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Nearly all wars end not because the states that are fighting are incapable of further fighting but because they agree to stop. Thus to explain why wars occur one must explain why states must fight before reaching agreement, which implies that war must be considered part of the bargaining process that leads to a negotiated settlement and not as an alternative to it. However, most attempts to explain the occurrence of war assume that it is entirely the result of a choice made before it begins. I show that this way of posing the problem can only lead to misleading conclusions by analyzing a model in which a negotiated settlement remains possible after war starts.

In his well-known book, *The Causes of War* (1988), Geoffrey Blainey claimed that to understand why wars started one had to understand why they stopped. There is good reason to take this claim seriously. Nearly all wars end not because the participants are incapable of further fighting but because they agree to stop, and even capitulation is often the result of concessions made by the victor (Kecskemeti 1958). Thus to explain why wars occur one must explain why states must fight before reaching an agreement. The problem of explaining the occurrence of war is therefore ambiguous: one might merely want to explain why two states could not reach agreement without fighting, or explain why their fighting lasted long enough and was severe enough to be identified as a war, or explain why some historical war occurred. And if fighting is expected to lead to agreement then fighting must be considered as part of the bargaining process and not an alternative to it.

However, this is not the way most of the literature on war approaches the problem. War is instead normally assumed to be entirely the result of choices made before it begins. If it is represented as anything more than a final outcome it is usually depicted as a costly lottery, and a negotiated settlement, if considered at all, is normally represented as an alternative to war rather than something war is expected to lead to.[1]

The only attempt to follow Blainey's suggestion is an article by Wittman (1979) on war termination. Wittman modeled a war as a costly military contest between two states which will be won ultimately by one or the other of them. If it is to be ended instead by a negotiated settlement then both states must prefer the terms of the settlement to the expected value of continuing the war. One implication of this fact, Wittman claimed, is that changes in the relative military power of the two states will have no effect on whether they will be able to reach a negotiated settlement, since making one state more pessimistic about continuing the war will only make the other more optimistic and therefore cannot diminish the

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Earlier versions of this paper were presented at the 1996 Conference on War, Washington University and at the 1998 Annual Meeting of the American Political Science Association. I have benefited from the comments of the participants at those conferences, as well as those of Bear Braumoeller, Hein Goemans, Dong-Won Kim, Jack Levy, Jongryn Mo, and Dan Reiter. I owe a special debt to James Fearon for extended discussions on this subject.

[1]For some recent examples, see Bueno de Mesquita and Lalman 1992, Morgan 1994, Fearon 1995a, and Powell 1996. This reflects a more general tendency in the literature to ignore what happens after war begins (Gartner 1998).

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expected value of war for both. Thus, he reasoned, the relative power of states affects the terms of any negotiated settlement they might reach but does not determine whether they will be able to reach one, and therefore the common belief that the distribution of power affects the probability of war has no theoretical foundation. However, Wittman did not present a model of the bargaining process that would allow us to evaluate this claim, nor has anyone else. I will do so below.[2]

This is not the only important question raised by Wittman's analysis. Another is why war occurs at all. Wittman suggested that prior to war there may have been no negotiated settlement that both sides preferred to the expected utility of war. If so, a settlement would become possible only if their expectations change enough to create a bargaining range. But if states anticipate such changes in expectations (as they must), then even if a bargaining range exists prior to war one side might hope by fighting to improve the terms it can extract from the other. In that case war would be just a continuation of bargaining, and therefore far more likely to occur than if the existence of a bargaining range were a sufficient condition for reaching a negotiated settlement. I will show that this is true.[3]

Another important question raised but not answered by Wittman's article concerns the nature of the military contest itself. Wittman assumed that a war, if not interrupted by a negotiated settlement, would eventually be won by one side or the other. This implies that the war must be a contest in which each side attempts to disarm the other. But historical wars have not always taken this form. For example, there is no conceivable way the North Vietnamese could have disarmed the United States in the war in Vietnam, and no way the U.S. could have disarmed North Vietnam by the military strategies it employed. The same could be said about the U.S. and China in the Korean War.

Many people assume that the nature of war is a function of military technology. But the fact that fighting is expected to lead to a negotiated settlement may have an impact on the way states fight. I will show that while technology determines what is possible, states choose what sorts of wars to fight within those constraints, and an understanding of the relation between fighting and bargaining helps explain those choices.

Wittman believed a full answer to the questions he raised would require a model of bargaining, but was unable to provide one. I will supply such a model. Several scholars have tried to evaluate his claims by analyzing instead a prewar choice between a negotiated settlement and a costly lottery. Before proceeding further it is important to understand why this formulation of the problem obscures rather than illuminates the relevant issues.

War as a Costly Lottery

Because decision theory implies that any uncertain expectations can be represented by a lottery, a costly lottery that is used to represent a war can be interpreted in two ways. One is that it represents a purely military contest fought until one or another state is incapable of further fighting, and thus a prewar choice between such a contest and a negotiated settlement is the result of a take-it-or-leave-it offer made by one state to another: if this offer is rejected then a fight to the finish will occur. The other possible interpretation is that bargaining continues to be possible after fighting begins, and the costly lottery of war merely represents the prewar expectations of states concerning the terms of the final settlement and the costs that will be suffered before it is reached.

Take-it-or-leave-it offers are commonly employed by economists as a way of abstracting from the complexities of the bargaining process, since if a take-it-or-leave-it offer is rejected then agreement does not occur and therefore there is no bargaining (Salnié 1997, 4–6). But precisely for that reason take-it-or-leave-it offers are not helpful if our aim is to understand the bargaining process. Of course, anything that might lead to no agreement when a take-it-or-leave-it offer is made is also likely to prevent immediate agreement if bargaining is possible. But just as there would likely be fewer strikes or lock-outs if their consequence were always that the firm went out of business, so a state might be willing to fight for a while in hopes of getting a better deal even though it would be unwilling to forgo the possibility of agreement altogether. Take-it-or-leave-it offers provide no insight into when and why this might be done.

Interpreting the costly lottery of war as representing expectations about what might be gained by bargaining, on the other hand, implies that any conclusions that we might reach will be trivial since such a representation tells us nothing about what the basis of such expectations

[2]Blainey had argued that the possibility of a negotiated settlement implied that war is least likely when power is distributed unequally (Blainey 1988, chapter 8). Morrow (1985) and Fearon (1992) have claimed to present formal models that bear on Wittman's conclusion, and Powell (1996) might appear to have done so. However, none of them has supplied a model of bargaining after fighting begins, without which, as I will show below, it is not possible to evaluate Wittman's argument.

[3]In a footnote Wittman acknowledged this possibility, but said that discussion of it required a theory of bargaining (Wittman 1979, 747).

might be. For example, it seems plausible that if a labor union rejects an offer from management and goes on strike it is because the expected value to the union of striking is greater than the value it places on management's offer. But if we do not know the basis for labor's expectations such a statement tells us nothing.

In models analyzing the choice between war and a negotiated settlement expectations concerning the outcome of war are commonly assumed to reflect the relative power of the adversaries, and the expected costs of war are assumed to be independent of the choices of the combatants. However, these are plausible assumptions if war is expected to be a purely military contest fought to the finish but not if war is expected to lead later to a negotiated settlement.

It is easy to be confused about this, since anything that increases the expected value of a fight to the finish for one state and decreases it for another will also improve the terms of any agreement that the state whose prospects have improved can expect, and thus if fighting changes the relative power of the combatants it will also change the terms of any negotiated settlement they might reach. But this only implies that a military contest may be a compound lottery and not a simple one and does not explain why agreement is possible after fighting but not before it.[4] It is not clear why the answer to the latter question should be different from any other bargaining situation, which implies that a state might hope to get a better deal if it fights for a while *even if there is no reason to believe that fighting will improve its military position.* I will demonstrate below that this is true.[5]

Thus formal models that focus on a prewar choice between war and a negotiated settlement either fail to distinguish between the outcome of fighting and the outcome of bargaining (Morrow 1985), or assume implicitly (Powell 1996) or explicitly (Fearon 1992, 1995a) that bargaining ends when war begins. They are therefore at best either irrelevant to historical wars (since they ignore the possibility of negotiated settlements once war has begun) or contain no information (since they do not tell us what is the basis for the expectations represented by the costly lottery). At worst they are examples of fallacious reasoning in which a costly lottery is defined in one way in the premises of an argument (an all-out war fought to the finish) and another way in the conclusion (a bargaining process which is preceded or accompanied by fighting).

Recently Stam (1996) has presented an informal model of war as a process of mutual coercion in which adversaries impose costs on each other in order to compel a concession. However, while his analysis has the merit of acknowledging that bargaining does not end when fighting begins, he does not present a model of the bargaining process and is therefore not able to analyze the relation between military outcomes and bargaining outcomes.

Thus no one has developed a model encompassing both war initiation and war termination that would allow us to examine the relation between fighting and bargaining. Without one we cannot hope to understand why war occurs, how long it lasts, why it takes the form it does, or why it stops. I will present such a model in the next section.[6]

War as a Bargaining Game

We have seen that Wittman (along with many other writers on war) assumed that a war that is not ended by mutual agreement will lead ultimately to the defeat of one side or the other, which could only be true if the participants are actually trying to disarm each other. Since wars do not always take this form, and since expectations about the consequences of fighting will affect a state's choice between accepting a negotiated settlement or continuing to fight, if we are to understand why war occurs we must know what determines the nature of the military contest that is the alternative to a negotiated settlement. To my knowledge the only extended treatment of this question is by Clausewitz.

It was not Blainey or Wittman but Clausewitz who first emphasized that:

> . . . war is simply a continuation of political intercourse, with the addition of other means. We deliberately use the phrase "with the addition of other means" because we . . . want to make clear that war in itself does not suspend political intercourse or change it into something entirely different. (Clausewitz 1976, 605)

[4] The clearest example of this problem is in Morrow 1985. For further discussion of this point see the section below titled "Absolute War Reconsidered."

[5] The most obvious example of this is the war in Vietnam, where it is unlikely that the North Vietnamese leaders were optimistic about being able to weaken the United States militarily, but apparently had good reason to be optimistic about getting the US to agree to more favorable terms by fighting.

[6] The person who came closest to using a model of bargaining as a means of understanding war is Pillar (1983), who applied Nash bargaining theory to the study of peace negotiations. His book is a much underappreciated source of insights into the relation between bargaining and war.

But Clausewitz distinguished between what he called "absolute war" and "real war" and said that ". . . war can be thought of in two different ways—its absolute form or one of the variant forms that it actually takes . . ." (1976, 582). And he claimed (though he has often been misunderstood on this point) that it is the possibility of ending war by a negotiated settlement that leads to the difference between absolute war and the variety of real wars that actually occur.

Clausewitz's definition of absolute war is famous:

> War is nothing but a duel on a larger scale. Countless duels go to make up a war, but a picture of it as a whole can be formed by imagining a pair of wrestlers. Each tries through physical force to compel the other to do his will; his *immediate* aim is to *throw* his opponent in order to make him incapable of further resistance. (Clausewitz 1976, 75; emphasis in original)

Absolute war, then, is a contest in which each side tries to render his opponent defenseless by disarming him, in order to be able to use force against him afterwards without resistance. Thus the war that Wittman assumed could be ended by negotiations was what Clausewitz called "absolute war," or war "in theory." However, Clausewitz claimed that because negotiated settlements of war are possible, absolute wars rarely occur. I will argue that he was right.

Because we must take into account not only choices between war and a negotiated settlement but also decisions about what sort of war to fight, the problem is very complex and it will be necessary to proceed in stages. I will begin by constructing a model of a war in which states attempt to disarm each other, but which, as Wittman assumed, can be interrupted by a negotiated settlement. I will show that such a war can be represented as a variant of the standard Rubinstein bargaining game that is often used to model bargaining.

If the parameters of such a game are common knowledge then agreement should be immediate, which implies in this context that war will not occur. In the bargaining literature delayed agreement is explained by the possibility that the bargainers have private information about their preferences which they can only reveal by paying the price of postponing agreement. Thus readers familiar with the standard bargaining literature will expect me to introduce private information about the bargainers' preferences into the bargaining game that represents absolute war in order to explain why both war and bargaining occur.

However, this would be a mistake, since in the case of war what prevents immediate agreement is not private information about the personal preferences of political leaders, but conflicting expectations about the relative performance of military forces and/or about the behavior of other actors such as potential allies or political actors within states. And while such conflicting expectations can be the result of private information, war provides a means of revealing information that is not available in the standard bargaining models.

An insight shared by Clausewitz and Blainey is that when negotiated settlements are possible war leads to agreement because it reveals information. But Clausewitz also understood that since this is true states can fight military contests that just reveal information, but do not entail the costs and risks associated with absolute war. This is part of his explanation for the occurrence of what he calls "real war." Thus in my analysis "real wars" (i.e., wars in which states do not risk complete disarmament) are assumed to occur prior to the bargaining game that models absolute war, and one of their functions is to influence the terms of the agreement that will be accepted in lieu of fighting an absolute war by revealing information about the parameters associated with it. Since bargaining does not occur until states no longer have an incentive to reveal information by fighting (which is why peace negotiations typically do not occur for some time after a war begins), these wars are pure military contests that can be represented by simple lotteries. However, a lottery that represents such a contest will be quite different from the lottery-equivalent of absolute war.

A war that we see, therefore, may have the same relation to absolute war that crises are commonly assumed to have to war, and what we see as peace negotiations may be analogous to crisis bargaining. This provides a formal justification for Clausewitz's claim that absolute wars are unlikely to occur, but their possibility explains the wars that do occur.

Although I sharply distinguish between wars fought solely for the purpose of revealing information and wars fought to disarm the adversary, it is obviously possible for information to be revealed in the latter type of war as well—especially if it consists of multiple contests rather than one single contest leading to a decisive conclusion. While this possibility is mentioned below, it is not emphasized, for two reasons: (1) incorporating it into the model of absolute war presented below would only complicate an already complex model without changing the main conclusions, and (2) wars in which states do not try seriously to disarm each other have occurred, and their possibility has very important implications.[7]

[7]The most recent example is the conflict between NATO and Serbia over Kosovo, in which despite NATO's inability to do serious damage to Serbia's military forces from the air (leading many critics to argue that Serbia could not be disarmed without using ground forces) Milosevic agreed to allow it to occupy Kosovo anyway.

Since "real wars" are less risky than absolute wars, one might ask why absolute wars ever occur at all. One possibility is implied by what has just been said: in some circumstances it may not be possible to reveal information about the parameters associated with absolute war without actually beginning one. But there is another possible explanation as well (as though the problem were not already complicated enough), which is that negotiated settlements that might be accepted in lieu of war are not always enforceable and therefore states may choose to fight instead. However, while it is possible that enforcement problems might lead to a war that results in the disarmament of one side or the other, the analysis presented below demonstrates that enforcement problems can also explain limited wars for territory that end in negotiated settlements (another type of "real war" discussed by Clausewitz, though one whose explanation he is not so clear about).[8]

Thus military operations can have two different effects, and a failure to distinguish between them can cause great confusion. One is to reveal information about relative capabilities (including the capability of inflicting costs). The other is to influence relative capabilities, by damaging the enemy's military forces or capturing territory. Both effects will influence the terms of any negotiated settlement that is accepted in lieu of fighting until one side or the other is disarmed, but they do so in quite different ways. Since the expected utility of war depends on what sort of war will be fought, a failure to distinguish between them will lead not only to incorrect explanations of the outcome of war, but also to inaccurate estimates of its ex ante expected utility.

Temporally, absolute war comes last in the sequence of choices analyzed below and may not occur at all. Nonetheless, expectations about the consequences of such a war determine the choices that come prior to it. Thus I begin with a model of absolute war.

A Model of Absolute War

Clearly a war that leads to the disarmament of one state by another does not decide the allocation of some good that is in dispute (such as territory) or settle some issue over which the parties may have been fighting—it merely determines who can do what to whom in any postwar bargaining that may take place. Let W_i, therefore, represent the expected utility to State i of the bargaining game that results from disarming State j, L_i the utility to State i of the bargaining game that results from being disarmed by State j, and p the probability that State j will be disarmed. These are the standard components of the lottery normally used to represent war, and all that is missing is a term representing its cost. However, the cost of war depends on its length, which cannot be known with certainty until the war is over. Thus the cost of such a war must be an expected value of some sort, which requires some probability distribution over its possible lengths.

I will assume, therefore, that prior to war the participants are able to estimate for every possible future date the probability that one side or the other will have been disarmed by that date. This implies that at every period t there is some probability q that combat will continue and some probability $1 - q$ that one or the other will be disarmed instead. For the moment I will assume that these continuation probabilities are constant and postpone consideration of how they might vary and what the significance of this variation might be. (The effect of varying the parameters associated with absolute war is discussed later.) Thus the probability that one state or the other will be disarmed by some date t is $1 - q^t$. Whenever a state is disarmed, the probability that the outcome will be W_i is p, and the probability that it will be L_i is $1 - p$.

I will also assume that associated with each period is some cost c, and for the moment assume that the per period cost of war is constant as well. Then the expected cost of a war that ends no later than time t is:

$$\begin{aligned}(1-q)c + q(1-q)2c + q^2(1-q)3c + \ldots \\ +q^{t-1}(1-q)tc = \\ (1-q)c(1+2q+3q^2+\ldots+tq^{t-1}) = \\ c(1+q+q^2+\ldots+q^{t-1}-tq^t) = \\ c\left(\frac{1-q^t}{1-q}-tq^t\right) \equiv C(t)\end{aligned}$$

And therefore the total expected cost of war is:

$$\lim_{t\to\infty} C(t) = \frac{c}{1-q} \equiv C$$

This provides a justification of the standard assumption that war can be represented by a costly lottery of the form $pW + (1-p)L - C$.

However, this formulation has three advantages over the standard one: (1) it makes clear that this is the expected value of a war that is fought to the finish, that is, a war that results in the complete disarmament of one side or the other, and therefore this expected value is seldom if ever realized; (2) it provides us with an intrawar period

[8]It should be obvious that these explanations of war coincide with those discussed in Fearon 1995a. However, the only model presented in that article is one in which a dissatisfied state makes a take-it-or-leave-it offer to a satisfied state, which for the reasons already given is inadequate for examining the implications of these explanations.

during which the war can be interrupted; and (3) it provides us with a plausible way of representing the possibility of a military stalemate. The first two features provide a means of evaluating Wittman's analysis. Before exploring their implications, however, let us consider briefly the third.

Fearon (1995b) and Stam (1996) have suggested that stalemates or draws ought to be included as one of the possible outcomes of war (Fearon claims that military technology might make decisive outcomes unlikely and Stam that neither side may be able to coerce the other into conceding). However, these suggestions fail to distinguish between war as a duel and the bargaining outcome that the duel is fought to influence.[9] If we ignore the possibility that a military contest might be stopped by mutual agreement and assume that the simultaneous disarmament of both sides is a zero probability event, then the duel must either continue or end with the disarmament of one side or the other. A stalemated war, therefore, is, like any other stalemated contest, simply a contest that would never end unless the contestants agreed to end it.

However, it seems unrealistic to think that a war could, if not interrupted, literally go on forever. One of the advantages of this formulation is that in it the expected length of war (that is, the date by which the war is expected to end with some probability above some predefined threshold) depends on q, and a genuine stalemate is simply the upper limit of the possible lengths that might characterize a war.

Fearon (1995b) has suggested that increasing the probability of stalemate makes wars more attractive by making them less risky and therefore increases the probability that they will occur. But increasing the expected length of a war that is fought to the finish does not make it less risky, it just increases its expected cost. Thus introducing the possibility of a stalemate can make war more attractive to a state only if it believes it likely that the war will be ended quickly by a favorable negotiated settlement.

Obviously contests that are stalemated can always be ended by mutual agreement, and wars are no exception. Indeed, this is the only rational choice explanation that is possible for many conflicts involving guerrilla warfare and terrorism, since typically neither side in such a conflict can be very confident of disarming the other, and therefore both must hope for a favorable negotiated solution to it. But this implies that a state may fight a war because a negotiated settlement is possible rather than because it is impossible. Moreover, if a stalemated war can be ended by a negotiated settlement then so can any other war.

[9]My own thinking on this subject has often been confused. I am grateful to James Morrow for pressing me to think more carefully about it.

Intrawar Bargaining

To evaluate Wittman's claims we must now introduce intrawar negotiations into this model. To do that let us use Λ to denote the lottery that represents the expected outcome of the military contest (without the associated costs), and assume that at every period of this contest a state that has received an offer $y \equiv (y_i, y_j)$ of a negotiated settlement from the other state can end the war by accepting it, or reject it and make its own offer x instead. If it decides to reject the other's offer and make its own, then the war continues and the other state must decide at the next period whether to accept the offer or insist on its own demand; but in the meantime chance will determine whether one or the other is disarmed on the battlefield instead. Thus if a state accepts y the war ends immediately and it receives y_i, whereas if it demands x instead then the best it can expect is $qx_i + (1 - q)\Lambda_i - c$ if it expects the other state to accept x at its first opportunity.[10]

Interpreted in this way, an absolute war is nothing more than a Rubinstein-type bargaining game with alternating offers and a risk of breakdown.[11] The breakdown outcome B in the Rubinstein bargaining game corresponds to Λ in this game, and the risk of breakdown q in the Rubinstein bargaining game corresponds to $1 - q$ in this game. Thus, paradoxically, the risk of breakdown in this game corresponds to the probability that the war might *end*. This is because if the war ends the combatants are exposed to the risk of defeat and are unable to capture the gains from agreeing on a sure thing as a substitute for the lottery of war.

Now we have a model of the situation analyzed by Wittman: two states are engaged in a military contest in which each tries to disarm the other, but before that contest reaches a decisive outcome they can end it if they can both agree on the terms of some negotiated

[10]Note that in this notation x and y are points in a two-dimensional space whose coordinates represent the payoffs to each of the two bargainers. I assume that the military contest is a continuous process taking place in the background while the exchange of offers requires some finite time to occur, and that if the war continues the same cost must be paid whether the war is ended by agreement in the next period or by the defeat of one side or the other. Note that because of the role that chance plays in determining these outcomes all these values must be von Neumann-Morgenstern utilities.

[11]For a description and analysis of such a game, see Osborne and Rubinstein (1990, 71–76).

settlement. Since Rubinstein has already solved this game we need only interpret his results in the context of war to see its implications for the claims made by Blainey and Wittman.

In any subgame perfect equilibrium of this game leading to agreement, offers that are made must be accepted and players with an opportunity to make an acceptable offer must at least weakly prefer to do so. This implies that each player must be indifferent between accepting another's offer at some period t and waiting for his own offer to be accepted at period $t+1$. Call Player 1's equilibrium offer x^* and Player 2's equilibrium offer y^*. If we assign the value of zero to the "breakdown" outcome (Λ), this means that the equilibrium offers (x^*, y^*) made by the two players must have the property that $x_2^* = qy_2^* - c$ and $y_1^* = qx_1^* - c$.[12]

To gain some intuition for what this means, assume for the moment that war is costless and therefore $c = 0$. Then the equilibrium offers have the property that $x_1^* x_2^* = y_1^* y_2^*$, and they can therefore be represented by the points of intersection with the bargaining frontier of a rectangular hyperbola defined by $x_1 x_2 = k$ where k is some constant. One of these agreements favors one of the players and the other favors the other player. The agreement that is selected is the one that is offered first, and thus there is an advantage in this game to making the first offer. The cost of war increases the advantage of moving first, since in equilibrium Player 1's offer to Player 2 (x_2^*) must only be equal to $qy_2^* - c < qy_2^*$ (and similarly for Player 2's offer to Player 1).[13]

Let us see what this implies about the prewar choice between war and a negotiated settlement. Assume that two states can divide between them some continuous good (perhaps territory) represented by the unit interval, so that any point z on that interval represents the amount received by State 1 (hence $z_1 = z$) and State 2 receives $z_2 = 1 - z$, and assume that $W_i = U_i(1)$ and $L_i = U_i(0)$ (where $U(\cdot)$ is a von Neumann-Morgenstern utility function defined on the interval). Then war can be equated with a costly lottery over the end points of the interval, and if both states are risk-averse there will be a range of values within the interval that both states prefer to war. Within that bargaining range there are two points that can be equated with the equilibrium offers in the bargaining game associated with war. Let us label them w^* and z^*, where $w^* < z^*$. Finally, there is some point s $(0 > s < 1)$ that represents the status quo.

Unlike the standard Rubinstein bargaining game, the status quo is not the disagreement outcome but is instead a point on the bargaining frontier. Thus if war is not expected neither state has an incentive to make a concession to the other. Therefore a state that is dissatisfied with the most its adversary is prepared to offer in the status quo (which might be the status quo itself) must be willing to attack in order to demand more. A failure to resist by the state that is attacked, on the other hand, would be equivalent to conceding all the territory in dispute. Thus if they are to bargain they must fight, and while the dissatisfied state must initiate the war if bargaining is to take place, the satisfied state has the advantage of moving first in the bargaining game associated with the war.

The most State 1 can expect by attacking State 2 is $qU_1(z^*) + (1-q)U_1(\Lambda) - U_1(c) = U_1(w^*)$. Similarly, the most State 2 can expect by attacking State 1 is $qU_2(w^*) + (1-q)U_2(\Lambda) - U_2(c) = U_2(z^*)$. Thus if $w^* \leq s \geq z^*$ then neither state can expect to gain from war. If, however, $s < w^*$ then State 1 can expect to gain by attacking State 2 and demanding z^*; but knowing this, State 2 can prevent an attack by offering to accept w^* in place of the status quo. (A similar analysis applies with the roles reversed if $s > z^*$.)

Note that the difference between w^* and z^* is an increasing function of c and a decreasing function of q, and therefore the greater the per period costs of war and the more likely it is to end quickly (and hence the less likely it is to end in a negotiated settlement), the wider the range of status quo distributions that will satisfy both states.[14] Conversely, the less likely the war is to end quickly the narrower the range of status quo distributions that are invulnerable to renegotiation by the use of a military threat. This provides an alternative justification for Fearon's claim discussed above that increasing the probability of stalemate makes war more attractive, and thus, according

[12] The risk of breakdown in this game plays the same role in determining the equilibrium that discounting plays in the more familiar version of Rubinstein's bargaining model, and thus it is not necessary to consider discounting in order to analyze its properties (Osborne and Rubinstein 1990, 29–54). This does not mean, however, that the discounting of future benefits plays no role in bargaining in the context of war. For discussion of a game characterized by both a risk of breakdown and discounting of the future, see Osborne and Rubinstein (1990, 86–88).

[13] The closer q is to 1 the smaller is the difference between the two offers, and thus if $c = 0$ the closer they both approximate the one that maximizes $x_1 x_2$, the Nash solution (Osborne and Rubinstein 1990, 75–76).

[14] The costs of war per period and the probability that war will end within one period are functions of both the distribution of those values per unit of time and the length of each period. In this model a bargaining period is the amount of time that it takes for one state to respond to another's demand. In interstate bargaining it is reasonable to expect a nontrivial delay between offers and counteroffers, since bargaining is conducted by agents of collectivities who must secure the agreement of their principals before an offer can be accepted or rejected. Difficulties in communication can also be the cause of delays.

to Fearon, reduces the bargaining range. However, it is not the bargaining range that is reduced but the range of status quo distributions that are invulnerable to renegotiation, and this is not the result of reducing the variance of the expected outcomes of the military contest, but of increasing the gains from bargaining once war has begun by making it less likely that the military contest will end before agreement is reached.

However, none of this tells us anything about the probability of war, since if everything in this model is common knowledge the state that might be attacked can always prevent an attack by making the required concession and therefore the probability of war is zero. Thus to understand what this analysis implies about the probability of war we must first understand why a war might occur at all.[15]

Let us begin by considering the effect of an incentive to attack first. A state has an incentive to attack first if doing so increases its expected value of war (and therefore decreases the expected value of war for the other state). Thus an incentive to attack first implies that the location of the bargaining range in the interval (0,1), and hence the location of the two equilibrium bargaining outcomes, depends on which state attacks first.[16]

Let us assume that w^* and z^* are associated with an attack by State 1, and $s < w^*$. Then State 2 has a choice between appeasing State 1 by offering w^* or striking first and receiving the outcome associated with moving second in the bargaining game that follows its first strike. Let us call the bargaining outcomes in the game that results from Player 2's first strike w^{**} and z^{**}. Thus whether an incentive to strike first prevents a negotiated settlement without war depends on whether the gain to Player 2 from striking first is greater than the penalty associated with moving second in the bargaining game that follows its first strike, that is, whether $qU_2(w^{**}) + (1 - q)U_2(\Lambda) - U_2(c) = U_2(z^{**}) > U_2(w^*)$. There is nothing to rule this out, but it need not be true.[17]

[15]This provides an alternative way of posing the main question discussed in Fearon 1995a.

[16]Fearon (1995a, 402–404) claims that first-strike incentives have the effect of narrowing the bargaining range. But since the bargaining range is determined by the expected value of war, and the expected value of war is determined by which state attacks first, it appears there must be two different bargaining ranges depending on which state attacks first.

[17]It seems plausible that the greater the distance between the two equilibrium bargaining outcomes associated with each of the two bargaining ranges, the less likely it is that this condition will be satisfied. And therefore the same factors that increase the range of stable distributions also seem likely to reduce the likelihood that first-strike incentives will prevent a negotiated settlement if the status quo falls outside that range.

Suppose, then, that this condition is met and State 2 decides on a preemptive attack against State 1. In this model the result will be a war that ends in a negotiated settlement after one period. But the length of a period is just the amount of time it would take to exchange offers. A war that ends after one period would therefore not be much of a war, and certainly nothing like most of the wars we want to explain.[18] Thus even if an incentive to strike first can explain why a military conflict begins, it cannot explain why it lasts as long as most wars do.

We are reminded once again, then, of Blainey's admonition that to explain why wars occur we must explain not only why they start but also why they stop when they do (Blainey 1988). The answer suggested by bargaining models used in economics is that agreement is delayed until the bargainers are able to reveal information about their preferences by paying the cost of bargaining. The answer given by Clausewitz and Blainey is that agreement is delayed until the combatants are able to reveal information about their military capabilities by fighting. The latter answer better explains two important facts: (1) exchanges of offers between warring states are not constant, but are typically interrupted by a period in which states fight but do not negotiate; and (2) most wars that occur do not resemble the war modeled above. Clausewitz called them "real wars," and they are best understood by assuming they occur prior to the contest in disarmament just discussed.

Real War

The explanation of war given by Blainey and Clausewitz requires us to replace p, q, and c with the corresponding subjectively estimated values p_i, q_i, and c_i, and calls our attention to the fact that these parameters are likely to change in response to developments on the battlefield. But knowing this, the combatants can design battles and campaigns with an eye on their likely effect on the parameters that define the military contest that would result from an all-out attempt to disarm each other, and thus on the bargaining behavior of both sides. This possibility casts a rather different light on the conduct of war.

It is, in fact, the key to understanding Clausewitz's distinction between war in theory and war in practice, or between "Absolute War and Real War."[19] If the enemy could be made to accept a state's demands only after it

[18]Note that if periods are long then it is unlikely that a preemptive attack will be preferred to appeasement, while if they are short a preemptive attack will lead to a conflict that is settled very quickly.

[19]This is the title to Chapter Two of Book Eight of Clausewitz's treatise (Clausewitz 1976).

had been defeated and disarmed, Clausewitz said, then all military operations would aim solely for the complete disarmament of the enemy by the most economical means possible. But, he wrote: ". . . the aim of *disarming the enemy* (the object of *war in the abstract* . . .) is in fact not always encountered in reality, and need not be fully achieved as a condition of peace" (Clausewitz 1976, 91; emphasis in original). The explanation for this fact is that "Inability to carry on the struggle can, in practice, be replaced by two other grounds for making peace: the first is the improbability of victory; the second is its unacceptable cost" (Clausewitz 1976, 91). This, he says, is what explains the fact that wars can be fought between states of very unequal strength: since states can agree to a negotiated settlement as an alternative to fighting a total war, a weak state can hope to gain concessions from a strong state even though it would be unable to disarm the strong state.

But how could a weak state hope to gain by actually fighting a strong state? The answer Clausewitz gives is that military operations can be designed not to contribute to the enemy's defeat, but to influence instead his expectations of the future course of the war (Clausewitz 1976, 92).

These statements by Clausewitz can be summarized using the notation developed above by saying that military operations by State i can have as their goal an influence on p_j, q_j, and c_j such that the equilibrium offers in the bargaining game whose disagreement outcome is determined by $p_iW + (1 - p_i)L - C_i$ $(i = 1,2)$ are more favorable to State i. However, if this effect of military operations were anticipated by the leaders of both states at the outset one must ask why they would have to carry them out. One possible answer is that it is because their expectations are inconsistent. This is the connection between Clausewitz's discussion of "real war" and Blainey's explanation of the occurrence of wars as we know them.

To see what this implies about the relation between "real war" and the model of absolute war presented above, let us assume that q and c are common knowledge and focus solely on the difference between p_i and $1 - p_j$. Assume further that States 1 and 2 have roughly equal military capabilities, but the leaders of State 1 believe the superior training and intelligence of their military forces give them an advantage. The leaders of State 2, however, believe that there is only some probability $r < 1 - r$ that the leaders of State 1 are correct in this belief. Let p^+ represent the true probability that State 1 will win an absolute war if its leaders are correct and $p^- < p^+$ represent the true probability that it will win if they are incorrect. Thus $p_1 = p^+$ and $p_2 = r(1 - p^+) + (1 - r)(1 - p^-) > 1 - p_1$.

The difference between p_2 and $1 - p_1$ may be great enough that there is no division of the unit interval that both states prefer to the costly lottery of total war. But even if this is not true, the equilibrium offers in the bargaining game associated with that war will be less favorable to State 1 than they would be if p_2 were no greater than $1 - p_1$. This is because increasing p_2 increases the expected value of absolute war for State 2, and therefore increases the value State 2 places on the disagreement outcome in the bargaining game associated with such a war. And anything that increases the value of the disagreement outcome for a bargainer improves the terms of the bargain it will receive in equilibrium and therefore worsens the payoff to its adversary.

Now suppose that prior to the first move in the bargaining game analyzed above States 1 and 2 fight a battle which could not possibly lead to the disarmament of one or the other state, but whose outcome will be determined by the true value of p. Then if State 1 wins this battle Bayes' rule implies that State 2 will have to increase its estimate of r. In particular, if r^* is State 2's updated estimate of the probability that State 1 is correct in its evaluation of the situation then:

$$r^* = \frac{rp^+}{rp^+ + (1-r)p^-}.$$

Thus if State 1 wins the battle the difference between p_2 and $1 - p_1$ will diminish, and State 2 will have to increase its offer to State 1. On the other hand, if State 2 wins it will be even more confident that State 1 is wrong in its estimate of relative power, and therefore the expected value it assigns to an absolute war will be higher than it was prior to the battle. Thus if State 1 wins this battle it can expect some offer x from State 2, whereas if it loses, it can only expect some less attractive offer z. If the battle is not fought, however, then State 1 expects some offer y, where $x_1 > y_1 > z_1$. (State 2 has, of course, the reverse preference ordering.) Associated with this battle there will be some expected cost k to be paid by both states.

State 1 will prefer to fight this battle if $p_1x_1 + (1 - p_1)z_1 - k > y_1$ or equivalently if $p_1(x_1 - z_1) - k > y_1 - z_1$. If one or more such battles are fought and lead to enough casualties we would say that a war between States 1 and 2 had occurred, and that x or z were the terms of the peace settlement. Thus peace negotiations in the war that we observe would be exchanges of offers *prior* to the bargaining game associated with absolute war.

State 1's choice is between a costly lottery and a negotiated settlement. However, since all of the possible outcomes are agreements expected in the bargaining game analyzed above, victory and defeat are not among them, nor need be the status quo. Moreover, there need

be no connection between any territory gained in the conflict and the final settlement that determines the outcome.[20]

What can one say about the effect of the distribution of power on this choice? Because of the difference between $1 - p_1$ and p_2, of course, the cause of this conflict is a dispute about what the distribution of power actually is. However, it is clear that the expected value of fighting to State 1 is determined not by the expected value of a fight to disarm State 2, but by the magnitude of the concession that State 2 can be induced to make as a result of fighting. And that is determined by the magnitude of the difference between their estimates of relative power. Thus if a state that is not optimistic about defeating another state nonetheless believes the other state has significantly underestimated its fighting strength, it may have an incentive to fight a limited war to demonstrate its true capabilities. This confirms Clausewitz's claim that it is the possibility of negotiated settlements of absolute war that explains why weak states can hope to gain at the expense of stronger ones.[21]

Fearon, in his discussion of "Rationalist Explanations for War," says that ". . . states may be forced to use war as a credible means to reveal private information about their military capabilities" (Fearon 1995a, 400) and gives the Russo-Japanese war as an example (Fearon 1995a, 398–400). But he claims this would be true only if their disagreement about their relative strength was great enough that "no negotiated outcome is mutually preferred to war" (Fearon 1995a, 391). In the example just discussed, however, it should be clear that the disagreement between States 1 and 2 about their relative power need not be so great that there is no agreement they both prefer to fighting a war that would lead to the defeat of one or the other of them. Rather the war that occurs is fought to determine which of two such possible agreements they will ultimately accept—which is exactly what Fearon says happened in the Russo-Japanese war.

This implies an important difference between the effect of private information on bargaining in the context of war and the effect of private information in the standard models of bargaining in economics.[22] In the standard bargaining models used in economics, private information explains why agreement is not immediate, but the only way bargainers have to reveal their private information is by temporarily refusing to agree. Since they determine whether and how long they will hold out, they have an incentive to use this decision to misrepresent their private information. As a result, the signals they give by deciding whether to hold out or not are noisy and can be interpreted only by taking into account the strategic incentives of the bargainers. These facts account for the great complexity of these models and the multiplicity of equilibria in them.

Bargaining in the context of war is different, in that fighting is a source of information that is much less subject to manipulation by adversaries.[23] The bad news is that getting this information can be very costly. The good news is that states may not actually have to begin a dangerous all-out war in order to get it. Blainey claimed that war was a means of measuring power (Blainey 1988, chapter 8). A more accurate analogy might be to say that it is an experiment that allows states to test competing hypotheses about the outcome of a war fought to the finish.[24]

One might object that this analogy makes sense only because I have focused on the effect of private information on estimates of relative military power and not on the expected costs of war. But this would be wrong, because the expected costs of war as evaluated by political leaders depend not just on the leaders' personal preferences, which they can try to misrepresent, but also on the relative military capabilities of both sides and on the behavior of other relevant persons, including both potential allies and domestic political actors.[25] These are factors about which war itself provides independent evi-

[20]That is why states are often compelled during peace negotiations to give up territory they have conquered.

[21]Note that even if, as a result of the outcome on the battlefield, it should happen that $p_i = 1 - p_j = 1$, it will still take time for State i to defeat State j, and therefore State j can still impose costs on State i. Thus this analysis also supports Kecskemeti's claim that states that are expected to lose a war retain some bargaining power, and therefore even capitulation can be accompanied by bargaining (Kecskemeti 1958). For a model of bargaining in these circumstances, see Werner 1998; however, Werner assumes certainty not only about who will win but also about when the war will end.

[22]For a survey of the role of private information in bargaining models in economics, see Kennan and Wilson (1993).

[23]To appreciate the significance of this difference, consider the following question: If I own a horse that I claim is faster than yours and you are skeptical of my claim, which would you rather do: find a way of inducing me to reveal any private information I might have that would support my claim, or time the horse?

[24]Contrast this analysis with the model of crisis bargaining analyzed by Morrow (1989), in which war ultimately reveals the private information that decision makers have about military capabilities, but only after it is too late to agree on a negotiated settlement. Prior to that point, a state can only learn about its adversary's true military capabilities by making inferences about its private information based on whether offers that were made were rejected.

[25]See Pillar's discussion of this point in the context of peace negotiations (Pillar 1983, 208–210).

dence, and therefore their effect on the likelihood of war can be analyzed in exactly the same way as the example just discussed. It seems unlikely that in historical wars the only factor preventing immediate agreement was private information about the personal preferences of political leaders on each side, or that military strategies were chosen solely as a means of revealing that sort of information. On the other hand, military operations conducted for the purposes analyzed above can also reveal private information about decision makers' preferences.

What does this analysis imply about Wittman's claim that if war can lead to a negotiated settlement then the distribution of power cannot affect the likelihood of war? There are two necessary conditions for war in the model just discussed: a state must believe that (1) fighting would change another state's estimate of one or more of the parameters of the costly lottery entailed by absolute war and (2) this change would lead to a concession from the other state in the bargaining game in which absolute war is the disagreement outcome.[26] These conditions can be satisfied even though the status quo is preferred to the costly lottery of absolute war by both states, and they imply that there is no connection between the relative power of two states and which one can expect to gain from fighting.

However, this does not imply that the distribution of power plays no role whatever in determining whether war occurs. First, the size of the range of status quo distributions that are invulnerable to renegotiation under threat of war is influenced by q, which may itself be influenced by the distribution of power, since with some technologies it is plausible that the more nearly equal two states' military capabilities are the longer it will take one to disarm the other. Second, if we distinguish between the distribution of publicly known military capabilities (which is what is normally meant by the distribution of power) and the probabilities assigned to the possible outcomes of war (as we must if these probabilities are inconsistent), then it is plausible that the more nearly equal two states' publicly known capabilities are the greater the importance of factors about which they might have private information, and therefore the more likely they are to have inconsistent estimates of their probabilities of winning (Wagner 1994).

Both these ways by which the distribution of power can contribute to the possibility of war provide some support for Blainey's claim that equality of power makes war more likely. However, even when there are consistent estimates of relative power a settlement may be inhibited by inconsistent estimates of the effect of relative costs, as the war in Vietnam would seem to indicate. Moreover, one can convey information about one's ability to impose costs even while losing a battle, so in this case there need be no relation whatever between a state's relative power and the expected value of combat.

[26]That is, if the potentially dissatisfied state is State 1 then the change in the parameters must be sufficient to make $s_1 < w_1$, leading State 2 to offer w to avoid absolute war.

Absolute War Reconsidered

One important difference between Wittman's discussion of peace negotiations and the model of bargaining during absolute war presented above is that while Wittman assumed war was a military contest that, if fought to the finish, would lead to the defeat of one side or the other, he also assumed that the costly lottery that represented that contest is always expected to take place in the future, and in the meantime states can negotiate about the terms of a negotiated settlement they might both prefer. In the model of absolute war presented above, however, war could reach a decisive conclusion at any time, and therefore postponing agreement is risky.

One justification for assuming that the costly lottery of absolute war will only take place in the future is the one just discussed: the war that precedes a negotiated settlement is not a contest in which states actually try to disarm each other, but a contest designed to demonstrate their true military capabilities. However, there is another possible reason for such an expectation, and it is also to be found in Clausewitz's discussion of "real" war.

Clausewitz sometimes calls "real wars" wars with limited territorial aims. We have seen that one reason why war might take the form of a limited territorial struggle is that the outcome of the battle for a piece of territory can influence the enemy's estimate of one's own military capabilities and thus shift the disagreement outcome in the bargaining game associated with absolute war. However, Clausewitz's discussion calls our attention to another way the conquest of territory can influence the disagreement outcome associated with absolute war: "The point of such a conquest is to reduce [the enemy's] national resources. We thus reduce his fighting strength and increase our own" (Clausewitz 1976, 611). Thus the capture of territory can itself change the relative military capabilities of the two sides and therefore their expectations of the ultimate outcome of absolute war.

If so then even a war fought to the finish would consist of a number of discrete contests such that the probability of winning a contest in period t is a conditional probability based on the outcome of the contest at period $t-1$. The model of absolute war presented above would

then be a model of the final stage of the war, and each preceding stage could be modeled in exactly the same way, since victory or defeat at each stage of the contest would, just like the model of absolute war presented above, lead to more or less favorable bargaining outcomes at the succeeding stage. Changing war from a simple lottery into a compound lottery does not, therefore, alter the analysis presented above. It does, however, introduce another possible explanation for a failure to reach immediate agreement, and therefore for the occurrence of war.

To see what this is let us consider a simple example, and assume there are only two stages in the sequence of contests leading to the disarmament of one side or the other. For concreteness suppose that the first stage of the war will be a struggle for control over a strategic piece of territory such as a mountain range between the two states, which is initially controlled by the state to be attacked. If the attacking state captures this territory the probability that it will ultimately be victorious will increase; if it fails it will be weakened by the attempt and thus the probability that it will ultimately disarm the defending state will decrease.[27]

Let π_1^a be the probability with which State 1 expects to win the first stage of this contest, π_1^b the probability with which it expects to win the second stage if it is victorious in the first, and π_1^c the probability with which it expects to win in the second stage if it loses in the first. If p_1 is, as before, the *ex ante* probability with which State 1 expects to disarm State 2, then $p_1 = \pi_1^a \pi_1^b + (1-\pi_1^a)\pi_1^c$. Since $\pi_1^b > p_1$, winning the first stage of the contest will increase the size of any concession that State 1 can expect from State 2 in lieu of a fight to the finish. Therefore *any concession implied by p_1 that requires State 2 to concede more than the mountain range is unenforceable,* since the concession will itself change p_1 and thus lead to a further concession.

If x is the agreement State 2 will have to accept if State 1 controls the mountain range and y the agreement if State 1 tries to capture it and fails, State 2 will not concede the mountain range if $\pi_2^a y_2 + (1-\pi_2^a)x_2 - k > x_2$, or, equivalently, $\pi_2^a(y_2 - x_2) > k$ (where k is the cost of fighting the first stage of the contest). Thus there may be no enforceable agreement that both states prefer to fighting.

If they fight, the battle will again be a contest to determine the disagreement outcome in the bargaining game associated with total war. But now the explanation for this fact is not that the outcome of this battle would convey information about the true relative power of these states, but that the outcome of the battle would actually influence their relative power.[28] If State 1 chooses to fight for control over the mountain range it will be because the expected value of fighting is greater than the value it places on the status quo, and the expected value of fighting will be influenced by π_1^a. But if a military conflict occurs it will be because an enforceable compromise agreement was unavailable and not because of incomplete information.

However, this does not mean that the two states must fight to the finish, since they can instead just fight for control over the mountain range and then reach a negotiated settlement based on the distribution of power determined by the outcome of that contest.[29] And therefore once again the expected value of a fight leading to the disarmament of one or the other state plays no role in either state's decision about whether to fight.[30]

We have identified, then, two explanations for what Clausewitz calls "real war": inconsistent expectations of the consequences of fighting (which may be the result of private information which the adversaries have an incentive to misrepresent) and inability to enforce all the terms of a negotiated settlement, either of which can prevent acceptance of a compromise agreement as an alternative to war. These are, of course, the "rationalist" explanations for war identified by Fearon (1995a). However, Fearon leaves unclear what war will occur if agreement proves to be impossible, and at times assumes that the only alternative to a prewar negotiated settlement is a war leading to the disarmament of one side or the other. But if the only alternative to the status quo were a total war then

[27]For a more complex model of a war with these properties (which, however, does not take into account the possibility of ending the war with a negotiated settlement), see Smith (1998). Morrow (1985) is also relevant. Note that while wars may take this form, they need not.

[28]Morrow (1985) decomposes war into military engagements that affect the disagreement outcome associated with subsequent bargaining, but does not distinguish between these two effects.

[29]Fearon has developed a model in which there is always some concession that the defender can make that it will prefer to fighting even though any concession will lead to further concessions. However, he assumes that the alternative to compromise is, unlike the analysis offered here, always total war rather than just a limited conflict over the territory that might have been conceded (Fearon 1995c). For other discussions of the possibility that the terms of a negotiated settlement might alter the relative bargaining power of states, see Wagner (1994) and Fearon (1995a).

[30]Another possibility is that a state may have a military advantage which could be reduced or nullified by countermeasures if its adversary were aware of it. The problem in such a case is not, as it might appear, the existence of private information, but the fact that the other state could not commit itself not to take action to nullify its opponent's advantage if it knew about it. Once the advantage is gained a negotiated settlement based on the new distribution of capabilities may become possible.

war would be far less frequent than it has been. We have seen that states can avoid absolute war by fighting limited conflicts instead, which lead to more consistent estimates of what an absolute war would be like or restrict the conflict to those issues that cannot be made part of a self-enforcing agreement. By doing so they can hope to influence the terms of any settlement they accept in lieu of fighting an absolute war, and thus real war can seem profitable *ex ante* even when both states prefer the status quo to the expected outcome of absolute war.

Real wars therefore have much the same relation to absolute war that crises are commonly believed to have to war—they are conflicts that may enable states to reach agreements that allow them to avoid even more violent conflicts.[31] It is for that reason that one can meaningfully say that war is a form of bargaining. Note well, however, that such wars can be profitable only if a negotiated settlement of absolute war is possible, since their function is to influence the terms of that settlement. Moreover, a state might believe it would be worth fighting to improve the terms of such a settlement even though it would not be willing to fight an absolute war. If so, the possibility of a negotiated settlement would make war more likely, not less.

For negotiated settlements to be possible, however, they must be self-enforcing, that is, the parties to them must find that abiding by them is in their own self-interest. If the parameters defining the disagreement outcome that motivated an agreement remain the same, then each state can expect that the other will continue to have an interest in abiding by it since an attempt to renegotiate it would be expected to lead to the same outcome. If these parameters change, however, then states may have an incentive to violate the agreement; and if they are expected to change then there may be no agreement that both states are willing to accept.

One way the parameters of war can change is through economic development: a rapidly growing state can be expected to become militarily stronger over time. Another is through consolidation of the gains a state has made in absorbing someone else's territory (as with Iraq in Kuwait, or Germany or Japan in the run-up to World War II). A third is through a change in interstate alliances: if one's ally joins one's enemy, then one's enemy becomes relatively stronger. For all these reasons a bargain struck with one's enemy today may be overturned tomorrow when one's enemy is stronger. A state that has the opportunity to weaken decisively a potential enemy today, however, can avoid having to make unattractive bargains tomorrow, and therefore there may be no compromise settlement that such a state is willing to accept as an alternative to the disarmament of its enemy. Thus if a state that fights with that aim is successful it will not stop until it has accomplished its goal. The expected value of absolute war is relevant to understanding why a war might occur in this case, but only because a negotiated settlement is not possible.[32]

Concluding Comments

What is a war? This is a question that is surprisingly hard to answer. Schelling and Clausewitz agree that, in Schelling's words, "War is always a bargaining process . . ." (Schelling 1966, 142). However, war is also usually a contest between opposing military forces. The difficulty lies in understanding the relation between the two.

Most of the rational choice literature on the causes of war tries to sidestep this difficulty by equating war with a costly lottery and analyzing the prewar choice between a negotiated settlement and the costly lottery of war. War is indeed a costly lottery, but so are commercial airline flights, horse races, strikes, and economic sanctions. If any inferences based on this representation of war are to be meaningful we must know what empirical interpretation to give to the parameters that define the costly lottery of war.

The most common answer to this question is to define war as a costly lottery with two possible outcomes, victory and defeat, and then claim that expanding this lottery to include all the possible outcomes of war would not change the results of the analysis.[33] I have shown that if the outcome of war is determined by bargaining after war has begun then this claim cannot be justified, and any inferences based on it cannot be trusted.

I have argued that the most plausible interpretation of the relation between war and bargaining is to interpret war as a competitive struggle to determine the disagreement outcome in a bargaining game in which states use force and the threat of force to influence other states. A state is in the strongest bargaining position if its use of force against another state will be unopposed, and that is why states might hope to gain by disarming other states. But because a contest in which states try to disarm each

[31] Compare the analysis offered here, for example, with the recent history of the Korean War by Stueck (1995), one of the main themes of which is that the Korean War can usefully be considered to have been a substitute for World War III.

[32] For a fuller discussion, see Fearon (1995a, 404–408).

[33] The most elaborate example of this claim is presented in Morrow (1985).

other will be both risky and costly, there is likely to be some concession that one state could make to the other that both would prefer to participating in this contest. Thus the disagreement outcome in the bargaining associated with war is a military contest in which each tries to disarm the other completely. Such a contest can be represented as a costly lottery with two possible outcomes, victory and defeat, and probabilities that reflect the distribution of military capabilities. This explains why the standard representation of war seems reasonable.

However, if negotiated settlements of such a war are possible then any war that actually occurs will not necessarily be a contest in which states try to disarm each other, but may be instead a contest that is fought to influence expectations about the consequences of fighting such a war. That is why Pillar, in his study of peace negotiations, found that ". . . to the extent that military activity affects the outcome of the conflict, it does so less through direct physical effects than through changes in the belligerents' expectations . . ." (Pillar 1983, 220). It also explains why ". . . the opening of peace negotiations usually must await a common perception of the trend of military events" (Pillar 1983, 199).

A war fought to influence expectations about the outcome of a contest in which states try to disarm each other can also be represented by a costly lottery. However, I have shown that such a lottery need bear little resemblance to one representing a war that could lead to the disarmament of one side or the other—it is even possible for a state to improve the expected outcome of peace negotiations by losing battles, if in so doing it alters its opponent's expectations concerning the costs that would be associated with a fight to the finish.

It is the difference between the two types of costly lottery that is the source of confusion and error, a confusion that characterizes not only the theoretical literature on war but the empirical literature as well. For example, Stam (1996) does not distinguish between military stalemates and negotiated settlements in coding the outcomes of wars, nor does he distinguish the information conveyed by military operations from their effect on the relative power of the combatants, which makes his empirical results hard to interpret. Similarly, Walter, in an influential article on civil wars, does not distinguish between military defeats and outcomes in which one side or the other simply agreed to cease fighting and disband (1997, 344–345). This seems to imply that if, in a civil war, a government unilaterally instituted political reforms which deprived a rebel group of its support so that it stopped fighting, this outcome would be coded as a "decisive victory" rather than a "successful settlement," which makes her empirical results difficult to interpret as well.

Walter argues that her empirical results support the hypothesis that "the critical barrier to civil war settlement" is the lack of an enforcer of an agreement, which she interprets as confirming the common belief that it is the unenforceability of agreements in an anarchic environment that makes military conflict possible (Walter 1997, 360). The analysis offered here implies that this common belief is mistaken. If one group controls an indivisible good and another is confident enough of victory to try to seize it, then the availability of an agreement to divide the good between them may indeed prevent a military conflict. However, if in exactly the same situation the second group is not confident enough of victory then a military conflict will not occur, but introducing the possibility of an agreement to divide the good between them may cause such a conflict by enabling the dissatisfied group to use violence as a means of renegotiating its distribution. Thus the availability of an external enforcer of agreements may increase the probability of war, not reduce it.[34]

Ideally we might want to make it easy for states to agree to a compromise settlement as an alternative to war, but have political leaders believe that starting a war is very dangerous. Unfortunately it is not possible for both to be true. Thus the possibility of negotiated settlements calls into question at least one version of the obsolescence of war thesis (like strikes, the fact that the last war was horrible in retrospect does not imply that the next war will seem horrible in prospect), as well as many discussions of deterrence, which often assume that states can make take-it-or-leave-it offers.[35]

The analysis offered here has two important limitations: (1) it assumes that there are only two states in the world, and (2) it assumes that these states are unitary actors, and therefore ignores all the principal-agent problems associated with the conduct of war.[36] It none-

[34]In addition, the main parties to a conflict may have inconsistent expectations about what sort of agreement a third party would support, and war between them can be a means of forcing the third party to reveal its preferences. These issues are discussed further in Wagner (1999).

[35]The problem is nicely illustrated by the following quotation from a prescient US intelligence analyst prior to the war over Kosovo: "Confronted with a take-it-or-leave-it deal, Milosevic may opt to risk a NATO bombing campaign rather than surrender control over Kosovo. He may assume he can absorb a limited attack and the allies will not support a long campaign" (quoted in Sciolino and Bronner 1999). This explanation of Milosevic's behavior implies that the importance of the bombing campaign was not the damage it did, but what it revealed about public support in the NATO countries for military action against Serbia.

[36]For an interesting discussion of the second set of issues that complements the analysis offered here, see Goemans (2000).

theless clarifies the effect of the distribution of power, expectations of stalemate, and first-strike incentives on the probability of war, and enables us to see clearly for the first time the relation between crisis bargaining and peace negotiations and between total and limited war. It also clarifies the relation between war and other forms of inefficient conflictual behavior such as strikes and economic sanctions: like them, war involves the renegotiation of some existing agreement by temporarily reverting, or threatening to revert, from a point on the bargaining frontier (the status quo) to the disagreement outcome.

As in other bargaining situations, private information plays a key role in explaining why agreement on a negotiated settlement as an alternative to war is not immediate. However, the process of revelation of private information in the case of war is quite different because the outcomes of military operations are not as subject to control by the bargainers as are decisions about what offers to accept and when to accept them. And the fact that the information revealed by war is as important in determining the outcome as are its physical consequences influences states' decisions about what sort of war to fight.

If states choose not only how long to fight but also (within the limits of available technology) what sort of war to fight, then understanding the relation between war and bargaining is crucial to explaining the great variety of military conflicts that have occurred. The Militarized Interstate Disputes dataset contains 718 interstate conflicts between 1816 and 1974 in which states used force, only ninety-one of which led to enough casualties to be called a war (Gochman and Maoz 1984, Table 4). Jack Levy's well-known collection of data on wars between 1495 and 1975 includes both the War of the Bavarian Succession, which lasted for one year and led to three hundred great power battle deaths, and World War II, which lasted for six years and led to nearly thirteen million great power battle deaths (Levy 1983, Table 4.1). Clearly explaining the differences among interstate conflicts involving the use of force is as important as explaining why force is used at all.

Some of these differences are the result of differences in military technology. Others, however, are the result of decisions based on expectations of how fighting will end, many of them made after fighting has begun. It is common to attribute these decisions either to the irrationality of individual decision makers or collective irrationality caused by principal-agent relations.[37] Such explanations may often be correct, but we cannot be sure without knowing what rationality would lead one to expect. I hope that the analysis offered here will contribute to our understanding of this question.[38]

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[37] See, for example, Iklé (1991).

[38] This is an issue that was also raised by the psychological literature on crisis bargaining. For a pioneering analysis of how governments learn from battlefield experiences, see Gartner (1997). However, Gartner focuses on how governments determine whether military operations are having the desired results, and not on the relation between those results and the outcome of bargaining. See also Bennett and Stam (1996).

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