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Power-sharing and Civil Conflict

Scott Gates

Centre for the Study of Civil War
International Peace Research Institute, Oslo, (PRIO), and
Norwegian University of Science and Technology (NTNU)
scott@prio.no

Kaare Strøm

University of California, San Diego, and
Centre for the Study of Civil War
International Peace Research Institute, Oslo, (PRIO)
kstrom@ucsd.edu

Abstract: In this paper, we examine the argument that power-sharing arrangements may reduce the risk of civil conflict by lessening the stakes of democratic political contestation by guaranteeing a role in the post-conflict government. As such, power-sharing implies the pursuit of one conception of democracy, ex post fairness, at the expense of others, such as ex ante uncertainty or performance sensitivity. We develop a game-theoretic model of power-sharing and show that its ability to promote civil peace depends in part on the relative military capacity of the fighting parties as well as the potential role of "spoilers." Our results demonstrate that in societies that are divided into antagonistic groups of roughly equal ability, and where the costs of conflict are high, power-sharing will be more likely than more majoritarian institutions to induce groups to quit fighting. Where groups are less evenly matched, however, power-sharing may produce undesirable consequences (e.g. non-proportional distributions of power, positive incentives for spoilers), thereby failing to reduce the risk of civil conflict.

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Civil conflict is by far the dominant form of armed conflict in the contemporary world (Gleditsch et al., 2002), and its costs are enormous (Collier et al., 2003). In recent years, civil war has left approximately 800,000 dead in Rwanda alone, 350,000 in Angola, and 150,000 in Liberia. Building peace by preventing civil conflict is therefore a paramount objective for national and international policy makers.

Peace-building involves manifold challenges. The most pressing of these is typically to prevent a return to overt violence. Peace agreements themselves are not enough, as each of the above cases testifies. In each of these cases (Rwanda, Angola, and Liberia), peace agreements were signed, in all cases several such documents. Yet, these agreements failed, with a horrendous human toll. Peace-building requires ongoing efforts to contain and prevent violence as well as the establishment of viable civilian institutions for the long haul. These challenges can be particularly profound in societies that have already experienced conflict or that are susceptible to such conflicts, and the search for remedies is therefore particularly critical under such circumstances.

Thus, peace-building requires not only committed efforts to end an ongoing conflict, but also the painstaking design of credible institutions for civilian, and preferably democratic, rule. These issues of governance do not replace, but are superimposed upon, those of conflict resolution and prevention. Successful civilian governments not only have to prevent conflict but also to provide various public goods and other policies that their populations desire. Most polities around the world face such problems of governance, and many are torn by domestic conflict that could erupt into violent struggle.Sadly, peace-building is typically most difficult where it is at the same time most critical.

Many problems can threaten the effectiveness of peace agreements and peace-building efforts, including shortcomings in the areas of coordination, capabilities, and credibility among the guarantors (third parties) of the agreements (Stedman and Rothchild 1996). But as Stedman (1997) points out, the greatest risk to peace-building in post-conflict situations comes from "spoilers" – leaders and parties that have the capacity and will to resort to violence to subvert peace processes through the use of force. Conflict may result whenever there is at least one player that has both the capability and incentive to act in this way.

The Remedy of Power-Sharing

Among the remedies commonly prescribed for societies threatened by civil conflict are power-sharing arrangements designed to accommodate the various actual or potential parties to a civil conflict. In many cases, the critical players that power-sharing arrangements seek to integrate are precisely "spoilers" and their respective constituencies. The main premise of power-sharing is to guarantee each of the critical players, those capable of acting as spoilers, a significant payoff from cooperation and peaceful behavior. The hope is that *ex ante*, each player will see the payoff from peaceful cooperation as superior to the expected returns from violence, and that *ex post* the rewards from cooperative behavior will sustain this expectation.

Power-sharing thus helps reduce the threat of conflict by giving all potential parties to any conflict a stake in peaceful cooperation and a set of mutual guarantees of security and the protection of basic interests. Both of these features are likely to lessen the probability that any group will perceive significant threats to its interests. This may be especially true for groups that are small or have few of the resources necessary for armed conflict. Power-sharing arrangements are designed specifically to reduce the uncertainty found in democratic societies by limiting the ability of larger social groups or electoral winners to use the power of the state for sectional

purposes. Given that such governance solutions thus promise to minimize the risk of a recurrence of conflict, it is no surprise that power-sharing arrangements have found widespread favor among analysts and peace-makers (Sisk 1996).

Previous research on power-sharing has identified this practice as the political institutionalization of conflict resolution. Institutionalization implies that power-sharing must be embedded in key aspects of political decision making and that it must be given sufficient procedural entrenchment and "stickiness" to form the basis for credible commitments. Power-sharing arrangements vary in the institutions involved, as well as in the entrenchment or rigidity of these procedures. Probably the most well-known example of rigid power-sharing existed in Lebanon from 1943 to 1975, which was governed according to a very specific and static formula. Other examples include Colombia (1958) and Northern Ireland (1974). Less rigid forms of power-sharing allow grand coalitions to be formed not only on the basis of predetermined ethnic groups, but on an evolving basis through the party system. South Africa exemplifies this type of "self-determined" arrangement. South Africa's power-sharing arrangement is also noteworthy for its time limitation, a transitional period of five years. Such constraints address one of the key weaknesses of the power-sharing enterprise – the rarity of circumstances under which both advantaged and disadvantaged parties are willing to accept such arrangements (Spears, 2000).

Power-sharing arrangements have been implemented in a wide variety of forms. Typically, power-sharing includes institutions that mandate joint control of the executive, minority veto power, group autonomy and special forms of legislative representation. Such regimes might feature collegial executives, grand coalition governments, federalism or administrative decentralization, super-majority requirements for policy making, judicial

institutions designed to protect group or individual rights, and electoral systems chosen to provide guarantees of continuous representation.

The most prominent model of power-sharing is Lijphart's (1977) consociational democracy, which has four definitional components: (1) a grand coalition, (2) a system of mutual veto power, (3) proportional representation, and (4) segmental autonomy, such as federalism. Jointly, these features help alleviate the grievances of potential spoilers, ensure the representation of a broad range of social interest, and guarantee that no group will have to suffer policies that are considered seriously detrimental to its own interests.

Is Power-Sharing Democratic?

Although power-sharing is possible without democracy, such arrangements, and other peace-building efforts, are most commonly associated with attempts to build democratic governance. Whether power-sharing is effective in preventing civil conflict is a different concern from whether it embodies a form of government that meets our standard of democratic rule. In principle, power-sharing may be peace-inducing without being democratic, or vice versa. Yet, in practice we expect these two concerns to be related. If power-sharing, for example, violates basic democratic values, it is unlikely to promote peace in the long run. Indeed, the claim commonly made for power-sharing institutions is that they promote not only civil peace but also democracy. This is indeed Lijphart's (1999) claim concerning his broader, but closely related, notion of consensus democracy. Consensus democracy is, according to Lijphart, not only more peaceful, but also more democratic in its design and benign in its effects, compared to majoritarian democracy. This is, at least in major part, because of not only the security guarantees, but also the egalitarian effects, of this kind of power-sharing. The implicit conception embodied in this of

democracy is that of policy outcomes that tend to win popular approval, the focus lying with the *ex post* fairness of rewards. In particular, the concern here is that no significant group should receive a payoff that falls below a certain level of acceptability.

Yet, the democratic credentials of power-sharing institutions are not self-evident. To see why this is so, consider two other normative ideals common to many prevalent conceptions of democracy, namely the ideas of (1) *ex ante* uncertainty and (2) procedural performance sensitivity. The first of these ideals is reflected in Przeworski's (1991) conception of democracy as the institutionalization of uncertainty (typically expressed through the electoral channel – see also Schumpeter 1942 and Strand 2007). In this elegant conception, which has become increasingly influential since its first publication, Przeworski identifies democracy with the *ex ante* openness of the process of democratic contestation. The greater the *ex ante* uncertainty about political contests, the more democratic the regime.

Yet, this conception does not exhaust the meaning that we commonly give to the democratic political process. For example, we probably would not consider a political system as perfectly democratic in which political contests were entirely unpredictable, but subject to a lottery governed by a random number generator. Democracy, in most people's minds, also implies that political rewards are governed by a process that reflects popular sovereignty and responds to the performance of the political contestants as judge by their political principals. Thus, Strøm (1992) thinks of democratic competitiveness in terms of the sensitivity of the political outcomes (e.g. election results) to the performance of the relevant players.

In consolidated democracies, these three considerations typically do not conflict too starkly with one another. Uncertainty and competitiveness under generally accepted rules lead to outcomes that at least over the long haul satisfy most players' conceptions of fairness. Yet, when

institutions may be viewed as biased, or when the future is heavily discounted, as may well be the case in less consolidated polities, participants may perceive a conflict between these different conceptions of democracy. In such circumstances, power-sharing arrangements may tap concerns about *ex post* fairness more effectively than would more competitive and majoritarian institutions.

On the other hand, power-sharing institutions clearly run counter to the spirit of Przeworski's concerns, as it is in their very nature to reduce *ex ante* uncertainty about feasible political outcomes. In the same way, power-sharing essentially works to reduce competitiveness by reducing the volatility of political outcomes and thus effectively to blunt the impact of democratic competition. Thus, power-sharing effectively means giving priority to one aspect of democracy, what we have referred to above as *ex post* fairness, over other aspects such as *ex ante* uncertainty and procedural competitiveness.

Modeling Civil Conflict Resolution

Using the tools of game-theory we now aim to model the environments characterized by group contestation and the threat of armed violence in order to better understand the choices actors make in such settings. We shall seek to determine the circumstances under which civil peace is attained, as well as the conditions that may give rise to different equilibria. By formalizing the arguments in the literature on power-sharing, our game theoretic analysis will offer a theoretical contribution to our understanding of such institutions.

Self-enforcing Democracy

The idea of democracy as an equilibrium whereby compliance is self-enforcing was first articulated by Przeworski in 1991. Fundamentally this means that democracy is sustained by

"self-interested strategic compliance" whereby no actor has an incentive to unilaterally change the system. Similarly we argue the case for power-sharing as a solution to the spoiler problem critically depends on such self-enforcing mechanisms. We begin with a presentation of Przeworski's model of democracy as an equilibrium, which features *ex ante* uncertainty. We then present our own model of power-sharing with a focus on *ex post* proportionality. This model contains a detailed analysis of a spoiler's outside option to engage in armed conflict. From our analysis of these games, we derive a number of conclusions.

Przeworski's (1991) game involves two players. These players can be considered to be political parties, ethnic groups, or even military groups having a choice to compete in an election or to subvert or spoil the democratic process.[1] Presume for now, as Przeworski (1991) implies, that the contest is winner-take-all. The outcome of an election results in winning or losing respectively. The subjective probability of winning is p_i. As such, the game is a lottery, which underscores the uncertainty inherent in democracy. Players also have the choice to subvert the election or comply. The game is solved by comparing the discounted payoffs associated with spoiling an election and complying and losing. Losers in the first election will comply if the payoff associated with complying is greater than that associated with spoiling the election or if the value of future election payoffs is greater than the immediate rewards of spoiling a single election.

The implication is that even under conditions of winner-take-all, losers of an election have an incentive to participate rather than subvert given the value of future payoffs that would come with participation. Subversion of the election process may lead to immediate gains (in one round of the game subversion is preferred to losing, but long-term gains are more valuable.

[1] See Przeworski (1991) for a formal explication. See.Fearon (2006) for an elegant reformulation of Przeworski's model.

The logic of power-sharing

Przeworski's (1991) and Fearon's (2006) focus on "loser-takes-nothing" political institutions to demonstrate how losers still have an incentive to participate in the democratic process. We refer to this as the Przeworski-Fearon model of self-enforcing democracy. Fearon's (2006) game is a modified version of Przeworski's (1991) original model and self-enforcing democracy is Fearon's term.

We draw on this formulation and further develop it to model the underlying logic of Przeworski and Fearon and adopt it to power-sharing institutions in post-conflict environments. This game also involves two players competing over the political pie. While both Przeworski and Fearon feature the probabilities of winning the election presuming winner-take-all majoritarianism, in our attempt to model the features of power-sharing, we consider p_i to be the proportion of the total pie allocated to a political party, *i*, in accordance with the results of an election and the nature of the political institutions. Such proportionality stems from several of the political institutions that define a power-sharing system, especially a grand coalition and proportional representation. In a majoritarian system, the winner of the election captures the entire political pie. In a power-sharing system, the pie is divided more proportionally.

To keep the model simple we assume only two players, *i* and *j*; the model, however, could be extended to N-players without altering the basic results. The game is played with imperfect and complete information, meaning that the players make their choices simultaneously but with full information about their opponent's capabilities and payoffs.[2] Each player has a

[2] Some interesting insights could be obtained by analyzing an incomplete information game, but we will reserve this for future work. Note also in contrast to Powell (1996), Fearon (199x), or Fearon and Laitin (2003), our results are not driven by incomplete information -- nor are they

choice to engage or not in armed conflict; *fight* or *not fight*. To not fight is equivalent to Przeworski's notion of complying. The value associated with not fighting is determined by the ex ante rules of the election. To fight is the equivalent of subverting or spoiling an election. Given a choice to fight by an actor, we determine each actor's optimal fighting effort given the opponent's corresponding choices and resource constraints using the technology of a Contest Success Function (CSF), which is explicated below.[3] Fighting is costly in that a player must pay (in terms of expending resources) to fight.[4] We solve for the Cournot equilibria using standard constrained maximization techniques.

The basic feature of a power-sharing arrangement is the allocation and distribution of political powers to all relevant political parties. To capture this concept, we model the division of the political pie, such that $p_i + p_j = 1$, where p is a share of the pie. As such, there is no *ex ante* uncertainty and no *ex post* surprises either. The share of political power (rather than the uncertainty of democracy) is emphasized. Accounting for future years of peace (and thereby avoiding costly war) the payoff to party i, given a choice of participating in a power-sharing arrangement and not playing the role of spoiler is thus $p_i / (1 - \delta)$.[5]

These choices are analyzed in three different environments: symmetric, asymmetric, and extremely asymmetric resource endowments. In turn, we compare the payoff from fighting in

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driven by commitment (Powell, 2004). The sequence of moves plays no role in the game. Choices may be made at different moments in time, but we assume that given imperfect information, choices are made as if they were simultaneous.

[3] James Tullock (1980) conceived of the concept of a contest success function, but Jack Hirshleifer, Herschel Grossman, and Stergios Skaperdas have done the most to apply it to conflict settings. See Hirshleifer (2001) and Skaperdas (1992 and 1996) as representative works.

[4] We do not explicitly model the destructiveness of war and its effect on total income. We only examine the cost of waging war. In other words we only worry about the cost to the players themselves.

[5] The discount factor is δ, and the sum of discounted payoffs is $\sum_{t}^{\infty} p\delta^t = \frac{p}{1-\delta}$.

different circumstances to the payoff s associated with the *ex ante* lottery of an election, the *ex post* allocation of a power-sharing arrangement, and an ex ante lottery associated with the segmentation of political institutions. Ultimately, we identify the set of equilibrium strategies supported under these different conditions. We begin our analysis by starting with an analysis of the payoffs associated with the decision to fight. Given a choice to participate in an election, we consider fighting as an outside option.

Fighting as an outside option

Allocating a slice of the political pie to spoilers, (i.e. those capable of engaging in an armed conflict), is frequently touted as a path to peace. To model the role of spoilers, we assume that actors have a choice of complying with the results of the election or subverting the election – just as in Przeworski's (1991) game. A player (the leader or designated leader of a group) acting as a spoiler can restart the armed conflict as an outside option to striking a bargain over his share of p_i.

We develop this part of our analysis through the use of a contest success function (CSF).[6] (This aspect of our model is a modification of Hirschleifer (1991)). CSFs offer a flexible technology for modeling the dynamics of civil conflict.[7] The contest success functions are widely employed by economists to study conflict and for their theories of conflict are analogous to production functions in production theory or utility theory for consumption theory (Skaperdas 2008). We proceed now with a description of our contest success function.

[6] We use the ratio form of the CSF rather than the logistic difference form. See Hirschleifer (1989). For good treatments of the different functional forms of CSFs, see Hirshleifer (1989), Skaperdas (1996), and Neary (1997).

For our contest success function, we assume that each group has some initial endowment of resources (human and natural), $r_i > 0$, which are allocated into productive and appropriative effort. Appropriative effort is conceptualized as fighting effort, such that $F_i \in [0, r_i]$. In this regard, fighting is costly. This essentially means that groups are subject to a budget constraint, which we model in terms of a resource endowment. Such endowments may come in the form of physical capital, such as loot obtained from diamonds or drugs, or from human capital, which would include such factors as group identity and ideology that allow the group to provide solidary norms and functional benefits.[8]

In the absence of enforceable contracts, which is implied given the choice to restart the conflict, all productive effort is assumed to create a collective income Y, which is divided between the two groups according to their appropriative effort. Collective income is assumed to be the sum of productive effort (resource allocations minus the costs of fighting), such that $Y = (r_i - F_i) + (r_j - F_j)$; which can also be expressed as $Y = E_i + E_j$.[9] The proportion of collective income that group i gets is a function of its fighting effort divided by the total fighting effort of both groups, such that:

$q_i = \dfrac{F_i}{F_i + F_j}$. This is the basic CSF.

Given this division mechanism, each group maximizes its share of the collective income, $Y_i = q_i(Y)$; which implies that all productive income is commonly pooled and can be captured by either side through fighting, as such:

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[8] See Weinstein (2007) and Gates (2002) for discussions of resource constraints. See Brehm and Gates (1997) for more on functional benefits and solidary norms. In brief, functional benefits are the non-pecuniary rewards members of an organization earn by simply performing a task they value – doing the work is a reward in itself. Solidary norms regard the inter-connectedness of a team; such notions of comradeship are essential to an effective army.

[9] Productive effort for group i is $E_i = r_i - F_i$.

$$Y_i = \frac{F_i}{F_i + F_j}[(r_i - F_i) + (r_j - F_j)]. \qquad (1)$$

We assume that both groups simultaneously make their allocation decisions; we therefore adopt the Cournot solution concept and solve for the respective reaction curves for the two groups. Substituting group j's reaction curve into equation 1 and solving for F_i again, we find group i's equilibrium level of fighting effort is a function of initial resources. This holds as long as the joint equilibrium is an interior solution; in other words, $F_i < R_i$ and $F_j < R_j$. (We will discuss corner solutions – non-interior solutions, which constitute extreme resource asymmetries below). Thus, if the equilibrium fighting efforts of i and j (F_i^* and F_j^*) jointly compose an interior solution (i.e., $F_i^* \in [0, r_i]$ and $F_j^* \in [0, r_j]$), then the equilibrium levels of fighting for *i* and *j* are:

$$\frac{F_i^*}{F_j} = \frac{(r_i - F_i) + (r_j - F_j)}{F_i + F_j} \qquad (2)$$

and

$$\frac{F_j^*}{F_i} = \frac{(r_i - F_i) + (r_j - F_j)}{F_i + F_j} \quad . \qquad (3)$$

If *i* and *j* have equal endowments of *r*, such that $r_i = r_j$, the equilibrium level of fighting is:

$$F_i^* = F_j^* = \frac{r_i + r_j}{4} \qquad (4)$$

Under such conditions, one half of each group's resources will be allocated to fighting. (A quick numerical application demonstrates this. Assume $(r_i, r_j) = 200$. By plugging these values into equation 4, we find that $(F_i, F_j) = 100$. The portion of each group's resource endowment devoted to fighting will be ½). From this result, the role of resource endowments in determining the level of fighting is evident. The role of resource endowments constitutes an important aspect of both

contest success function (with regard to the relative allocation of fighting effort) and the inherent logic of power-sharing (or the proportional division of the political pie).

When group j's endowment is lower than group i's, j's marginal utility of fighting will be relatively higher than i's. This can be seen readily through a numerical example to calculate the best response for each actor and to determine the equilibrium result given these endowments. Assume that (r_i, r_j) = (200, 100). Plugging in these values into equation 4, we find that (F_i, F_j) = (75, 75) and (E_i, E_j) = (125, 25); however, given the equality of F (that is the absolute output of fighting, not the proportional effort invested in fighting), income for both groups is also equal, such that (Y_i, Y_i) = (75, 75). Under such conditions group j devotes a substantially greater proportion of their endowed resource to fighting than group i does. In this example, group i devotes 3/8 of its endowment to fighting while, group j spends 3/4 – so, given these respective resource endowments, j devotes proportionally twice as much to fighting as i does. More generally this can be seen mathematically; whereby differentiation of $Y_j = q_j Y$ produces the following:

$$\frac{\partial Y_j}{\partial E_j} = \frac{F_j}{F_i + F_j} \qquad (6)$$

and

$$\frac{\partial Y_j}{\partial F_j} = \frac{F_i(E_i + E_j)}{(F_i + F_j)^2}. \qquad (7)$$

The partial derivative $\frac{\partial Y_j}{\partial E_j}$ represents the marginal utility of fighting, while the partial derivative $\frac{\partial Y_j}{\partial F_j}$ can be considered to be the marginal utility of engaging in productive output. Equation 5 shows that as j expends resources on productive output, group i will capture most of them;

whereas in equation 6, an investment in fighting will mean retaining a greater share for the less well endowed group. Fighting is relatively more attractive to the poorer group. They have less to lose by engaging in armed conflict and will therefore devote most, if not all, their resources to fighting. A group with a poorer resource endowment has a higher marginal utility for fighting than a marginal utility for productive activity. This is the essential result of Hirshleifer's "Paradox of Power" (2001)[10] and is also found in different models by Butler and Gates (2007), and Mehlum, Moene, and Torvik (2006). Our model presented here follows from Hirshleifer. We shall refer to this as the "nothing left to lose" results, with an acknowledgement to Janis Joplin.

When r_j is very small, then it will serve as a constraint on group *j*'s ability to fight. Fighting effort will rise eventually to consume all resources, such that $F_j = r_j$.[11] Such a condition will produce a corner solution. If the disparity in endowments is great enough, group i may be able to expend more resources on both fighting and productive output, whereby $F_i > F_j$.

These results demonstrate the incentive for a group to engage in armed conflict, particularly when a group is disadvantaged relative to another and thereby have a higher marginal utility for fighting.

Power-sharing equilibrium under different conditions

To evaluate the effectiveness of power-sharing to a potential spoiler, we need to compare the relative value of p_i offered to a group as compared to the value afforded through armed conflict, $q_i(Y)$. This is the central feature of our game – the comparison of the relative value of accepting the ex ante certainty of a power-sharing arrangement to the value of fighting (the degree of fighting being determined by the contest success function). Ultimately, as long as the value of

[10] This article first published in 1991.
[11] F_j cannot exceed r_j

power-sharing is greater than the share a spoiler could earn through fighting, the party will agree to the power-sharing agreement, such that $p_i / (1 - \delta) > q_i Y$.[12] Substituting this into equation 1,

$$\frac{p_i}{1-\delta} > \frac{F_i}{F_i + F_j}(r_i - F_i)(r_j - F_j)\,. \qquad (7)$$

From equation 1, the importance of the ratio of fighting capacity and the relative resource endowments from which the combatants can employ in their fighting efforts are evident in comparison to the value of a power-sharing arrangement. Below we shall devote more attention discussing how these variables affect the success or failure of power-sharing in inducing belligerents to stop fighting.

Power-sharing Equilibrium condition 1. Evenly matched belligerents

Equation 8 can be used to determine those circumstances that are favorable or unfavorable to power-sharing arrangements. First consider situations in which the two belligerent groups are evenly matched. Under such conditions, both sides possess relatively symmetric resource endowments and both groups devote half their resources to fighting such that $q_i(Y) = q_j(Y)$. To determine the attractiveness of a power-sharing arrangement, the value of p_i and p_j must

[12] We do not conduct a dynamic analysis here, but we could. Drawing on Hirshleifer (2001), the dynamic aggregate income (as opposed to aggregate income, which is speficified above), can be specified such that collective income is assumed to be the sum of productive effort, $Y = A[(r_i - F_i) + (r_j - F_j)]$, where A is "a total productivity index". In a growing economy, resource inputs rise over time; in a shrinking economy they will fall. What happens under conditions of a growing pie? It should mean increasing the absolute income even when p remains the same. The value of the future in a growing pie environment will make it easier to meet a group's reservation level – meaning that peace is more likely. The discovery of oil in Sudan serves as an example. If the pie shrinks, this can lead to instability as the outside option in absolute terms becomes relatively more attractive. This would explain the collapse of a number of power-sharing arrangements. This dynamic analysis can then be tied to a discussion about the nature of governance with power-sharing arrangements – are they more likely to lead to a growing pie? Are the prospects for future growth of the political pie under different political systems (power-sharing vs. other arrangements)?

be evaluated relative to the returns from fighting, $q_i(Y)$ and $q_j(Y)$, respectively. In this case, in which the two parties are symmetrical, the value of a proportional share of the political pie is identical By definition p_i, is strictly greater than $q_i(Y)$, since fighting consumes resources. The implication is that under conditions in which groups are roughly balanced, power-sharing is relatively easily attainable.

More formally we can state this as:

Proposition1 (Power-sharing under Symmetry): Given relative equally endowed parties, i and j, a proportional division of political resources will be preferred to fighting.

Under conditions of parity, such that both parties a symmetrically endowed, we should expect favorable conditions for a power-sharing accord. Although not a textbook case of power-sharing, the Dayton Accord and the resulting peace in Bosnia-Herzegovina serves as a good example. Lesser known cases of the Comoros and Djibouti serve as better examples. The power-sharing arrangement in the Comoros involves electing presidents for each of the three islands and a union president, a proportionally shared budget and shared power. Different governmental offices are located on each of the islands and institutions such as the Customs Service have inclusive membership with mutual veto (Agreement on the Transitional Arrangements in the Comoros, Moni, 2003).

Power-sharing Equibrium Condition 2. Asymmetry

Consider now an asymmetrical relationship, such that one group possesses a greater endowment of resources than the other. As demonstrated in the section above, under conditions of asymmetry, the less-powerful group will exhibit a higher marginal return from fighting. When one group is poorer than the other (but $F_j < r_j$), the share of p_j needed to insure that group j does

not fight will need to be disproportionately large. Power-sharing agreements are less likely to hold under conditions of inequality between groups (as long as the inequality is not too large).

Proposition 2 (Power-sharing under Asymmetry): Given unequally endowed parties, such that $q_i(Y) > q_j(Y)$ *and* $F_j < r_j$, *the weaker party (group j) will preferred to fight rather than agree to a proportional division of political resources.*

Such asymmetries between the government and a rebel group are typical of most civil conflicts. In nearly all cases of asymmetry, the government will hold the advantage. Superficially, asymmetry would appear to be an advantageous environment for power-sharing. After all, it would appear that the weaker party could be "bribed" with a guaranteed share of the political pie. Alas it's not that easy. The paradox of power result, driven by the higher marginal utility for fighting, makes it much more difficult for power-sharing arrangements to work under conditions of asymmetry. As long as the weaker party is not completely outmatched in terms of resources that can be devoted to fighting, it will prefer to fight than accept a stake in the political that is proportionally allocated. The implication is that in order to bribe such a group, p will have to be distributed non-proportionally.

The "nothing left to lose" result, whereby the weaker side is more attracted to fighting, can lead to another problem -- one of adverse selection. Say a power-sharing deal is struck between two relatively balanced groups, extremists in one or both groups have an incentive to break away and form their own group (as long as $r_j > F_j$). Splinters and renegades thereby actually increase the marginal utility of fighting. A relevant example is in Northern Ireland, where the two moderate sides signed onto the Good Friday power-sharing agreement, while Sinn Fein (Adams) and DUP (Ian Paisley) did not. In Niger, after a short minor war with the FLAA (Front de libération de l'Aïr et l'Azaouad, Air and Azawad Liberation Front), the government

began peace negotiations involving power-sharing arrangements. In all the government went through five rounds of negotiations with Tuareg rebels that resulted in a splinter faction starting the conflict anew after each round. Only with the sixth round did peace stick. And even then only for a while, in February 2007 the MNJ (Mouvement Nigérien pour la justice, Niger Justice Movement), a Taureg dominated group led by Aghaly Alambo, a former FLAA member, initiated an armed struggle against the government of Niger. Splinter groups in Mali and in Indian Assam have renewed armed combat after a power-sharing agreement had been reached between the original two belligerent parties.

Power-sharing Equilibrium Condition 3: Extreme Asymmetry

When the degree of asymmetry between groups *i* and *j* are much greater, such that $F_i > F_j$, group i may be able to expend more resources on both fighting and productive output than group j. Under such conditions,r_j will serve as a constraint on group *j*'s ability to fight. Since F_j cannot exceed r_j, when $F_j = r_j$, fighting effort consumes all resources. This is a corner solution. The prospects of an ex ante guarantee piece of the political pie in contrast to certain outcome of losing an armed contest will certainly look attractive.

Proposition 3 (Power-sharing under Extreme Asymmetry): Given extremely unequally endowed parties, such that $q_i(Y) > q_j(Y)$ *and* $F_j > r_j$, *the weaker party (group j) will agree to a proportional division of political resources rather than continue to fight.*

Examples of such extreme asymmetry are evident in two forms. The first is typically characterized by a minor conflict involving a small rebel group such as in Macedonia. In the case of Indonesia, the tsunami of December 2004 totally devastated Aceh and the resource base for the GAM, transforming what had been an asymmetric conflict became an extremely asymmetric

conflict. A peace agreement involving some devolution of local powers was signed in the aftermath of the natural disaster and peace has endured.

The second type of asymmetry results from the presence of a third party security guarantor. British forces in Sierra Leone serve as an example of how a symmetric conflict was suddenly transformed into an extremely asymmetric one.

Empirical Examination

Table 1 shows a list of recent power-sharing arrangements as compiled by Anna Jarstad (2008: 112). The first two columns are taken directly from Jarstad. We have added additional columns to highlight the variables that are shown to be important in our analysis as well as a conclusion regarding whether the power-sharing arrangement led to peace or not. The third column is derived from the Cunningham, Gleditsch, and Saleyan (2008) dataset on rebel capabilities and the Buhaug, Gates, and Lujala (2008) transformation of the variables regarding relative fighting capability. Relative capability is coded as parity, asymmetry, and extreme asymmetry at the time that the peace-agreement was signed. The fourth column indicates whether a third party security guarantor was present. These data are derived from Fortna (2008: 77) and the Uppsala Conflict Database (http://www.pcr.uu.se/gpdatabase). The fifth column regards whether the power-sharing arrangement led to a durable peace or not. We ascribe a notion of a weak peace, one simply entailing the return to armed conflict as defined by the Uppsala Conflict Data Program (involving armed conflict between the government and a political group where at least 25 battle casualties occur). The temporal domain is 1990—2007.

Table 2 groups all countries included in Table 1 in a contingency table, whereby the success of power-sharing arrangements can be compared across the relative fighting capacity of

the belligerents. In this table we stick to the coding of relative fighting capability as determined by Cunningham, Gleditsch, and Saleyan (2008). A plurality of power-sharing cases (17) involves asymmetric opponents, which resulted in a non-durable peace. There are no cases of a power-sharing agreement involving an extremely weak rebel group that returns to armed conflict. The x^2 statistic is 6.13, which is statistically significant at p=0.047.

Table 2 incorporates the role of a third party security guarantor, thereby transforming the conflict from parity to one of extreme asymmetry. This recoding increases the number of cases of extreme asymmetry from four to twelve. Two cases of third party intervention do not serve to guarantee peace. They are Syria in Lebanon and Russia in Tajikistan. UN Peacekeeping missions are strongly associated with stable power-sharing arrangements. The x^2 statistic is 9.97, which is statistically significant at p=0.007. We regard these results to be largely confirming of the propositions derived from our formal model.

Discussion

We derive several conclusions from our model. First, the values of p_i and q_i must be relatively similar. In other words, if a player is unlikely to win an election, but likely to win a war, war is likely. As such, democracy is not self-enforcing, if the value of q_i gets too high relative to p_i. This result is similar to Chacon, Robinson, and Torvik (2006), who demonstrate that party's decisions to play by the rules of democracy or spoil the process ultimately depend on both the probability of winning an election *and* the probability of success in a violent conflict. Their example of Columbia's *La Violencia*, the incredibly bloody civil war fought by the Liberal and Conservative parties 1946—1950, further demonstrates this. Any assessment of power-sharing as an instrument of peace-building has to account for the threat of spoilers.

The second conclusion we draw is that proportionality can serve to lower the risk of spoilers. Proportionality increases the value of the present for the losers of an election by giving them a piece of the political pie. By focusing on p as a share (or a slice of the political pie), we feature the ex post aspects of power sharing and contrast them with the ex ante features of p as an election lottery. Without accounting for risk, a p that represents chance in a lottery is mathematically the same as the p which designates a guaranteed share of the total payoff.

The third conclusion has to do with the relative power of different groups in a society and how this affects the attractiveness of fighting. The paradox of power has particular relevance for power-sharing and the threat of spoilers. Moreover, it helps explain the problem of extremist splinter groups that re-start conflicts. Given a strong incentive to fight (most evident in cases of asymmetry between the groups), military leaders will be regarded to provide a more credible threat of the military option. Therefore even as representatives of a political party the transition to leader of the army would be less costly. Thus we should expect military politicians to be in a stronger bargaining position. Military leaders will be "unfairly" rewarded in a power-sharing arrangement due to the threat of them choosing war over a more proportional division of the political pie.

Implications

The resolution of civil conflict is among the most pressing issues facing the world today. Civil conflicts account for the vast majority of armed struggles in the contemporary world and the vast majority of casualties from war. The prevention and resolution of civil conflict is therefore a paramount concern among scholars and the policy community alike. It is especially important to understand the challenges faced by societies that are trying to resolve or prevent civil conflict while at the same time build institutions of political democracy, perhaps for the first time, as in

Iraq or Afghanistan today. It is important to improve upon the existing knowledge of institutions conducive to peace-building, specifically by carefully considering the different aspects of power-sharing and their compatibility with other social goals such as democratic accountability and the provision of public goods. In this paper, we have discussed the advantages as well as the disadvantages of power-sharing arrangements in societies threatened by civil conflict. A significant and prominent literature touts the benefits of such institutions when civil peace is under threat. In this paper, we have tried to identify the merits of power-sharing institutions but also the limitations and risks that they carry. In order to illustrate some of the pros as well as cons of power-sharing, we have presented a simple model in which two parties in a conflict-prone society have to choose between peaceful and belligerent behavior under either majoritarian or power-sharing institutions. Our results show that power-sharing has powerful attractions when the parties are evenly matched and the costs of war high, but that under other circumstances such institutions may have less intuitive and desirable consequences. Specifically, when the parties to a potential conflict are less evenly balanced but each party still retains a credible military threat, power-sharing may favor and at the same time radicalize the weaker party in a way that suggests that adverse selection of belligerent groups may occur. These results suggest that the unintended consequences of power-sharing arrangements are well worth further study, and that practitioners should approach such solutions with an understanding of the risks as well as the benefits that they may entail.

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Table 1. Recent Power-sharing Accords and Peace-building, 1990--2007

Conflict Location (Jarstad, 2008: 112)	Name and Year of Latest Peace Accord (Jarstad, 2008: 112)	Relative Strength of Combatants (Cunningham, Gleditsch, Saleyan, 2008; Buhaug, Gates, Lujala, 2008)	Security Guarantor (Fortna, 2008: 77; Gates & Strøm, 2008)	Durable Peace (Uppsala Conflict Database, June 2008)
Afghanistan	Mahipar Agreement 1996	parity	No	No
Angola	The Lusaka Protocol 1994	parity	No	No
Bangladesh	Chittagong Hills Tracts Peace Accord 1997	asymmetry	No	No
Bosnia and Herzegovina	The Dayton Accords 1995	parity	Yes	Yes
Burundi	Global Ceasefire Agreement 2003	asymmetry	No	No
Cambodia	The Paris Agreement 1991	asymmetry	No	No
Chad	Yebibou Agreement 2005	asymmetry	No	No
Colombia	Los Pozos Accord 2002	asymmetry	No	No
Comoros	Agreement on the transitional arrangements in the Comoros 2003	parity	No	Yes
Congo -- Brazzaville	Accord de Cessez-le-Feu et de Cessation des Hostilités 1999	asymmetry	No	No
Côte d'Ivoire	Pretoria Agreement on the Peace Process in Côte d'Ivoire 2005	asymmetry	No	No
Croatia	The Erdut Agreement 1995	asymmetry	Yes	Yes
DRC	Inter-Congolese Political Negotiations – The Final Act 2003	asymmetry	No	No
Djibouti	Accord de reforme et concorde civile 2001	parity	No	Yes
El Salvador	Chapultepec Peace Agreement 1992	asymmetry	No	Yes
Georgia (Abkhazia)	Declaration on measures for a political settlement 1994	asymmetry	Yes	Yes
Guatemala	Agreement for a firm and lasting peace 1996	asymmetry	No	Yes
Guinea Bissau	Abuja Peace Agreement 1998	parity	No	No
Haiti	Governor's Island Agreement 1998	asymmetry	No	No

India (Bodoland)	**Bodoland Autonomous Council Act 1993**	**asymmetry**	**No**	**No**
India (Tripura)	**Memorandum of Settlement 1993**	**asymmetry**	**No**	**No**
Indonesia (Aceh)	**Memorandum of understanding between Indonesia and GAM 2005**	**Extreme asymmetry**	**No**	**Yes**
Israel (Palestine)	**The Sharm-el-Sheik Memorandum Wye II 1999**	**Asymmetry**	**No**	**No**
Lebanon	**Ta'if Charter 1989**	**parity**	**Yes**	**No**
Liberia	**The Accra Comprehensive Peace Agreement 2003**	**asymmetry**	**Yes**	**Yes**
Macedonia	**The Ohrid Agreement 2001**	**Extreme asymmetry**	**No**	**Yes**
Mali	**Pacte National 1992**	**asymmetry**	**No**	**No**
Mexico	**San Andrés Accord 1996**	**asymmetry**	**No**	**Yes**
Moldova (Dniestr)	**Memorandum on the Basis for Normalization of Relations 1997**	**parity**	**Yes**	**Yes**
Mozambique	**Acordo General de Paz 1992**	**parity**	**No**	**Yes**
Niger (Air and Azawad)	**Agreement on Lasting Peace Settlement (Niger – ORA) 1995**	**asymmetry**	**No**	**No**
Papua New Guinea (Bougainville)	**The Bougainville Peace Agreement 2001**	**parity**	**No**	**Yes**
Philippines (Mindanao)	**Mindanao Final Agreement 1996**	**asymmetry**	**No**	**No**
Rwanda	**The Arusha Accords 1993**	**parity**	**No**	**No**
Senegal (Casamance)	**General Accord between Senegal and MFDC 2004**	**asymmetry**	**No**	**Yes**
Sierra Leone	**Abuja Ceasefire Agreement 2000**	**parity**	**Yes**	**Yes**
Somalia	**The Cairo Declaration on Somalia 1997**	**parity**	**No**	**No**
Sudan	**Sudan Comprehensive Peace Agreement 2005**	**asymmetry**	**No**	**Yes**
Tajikistan	**The Moscow Declaration 1997**	**asymmetry**	**Yes**	**No**

Uganda (UNRF II)	**The Yumbe Agreement 2002**	**Extreme asymmetry**	**No**	**Yes**
UK (Northern Ireland)	**The Good Friday Agreement 1998**	**Extreme Asymmetry**	**No**	**Yes**
Yugoslavia (Kosovo)	**Kosovo Peace Agreement I 1999**	**Asymmetry**	**Yes**	**Yes**
Yugoslavia (Slovenia)	**Brioni Agreement 1991**	**Asymmetry**	**No**	**Yes**

Table X. Relative

	Peace	War	
Parity	Bosnia-Herzegovina Comoros Djibouti Moldova Mozambique Papua New Guinea Sierra Leone (7)	Afghanistan Angola Guinea Bissau Lebanon Somalia (5)	12
Asymmetry	Croatia El Salvador Guatemala Liberia Mexico Senegal Sudan Kosovo Slovenia Georgia (10)	Colombia Congo-Brazzaville Côte d'Ivoire Bangladesh Burundi Cambodia Chad DRC Haiti India (Bodo) India (Tripura) Israel-Palestine Mali Niger Philippines Rwanda Tajikistan (17)	27
Extreme Asymmetry	Indonesia (Aceh) Macedonia Uganda (UNRF II) UK (4)	(0)	4
	2|1	22	43

$x^2 = 6.13$
df = 2
p = 0.047

Table Y.

	Peace	War	
Parity	Comoros Djibouti Moldova Mozambique Papua New Guinea (5)	Afghanistan Angola Guinea Bissau Somalia (4)	9
Asymmetry	El Salvador Guatemala Mexico Senegal Sudan Slovenia (6)	Colombia Congo-Brazzaville Côte d'Ivoire Bangladesh Burundi Cambodia Chad DRC Haiti India (Bodo) India (Tripura) Israel-Palestine Mali Niger Philippines Rwanda (16)	22
Extreme Asymmetry	Bosnia-Herzegovina Croatia Georgia (Abkhazia) Indonesia (Aceh) Liberia Kosovo Macedonia Uganda (UNRF II) UK Sierra Leone (10)	Lebanon Tajikistan (2)	12
	2|1	22	43

$x^2 = 9.97$
df = 2
p = 0.007