated in Figure 2 is equivalent to a pure bargaining game without the outside option of "fight." First, the lemma below tells us that it is never rational for the two states to end the bargaining in deadlock.

Lemma *When the payoff to deadlock is low enough, that is,* $d_1 + d_2 \leq 1 + c_1^{[2]} + c_2^{[2]}$*, the second round of bargaining always ends in agreement. In particular, state 2 always offers* $y^* = d_1 - c_1^{[2]}$*, which is always accepted by 1.*

Proof The condition U_1 (y, 2) = U_1 ({D}) is equivalent to $y = d_1 - c_1^{[2]}$ and U_2 (y, 2) = U_2 ({D}) is equivalent to $y = 1 - d_2 + c_2^{[2]}$. Because U_1 (y, 2) increases in y and U_2 (y, 2) decreases in y, 1 prefers (y, 2) to {D} when $y \geq d_1 - c_1^{[2]}$ and 2 prefers (y, 2) to {D} when $y \leq 1 - d_2 + c_2^{[2]}$. An agreement that is mutually preferable to deadlock exists iff (if and only if) $d_1 - c_1^{[2]} \leq 1 - d_2 + c_2^{[2]} \rightarrow d_1 + d_2 \leq 1 + c_1^{[2]} + c_2^{[2]}$. In this situation, state 2 is always rational to offer the lowest that 1 is willing to accept, $y^* = d_1 - c_1^{[2]}$.

Proof of Proposition The lemma states the optimal strategies of the players in round 2. Now let us check the optimal offer of the states in round 1. The lemma has showed that the states' utility is U_i (y^*, 2) if the bargaining enters round 2. Intuitively, if and only if both states are better off by agreeing upon (x, 1), the game will have a unique SPE in which the status quo is revised in round 1. In particular, we need

$(1+\delta_2)c_1^{[1]} + (1+\delta_1)c_2^{[1]}$

$U_1(x, 1) \geq U_1(y^*, 2) \rightarrow x \geq x_{\min} = \frac{q - c_1^{[1]} + \delta_1 (d_1 - c_1^{[2]})}{1 + \delta_1}$; and $U_2(x, 1) \geq U_2(y^*, 2) \rightarrow x \leq x_{\max} = \frac{q + c_2^{[1]} + \delta_2 (d_1 - c_1^{[2]})}{1 + \delta_2}$. Note that $x_{\min}$ and $x_{\min}$ represent state 1's minimum acceptable offer and state 2's maximum acceptable offer, respectively. Any agreement in round 1 requires

$$x_{\min} \leq x_{\min} \rightarrow (\delta_1 - \delta_2)(d_1 - c_1^{[2]}) \leq (1 + \delta_2)c_1^{[1]} + (1 + \delta_1)c_2^{[1]} + (\delta_1 - \delta_2)q,$$

which holds under one of the following two conditions: (1) $\delta_1 = \delta_2$; (2) $\delta_1 > \delta_2$ and

$$d_1 - c_1^{[2]} \leq q + \frac{(1 + \delta_2)c_1^{[1]} + (1 + \delta_1)c_2^{[1]}}{\delta_1 - \delta_2}$$; or (3) $\delta_1 < \delta_2$ and

$$d_1 - c_1^{[2]} \geq q + \frac{(1 + \delta_2)c_1^{[1]} + (1 + \delta_1)c_2^{[1]}}{\delta_1 - \delta_2};$$

(1) when $\delta_1 > \delta_2$ and $d_1 - c_1^{[2]} \leq q + \frac{(1 + \delta_2)c_1^{[1]} + (1 + \delta_1)c_2^{[1]}}{\delta_1 - \delta_2}$

For state 1 to be motivated to start the bargaining, we need

$U_1(x_{\max}, 1) \geq U_1(\textit{status quo}) \rightarrow d_1 - c_1^{[2]} \geq q - \frac{c_2^{[1]}}{\delta_2}$. To conclude, when $\delta_1 > \delta_2$, the status quo can be revised to $(x_{\max}, 1)$ iff $q - \frac{c_2^{[1]}}{\delta_2} \leq d_1 - c_1^{[2]} \leq q + \frac{(1 + \delta_2)c_1^{[1]} + (1 + \delta_1)c_2^{[1]}}{\delta_1 - \delta_2}$.[15]

So we have proved part (a).

(2) when $\delta_1 = \delta_2$, $x_{\min} \leq x_{\max}$ always holds. As long as state 1 is motivated to initiate the crisis, or $d_1 - c_1^{[2]} \geq q - \frac{c_2^{[1]}}{\delta_2}$, the status quo can always be revised to $(x_{\max}, 1)$.

15. Note that when $\delta_1 > \delta_2$ the part on the left side of the inequality ($q - \frac{c_2^{[1]}}{\delta_2}$) is always smaller than the part on the right side ($q + \frac{(1 + \delta_2)c_1^{[1]} + (1 + \delta_1)c_2^{[1]}}{\delta_1 - \delta_2}$).

(3) when $\delta_1 < \delta_2$ and $d_1 - c_1^{[2]} \geq q + \dfrac{(1+\delta_2)c_1^{[1]} + (1+\delta_1)c_2^{[1]}}{\delta_1 - \delta_2}$

It can be checked that when $\delta_1 < \delta_2$, $q - \dfrac{c_2^{[1]}}{\delta_2} > q + \dfrac{(1+\delta_2)c_1^{[1]} + (1+\delta_1)c_2^{[1]}}{\delta_1 - \delta_2}$. Therefore, whenever state 1 is motivated to start the bargaining, $d_1 - c_1^{[2]} \geq q - \dfrac{c_2^{[1]}}{\delta_2}$, we have $x_{\min} \leq x_{\max}$ and the status quo is revised to ($x_{\max}$, 1). So part (b) is proved by section (2) and (3).

(4) when $\delta_1 > \delta_2$ and $d_1 - c_1^{[2]} > q + \dfrac{(1+\delta_2)c_1^{[1]} + (1+\delta_1)c_2^{[1]}}{\delta_1 - \delta_2}$, we have $x_{\min} > x_{\max}$.

That is, any offer $x \geq x_{\min}$ will be rejected by state 2 with counteroffer $y^* = d_1 - c_1^{[2]}$. However, state 1 would not offer anything $x < x_{\min}$. In this situation, state 1 offers $x \geq x_{\min}$, which will be rejected by state 2 with counteroffer y^*. According to the lemma, this means that the game ends with (y^*, 2). Note that in this circumstance, Player 1 is always motivated to initiate the crisis in the first place.[16] Part (c) is proved.

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16. $U_1(y^*, 2) \geq U_1(\textit{status quo}) \rightarrow d_1 - c_1^{[2]} \geq q + \dfrac{c_1^{[2]}}{\delta_1}$, which always holds when $d_1 - c_1^{[2]} > q + \dfrac{(1+\delta_2)c_1^{[1]} + (1+\delta_1)c_2^{[1]}}{\delta_1 - \delta_2}$.

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