Recruitment and Allegiance

THE MICROFOUNDATIONS OF REBELLION

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Civil war is fought between two political organizations, the state and a rebel group. Myriad theories of civil war have examined the role of state institutions and state strength, but little attention has been devoted to theorizing about rebel organizations themselves. The organizational structure of rebel groups is examined to understand patterns of recruitment and allegiance. Drawing on principal-agent analysis of participation and incentive compatibility constraints and the analytical tradition of rent-seeking contests, a model is developed to demonstrate that three factors—geography, ethnicity, and ideology—play an important role in determining military success, deterring defection within the rebel group, and shaping recruitment.

INTERNAL COHESION IN AN ARMED REBEL GROUP

What motivates a person to risk his life in armed rebellion? Why continue to expose oneself to life in the bush where one may be killed at any minute without home, family, or other comforts? Or, from the perspective of the rebel group, how does a rebel group maintain organizational cohesion and deter defection? How does a rebel group sustain itself? To answer these questions, we have to examine the motivations of those who join and stay in a rebel army. In this study, I attempt to answer these questions by focusing on how geography, ethnicity, and ideology are linked to patterns of recruitment and allegiance among rebel groups.

A plethora of theories explain the causes of revolt, rebellion, and civil war, yet few provide insights for answering questions regarding the management of a rebellion. Although a fair amount of work has focused on the institutional features of the state as they relate to civil war (Hegre et al. 2001), the organizational structure and problems of agency within a rebel group are for the most part ignored by scholars of civil conflict. By examining the incentive systems used by different armed rebellion groups, loot seeking, ethnic-nationalist, separatist, and ideological civil wars can be distinguished. Most economic models of civil conflict ignore politics, whereas most political scien-

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tists studying civil war ignore economic motivations. The approach used here allows me to account for ideology, nationalism, and ethnicity while featuring economic motivations. The article proceeds as follows. After a short introduction, a simple model of military competition is presented. Then I present a model of recruitment and allegiance for a rebel group without competition from the government. The next section shows how these patterns of recruitment and allegiance change in an environment of competition with the government. The article concludes with a discussion of the broader implications of this study.

SUPERVISION, OVERSIGHT, AND CONTROL WITHIN A REBEL ARMY

This article features an analysis of enforcement mechanisms available to a rebel group. Under normal economic conditions in peacetime, contracts within the public and private sectors (legal/noncriminal) are regulated by the state. Enforcement of contracts is exogenous to the organization itself. But with organizations that exist outside the state, enforcement must be endogenized. By definition, a rebel group exists outside the legal realm of the state, and contract enforcement is the root of recruitment and allegiance. It therefore exhibits many of the internal organizational characteristics of organized criminal groups, such as the Mafia. Indeed, much of the modeling presented in this study is derived from research on the economics of organized crime (Fiorentini and Peltzman 1995). The difference, though, is that unlike a mafia, a viable rebel group needs an army capable of engaging the government militarily. Military success serves as the fundamental objective of a rebel group, requiring a large labor force (ranging from 500 to 5,000 troops).[1] A rebel army's ability to succeed depends on its ability to recruit and motivate its soldiers to fight and kill.

This article is not about the dynamics of protest and revolution, whereby participation spreads across a population like a prairie fire (Kuran 1989).[2] Rather, a rebel group is assumed to have already formed and is engaged in armed military combat with governmental forces. As an existing hierarchical organization, I presume that many collective action problems associated with rebellion are overcome.[3] So rather than focusing on the factors that trigger or inhibit rebellion, this study examines the sustenance of such groups, more specifically the critical factors that affect recruitment and compliance in an armed rebel group. In this manner, the model developed below explores the theoretical foundations underlying the duration of civil war (Collier, Hoeffler, and

1. See Collier (2000) for a more elaborate discussion of the differences between the organization of household theft, mafia-style protection rackets, and rebel groups. Mueller (2001), however, argues that criminal activity and modern civil war are virtually indistinguishable—that the rebels of the wars of today are nothing but thugs and criminals.

2. Also see Roemer (1985) for a different perspective on revolutions.

3. Lichbach (1995) provides a good overview of the mechanisms applied to overcome collective action problems associated with rebellion. Hierarchy is one of the primary mechanisms. Miller (1992) provides a more general theoretical argument as to how hierarchy overcomes common collective action problems. Herbst (2000) provides a superb review of the literature regarding the organization of rebellion.

Soderbom 1999; Fearon 2001) rather than the factors affecting the onset of civil war (Collier and Hoeffler 2001; Hegre et al. 2001).

Geography is a fundamentally important variable for understanding the supervision, oversight, and control of a rebel organization. Nevertheless, few have systematically considered the role of geography with regard to rebel movement organization. Yet there is little doubt that geography plays a big role for military conflict, especially in regard to the supervision and control of an army. A civil war inherently involves two military organizations competing over the control of territory, either in the form of a rebel group trying to take control of the state (e.g., Nicaragua, Kampuchea) or attempting to secede (e.g., Sri Lanka, Sudan). Military tactics and strategies must address geographical issues, shaping the nature of engaging the enemy in battle, supplying troops, and the supervision, control, and recruitment of the troops.

Geographical distance is obviously important, but distance can be applied to a variety of concepts as well. One can also apply the concept of distance to ethnicity. Although less clearly measurable than geographic distance, ethnic distance constitutes the sense of group identity that an ethnic or national group feels with respect to one another and to other groups. An ethnically homogeneous rebel group with a clear sense of group identity, therefore, exhibits narrow ethnic distances, whereas an ethnically diverse group possesses great ethnic distance. This study demonstrates how ethnic distance affects the organization of rebellion. Distance can also be measured ideologically. Ideological distance can be represented in terms of mapping preferences in an issue space as used in spatial models of elections and committees. Anyone familiar with social choice theory has already thought in terms of ideological distance when thinking of distances between ideal points. This study analyses how these three forms of distance critically affect enforcement and recruitment in a rebel group.

How a group positions itself geographically and how it is spread about an ideological or ethnic space determine and shape the organizational structure of a rebel group. Recent research exploring the economic motivations underpinning rebellion differentiates between grievance-rebellion (loot seeking) and grievance-rebellion (ideological/justice seeking) (Collier and Hoeffler 2001). Loot-seeking groups focus on capturing mining operations (e.g., diamonds in Angola, Sierra Leone, and the Congo) or drug processing and shipping facilities (cocaine in Colombia). Most of this research features the distribution of wages and other pecuniary benefits ("splitting the loot").[4] Undoubtedly, such economic or "greed-based" motivations affect how rewards are allocated and distributed within a rebel organization. Yet such analysis of the economics of civil conflict, reacting against the extensive literature that has featured the roles of ideology and ethnicity in rebellion, subsumes ideology and ethnicity as causal factors and emphasizes the economic motivations for rebellion. Alternatively, works by Sambanis (2000) and Fearon and Laitin (1999) feature the distinctive aspects of ideological and ethnic-based civil wars. This study integrates the roles of ethnicity and ideology into an economic framework for analysis. Even for the most blatant loot-seeking groups, ethnicity, ideology, and geographical proximity play a direct role in shaping the pattern of compliance and enforcement in a rebel army. Likewise, ideologically

4. Also see Addison, LeBillion, and Murshed (2000); Azam (2001); and Collier and Hoeffler (2001).

and ethnically motivated groups do not motivate their members exclusively with nonpecuniary awards. With regard to the motivations for civil conflict, rather than taking an either/or perspective, this study examines all motivating factors as a way to understand enforcement, oversight, and control in a rebel group.

ENFORCEMENT WITHIN A REBEL GROUP WITHOUT COMPETITION FROM THE GOVERNMENT

To help clarify the role of a rebel group's enforcement technology, a simplified case of the rebel group is considered in isolation from the state. I start with a rebel group, l, based at some geographic location, designated as x_l, engaged in a variety of military activities M.[5] The group's base is centered by its leader or principal. All followers, members of the rebel group, or subordinates are referred to as agents for the rebellion.[6] For the most part, the choices and preferences of a single agent with respect to the principal (the rebel group) serve as the analytical focus of this study. An agent, a, located geographically at x_a is given a specific military task, $m \in M$ for each period. Define $s \in S$ as the actions of agents, which may or may not be consistent with M. If the agent chooses to accept the task, he opts for action s_a, consistent with military task m_l, and receives in return benefits, $b_a \in [0, b_{\max}(m_l)]$, meaning that benefits can vary anywhere between 0 and $b_{\max}(m_l)$, a maximum level of benefits associated with a particular task. All benefits are assumed to be net benefits so that costs of engaging in rebel activities are included.

The nature of benefits will vary considerably across different kinds of rebel groups. Loot-seeking groups will rely on wages and other pecuniary rewards distributed from their rent-seeking activities. Ideological groups anchor the other extreme, relying on the nonpecuniary rewards of fighting the "good fight." All groups distribute benefits that exhibit a mixture of pecuniary and nonpecuniary rewards. Pecuniary rewards consist of wages, one-shot monetary rewards, and other tangible rewards such as drugs or alcohol. Indeed, drugs play a big role in several civil wars (e.g., Sierra Leone). Nonpecuniary rewards can be broken down into two types, functional and solidary (Brehm and Gates 1997, 75). Functional rewards are already incorporated into the agent's utility through the value associated with performing the task as assigned. The value associated with such functional preferences varies across different types of rebel groups. All things being equal, ideological groups will tend to be characterized by higher functional rewards among their members than loot-seeking groups by being part of the "good fight." Alternatively, though, Mueller (2001) provides evidence demonstrating that groups can appeal to the sadistic tendencies of certain elements of any

5. The model presented in this study is rooted in theories of the firm and other applications of principal-agent theory (Holmstrom and Milgrom 1991, 24-52). I also draw on work featuring the difficulties of applying theories of the firm to public bureaucracy (Brehm and Gates 1994, 1997). But I rely most heavily on work that has analyzed the economics of organized crime (Fiorentini and Peltzman 1995). The model below is derived and modified from Polo (1995, 87-109) and follows in the tradition of works that examine enforcement schemes with repeated discounted games.

6. To distinguish between the principal (the rebel leader) and the agent (the subordinate rebel group member), principals will be represented by feminine pronouns and the agent with male pronouns.

population (thugs and hooligans) by giving them license to commit acts of extreme violence. Functional awards relate directly to the utility derived from performing a designated military task, m_l.

Solidary attachments stem from the camaraderie among members of an armed rebel group. Spending day and night together in life-threatening situations is certainly going to result in the development of strong bonds between members of rebel group. Ethnically homogeneous groups with a strong sense of identity vis-à-vis the rest of the population will, ceteris paribus, tend to be characterized by higher solidary preferences than other types of rebel groups. The extent to which a group can rely on pecuniary benefits depends on the group's resource base. Given the nature of their activity, loot-seeking groups generally possess more resources than other types of rebel groups. Nonpecuniary benefits, alternatively, reflect the nature of the agent with respect to the group. For agents to derive solidary benefits or functional benefits, they must derive utility from working for and associating with the group. We can characterize a rebel group's benefit stream allocated to a rebel agent to be a function of pecuniary rewards, functional rewards, and solidary norms.

Any action other than the assigned task, m_l, observed by the leader of the rebel group (the principal) is regarded as a defection, and the agent receives a punishment of $p_l \in [0, p_{\max}]$, where $p_{\max}$ is the maximum penalty. The maximum penalty ($p_{\max}$), death, is normalized such that $U_a(s_a, b_l, p_{\max}) = 0$, $\forall s_a \in S$, $\forall b_l \in b_l$.

The utility functions of the principal and the agent, $U_l(s_a, b_l, p_l)$ and $U_a(s_a, b_l, p_l)$, are assumed to be continuous and quasi-concave in s_a, b_l, and p_l(action, benefits, and punishment). I also assume a cardinal von Neumann–Morgenstern utility function. I also presume risk neutrality for all players. In addition, I assume that $\partial U_l/\partial b_l < 0$ and $\partial U_a/\partial b_l > 0$; this follows in that the organization pays out benefits to the agent. Furthermore, it is assumed that a principal's utility is bounded, such that all benefits paid out for tasks performed are limited, whereby $\forall m_l \in M$, $\exists\, b_{\max}(m_l)$: $U_l(m_l, b_{\max}(m_l), 0)$. That is, for all military tasks, there exists a maximum level of benefits associated with a task and no punishment. There also exists a reservation level of benefits for the agent, $b_{\min}$: $U_a(m_l, b_{\min}, 0) = u^*$. This reservation level is the minimally acceptable level of benefits for the agent; otherwise, he will not work for the rebel leader (meaning he will not join the group). This reservation level defines the agent's participation constraint, which, in turn, determines the level of recruitment to the rebel army.

A compatibility constraint defines the level of benefits needed to ensure compliance or allegiance within an organization. Such a contract offers to the cooperating agent the following payoff, $V_a(c)$:

$$V_a(c) = \sum \delta^t U_a(m_l, b_l(c), 0), \tag{1}$$

where $\delta^t = 1/(1 + r)$; δ is the discount factor, and r is the discount rate. Groups that can offer nonpecuniary rewards, both functional and solidary rewards, ceteris paribus, exhibit higher levels of benefits for cooperation, $b_l(c)$. In turn, leaders of ethnic groups, in particular, have an incentive to inculcate a sense of membership and solidarity among their kinfolk and thereby construct an ethnic identity (Fearon and Laitin 2000).

Consider the participation constraint. This constraint essentially is a comparison of the utility offered by the rebel group compared to some ex ante outside option. Recruit-

ment depends on fulfillment of this constraint. In other words, no one will join an organization unless the organization can offer a greater payoff over time. This condition can be satisfied when all outside options offer poor alternatives or when the rebel movement can offer greater rewards through wages from loot-seeking activities or from the intangible rewards that stem from fighting for an ideological or ethnic separatist cause. Defining an agent's outside option as u^*, the participation constraint is

$$V_a(c) \geq V_a^* = \frac{u^*}{1-\delta}. \tag{2}$$

For the theory of the firm and almost all principal-agent models, for that matter, the choice of whether to participate in an organization is voluntary. But in the case of rebel groups, this is often not the case. Participation is often forced at gunpoint. This is particularly true among rebel groups that use children as "recruits." What does this mean for the participation constraint? For the agent, it means a choice between joining the rebel group or being killed. Death would bring the discounted payoff stream to 0, meaning that $u^*/1-\delta = 0$. Thus, under forced participation, the participation constraint requires only that $V_a(c) > 0$. This, in turn, implies a reservation benefit level for the agent, $b_{\min}$, such that $U_a(m_l, b_{\min}, 0) = u^* = 0$. Examples of forced recruitment by rebel movements abound (e.g., Mozambique, Sierra Leone). This sets up an interesting situation for a rebel group that requires forced recruits; how does such a group induce compliance when the members never wanted to participate in the first place? By examining the compatibility constraint, this question can be answered.

The compatibility constraint relates directly to issues of enforcement. Rather than assuming that all rebel agents happily follow all orders, it is assumed here that all agents possess a latent opportunism that leads them to prefer an action other than the military task assigned to them, such that $m_l \neq ! s_a^{'}$. Obviously, this is not a realistic assumption. In another context (public bureaucracies), Brehm and Gates (1997) demonstrate that there are a number of problems with making this assumption. The purpose of making this assumption is to establish a worst-case scenario for enforcement, which is the focus of this article.

Given such an incentive to defect, how does a principal develop an incentive mechanism that induces compliance? Armed rebellion is a life-and-death situation in which noncompliance could have very serious consequences. Enforcement is critical. As seen above, the leader of a rebel group can offer an incentive scheme to a subordinate agent through a benefit stream for compliance and punishment for defection. Punishment can take on a wide variety of forms, ranging from a single-period, relatively minor reduction in utility to an extremely harsh punishment with permanent ramifications, even killing the defecting agent. Indeed, punishment in rebel groups is often harsh. In some rebel groups, for example, the penalty for failing to sound the alarm when a friend deserts is execution (Children under arms 1999, 22).

One of the central problems to be explored in this study is that a rebel leader cannot always effectively punish a defecting agent. Of course, punishment is costly to the agent, such that $\partial U_a/\partial p_l < 0$. The critical factor, though, is the probability of punishment, P. I assume that the probability of punishment is a function of the geographical

distance gradient between the agent and the rebel leader, $D(a)_l$, that accounts for physical distance weighted by mountainous terrain and dense vegetation; the nature of the defection taken by the agent, s_a'; and a random factor affecting the detection of the defection, θ. An additional assumption is that the probability of punishment decreases with respect to geographical distance, $D(a)_l$, such that $\partial p_l / \partial D(a)_l < 0$. Geographical distance serves to decrease the chances of detection as well as the ability of the organization to actually carry out the punishment.

The present value of the utility from defection, $V_a(d)$, can be shown as follows:

$$V_a(d) = U_a(d) + \delta \frac{P_l V_a'(p) + (1-P) U_a(s_a', 0, 0)}{1-(1-P)\delta}. \tag{3}$$

This equation breaks down as follows: $U_a(d)$ is the utility derived from defection for one period before detection, such that $U_a(d) = U_a(s_a', b_l, 0)$. Recall that s_a' means that agent a takes an action contrary to m_l. Because the principal has not yet detected defection, there is no punishment for this one period. After detection of defection, a permanent punishment scheme, if successfully applied, P_l, leaves an agent with a discounted utility stream, such that $V_a'(p) = \sum \delta^t U_a(s_a', 0, p_l)$. An unsuccessful punishment, $1 - P_l$, alternatively leaves the cheating agent with a single-period payoff of $U_a(s_a', 0, 0)$. Note that $\partial V_a(d)/\partial P < 0$, meaning that the utility associated with defection decreases with the principal's ability to punish.[7]

All of this essentially boils down to an agent's comparison between the utility associated with defection with a probability of punishment and the utility for cooperation. Formally, an agent will participate and follow orders in the rebel organization if the value of cooperating is equal or greater than the value of defecting, such that

$$V_a(c) \geq V_a(d). \tag{4}$$

From this setup, a proposition regarding the contract offered by a rebel organization facing no competition from the state can be formulated. Such a contract offered to a cooperating agent can be designated as $b_l^o(c)$, whereas the offered punishment for defection is $p_l^o(d)$.

Proposition 1. A long-term contract for a given military task, m_l, which satisfies the participation and the incentive compatibility constraints is characterized by $p_l^o(d) = p_{\max}$ and

$$b_l^\circ(c): \frac{U_a(m_1, b_l^\circ(c), 0)}{1-\delta} = \max\left\{\frac{u^*}{1-\delta}; U_a(d) + \delta \frac{(1-P_l)U_a(s_a', 0, 0)}{1-\delta(1-P_l)}\right\}, \tag{5}$$

where $b_l^o(c)$ is decreasing or at least constant with respect to the probability of successfully imposing a punishment, p_l, or equivalently constant or increasing with respect to

7. This is a point in which this formalization diverges from Polo (1995). Polo assumes that the probability of success in military competition is the same as the probability of successful punishment. By separating these two terms, the factors that determine organizational cohesiveness are differentiated from the factors that produce military advantage with respect to a foe. This is a critical modification if this model is to be relevant to a rebel army.

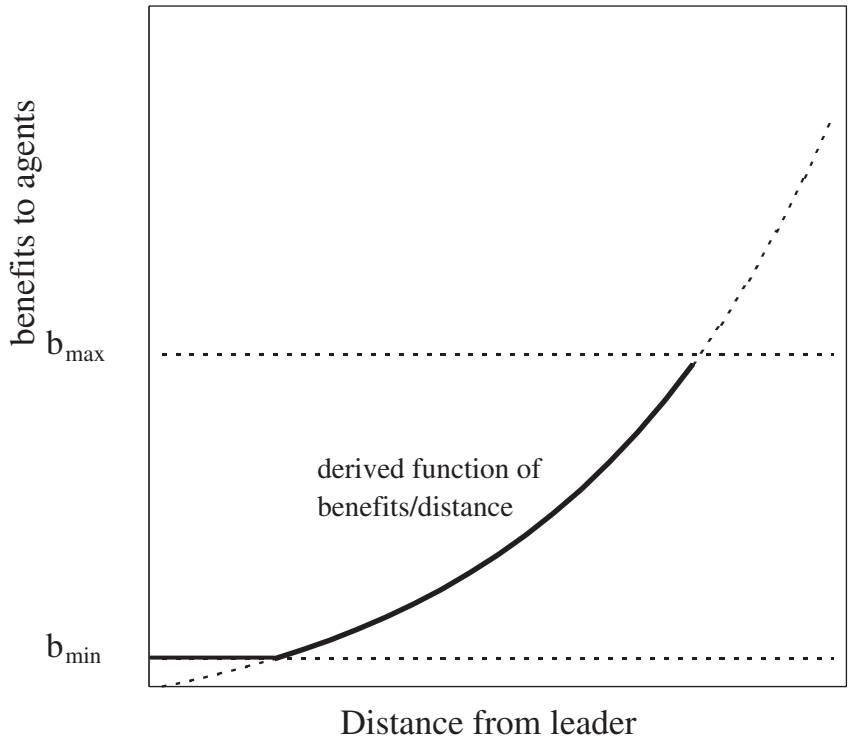

Figure 1: The Relationship Between Rebels' Distance from the Leader and Benefits to Rebellion.
SOURCE: Adapted from Polo (1995).

the distance between the principal and the agent, $D(a)_l \equiv |x_a - x_l|$. The offered contracts thus are specified such that $b_l^o(c)(m_l, D(a)_l) \in [b_{\min}, b_{\max}]$.

Proof (see Polo 1995). As assumed above, $\partial U_l/\partial b_l < 0$, $\partial U_a/\partial b_l > 0$, $\partial U_l/\partial p_l = 0$, and $\partial U_a/\partial p_l < 0$ constitute the nature of the utility functions. For a given task, the outside option $U_a(s'_a, 0, 0)$ is given, and the incentive compatibility constraint given the harshest punishment, $p_{\max}$, depends on the benefit stream $b_1(c)$ and on the probability of punishment, P, which decreases with distance between the agent and the leader, $D(a)_1$. When the agent is very close to the principal, the participation constraint is considered to be binding, and the agent is paid the reservation level of benefits, $b_{\min}$. As the distance between the agent and the principal increases, the incentive compatibility constraint becomes more binding, thus requiring a higher benefit stream to compensate the lower ability to punish defection. From the assumption that $\forall m_l \in M, \exists b_{\max}(m_l)$: $U_l(m_l, b_{\max}(m_l), 0)$, the principal does not offer benefits that exceed $b$max. In this manner, both $b_{\min}$ and $b_{\max}$ are established. QED.

In other words, proposition 1 states that, all other things being equal, for any given task and number of agents, agents closer to the principal will be rewarded less than

those further away. This is portrayed in Figure 1. The *x*-axis portrays the distance between the agent and the principal. The *y*-axis reflects the benefits allocated by the rebel group to the agent. Two critical values, b_{max} and b_{min}, are identified with horizontal lines. As portrayed here, the reservation level of benefits, b_{min}, is positive, implying that recruits are not forced to participate. If forced participation exists, b_{min} will be 0 at the origin. The maximum benefit allocation, b_{max}, shifts up or down the *y*-axis depending on the resources of the rebel group. This, in turn, determines the distance that a group is able to expand. The incentive compatibility constraint is represented as the function rising from the origin bounded between b_{min} and b_{max}. This function indicates how benefits rise in compensation for distance between the rebel leader and the agent.

Substantively, this means that b_{max} determines the extent of a rebel group's geographical zone of operation. Indeed, geographical distance results in a decreased ability to successfully punish defection. If agents are far away, they are going to be more difficult to punish if they choose to defect. This is evident with regard to the relationship between distance, $D(a)_l$, and the probability of punishment, P.

If one thinks in terms of ethnic homogeneity (where the group possesses a clear identity that is perceived to be distinct with respect to the rest of society or, even more potently, an identity that is perceived to be clearly distinguished from the ethnic group that is perceived to control the government), the ethnic distance would be small. The implication is that homogeneous ethnically based rebel groups have more benefits in the form of nonpecuniary rewards to induce fellow members of the same ethnic group to join the rebel movement than an ethnically heterogeneous group. The same logic applies in an ideological space. In this way, as long as ideological or ethnically oriented ethnic groups can distribute solidary and functional rewards, which rise with greater degrees of ethnic and ideological homogeneity, such groups will be able to recruit over a larger geographic area.[8] Of course, if an ethnic group is concentrated in a particular geographic area, the group will only be able to recruit within that range because the group cannot offer the same nonpecuniary rewards to members of other groups.

Can we categorize rebel groups exclusively in terms of geography, ethnicity, and ideology? No. Each aspect of distance plays a role in shaping the organizational structure of a rebel group. Obviously, every rebel group, first and foremost, has to function in the physical world, and geography indisputably has an effect on the organization of a rebel organization. Nonetheless, geography and the effects of geographical distance can be altered by the nature of a group's ethnic or ideological composition. Groups exhibiting narrow ethnic or ideological distance can increase the share of nonpecuniary benefits allocated to rebel agents, thereby raising the value of b_{max}. Yet even the most ethnically or ideologically homogeneous rebel group depends on a minimum level of pecuniary rewards, if not wages, at least food. Clearly, compliance depends on a minimal allocation of pecuniary rewards, but the fact remains that nonpecuniary ben-

8. Ethnic homogeneity may also relate to the ability to punish defection. Homogeneous groups exhibiting little ethnic distance may experience lower probabilities of successful enforcement due to social networks. For reasons of simplicity, only geography, in this model, formally relates to the probability to punish defection. Ethnic homogeneity relates only to the maximum benefit allocation for a task through the distribution of nonpecuniary rewards.

efits go far in maintaining allegiance to a rebel army. We now turn to examine how such factors of distance affect the outcome of military conflict.

MILITARY CONFLICT BETWEEN THE GOVERNMENT AND A REBEL ARMY

This section presents a model of military conflict between a rebel group and governmental forces. The model developed in this section follows from a general class of contest success functions that follows from Tullock's (1974) work on rent seeking and is applied to conflict by Hirshleifer (1989, 2000), Grossman (1991), and others. Skaperdas (1996) provides an axiomatic derivation of a general class of contest success functions. As applied to military conflict, the generalized success function relates to the relative capabilities of two competing sides of a conflict, such that $\pi(K_l, K_g) = f(K_l)/[f(K_l) + f(K_g)]$, where $f(K_l)$ is a nonnegative, increasing function of military capabilities, and π is the probability of military success.[9]

Consider military capability as defined by military effectiveness, distance as it relates to geography, and a stochastic element that incorporates aspects of technology, strategy, and random idiosyncratic factors. Obviously, a rebel force's effectiveness plays a role in determining military success, especially as it relates to troop size and internal cohesion and compliance as explicated in the previous section. Geographical distance is also an obvious variable as it affects the ability to project force. Issues of heterogeneity, whether with respect to ideology or ethnicity, also play a significant role with regard to enforcement and compliance within a rebel organization. Such organizational cohesion can greatly affect the chances of military success or failure. Military success can also be seen to be stochastic in nature because so many unforeseen or even unseen factors determine victory or defeat.

Military capability is defined here as military effectiveness, ε_l, and the rebel group's position in a geographical space, such that there is the distance between the leader, x_l (or the center of the rebel army's activities), and the location of the agent for the rebel group, x_a. Military effectiveness, in turn, depends on some unspecified combination of troop size, military budget, and so on. As such, military capability can be represented as $K_l(x_a; \varepsilon_l, x_l)$. This functional form allows me to consider the relative effects of distance and military effectiveness in a form that is amenable to application in a principal-agent analysis. Formalizing $K_l(\bullet)$, military capability is assumed to take the following form: $K_l(x_a; \varepsilon_l, x_l) = a + \ln(\varepsilon_l) - (x_a - x_l)^2 + \eta_l$, where η_l is a stochastic element and a is a constant. Given this random factor, η_l, there is a probability of success that can be related to the general classes of success functions. The capabilities of the two armies can thus be compared by setting the respective capabilities against one another such that $K_l(x_a; \varepsilon_l, x_l) = a + \ln(\varepsilon_l) - (x_a - x_l)^2 + \eta_l = a + \ln(\varepsilon_g) - (x_a - x_g)^2 + \eta_g = K_g(x_a; \varepsilon_g, x_g)$. For the rebel group to have an advantage in terms of capability, $K_l(x_a; \varepsilon_l, x_l) > K_g(x_a; \varepsilon_g, x_g)$, such that $\ln(\varepsilon_l) - (x_a - x_l)^2 - \ln(\varepsilon_g) + (x_a - x_g)^2 > \eta_g - \eta_l$. For the purpose of deriving a success function, the stochastic element of success is featured. To obtain the success func-

9. Also see Neary (1997, 373-88) for a comparison of rent-seeking and economic models of conflict.

tion, I use a subclass of the generalized form of the success function, the *logit success function* (Hirshleifer 1989, 2000), such that the cumulative density function of the difference between the two stochastic elements, $F(\eta_g - \eta_l)$, is assumed to be logistic:

$$F(\eta_g - \eta_l) = \frac{e^{(\eta_g - \eta_l)}}{1 + e^{(\eta_g - \eta_l)}}. \tag{6}$$

In terms of capabilities, the probability of success can be expressed in this logistic fashion, such that the probability of success, π_l, depends on the proximity of x_a and x_l with respect to x_g (the location of the government's forces). More specifically,

$$\pi_l = \frac{\varepsilon_l / \varepsilon_g}{e^{(2x_a - x_l - x_g)(x_l - x_g)} + \varepsilon_l / \varepsilon_g}. \tag{7}$$

Such a functional form builds on a growing literature on conflict success functions and allows me to explicitly incorporate distance into my analysis. If a military clash occurs at the center of governmental territory, then $x_a = x_g$. The closer x_g and x_l are together, the flatter the function of the probability of success, and the more the ratio of military effectiveness alone matters. If $x_l = x_g$, equation (7) will be the same as the generalized success function, $\pi_l = f(\varepsilon_l)/[f(\varepsilon_l) + f(\varepsilon_g)]$, because the distance term equals 0, making $e^0 = 1$.

ENFORCEMENT WITH COMPETITION FROM THE GOVERNMENT

In this section, not only do the rebel group and state compete militarily, but they also compete for recruits and defectors. In an environment of competition, an agent's participation and incentive compatibility constraint must be modified. The chief modification is that the two groups interact strategically. With competition, the rebel group and the army compete for soldiers. The contract specified by the principal is such that an agent will be subject to military risk, R, if he deserts and joins the other organization, such that $R(g)_l \in [0, R_{\max}]$. (I assume there is no option for simply going AWOL.) If the agent defects by not performing an assigned task, m, while remaining in the rebel group, then $p(d)_l \in [0, p_{\max}]$. Two streams of benefits are also offered: $b(c1)_l$ is paid out to the individual who joins the rebel group initially and is paid out until a defection is detected; $b(c2)_g$ is the benefit stream awarded to the individual who deserts from the governmental army and joins the rebel group. An agent's discounted utility over time under threat of being killed by governmental troops is

$$V_a(C_l) = \frac{\pi_l U_a(m_l, b(c1)_l, 0) + (1 - \pi_l)V_a^o(R_g)}{1 - \delta\pi_l}. \tag{8}$$

$V_a(c_l)$ now constitutes the participation constraint under competition, which mandates a higher stream of benefits to compensate for the risk of being killed by the other army, all other things being equal.

An agent also has the option of defecting without deserting. To assess the present value of defecting without deserting, several factors come into play: the probability of protection offered by the rebel army, π_l; the probability of punishment for defection, p_l; and the benefits associated with these different probabilistic outcomes. The equation representing the present value of defecting without deserting, $V_a(d)$, follows:

$$V_a(d) = \pi_l U_a(s_a^{\circ}, b_l(c1), 0) + (1-\pi_l)V_a(R_g) + \delta \frac{\pi_l\left[P_l V_a(p) + (1-P)U_a(m, b_l(c2), 0)\right] + (1-\pi)V_a(R_g)}{1-(1-\pi)(1-P)\delta}. \quad (9)$$

Agents also face greater opportunities for defection. In addition to defecting by not performing an assigned task, an individual can now desert and join the government's army or join a renegade group. Modifying equation (3) above, the present value of defection and desertion $V_a(dd)$ (and presuming cooperation within the government's army) becomes the following:

$$V_a(dd) = \pi_l U_a(s_a^{o}, b_l(c1), 0) + (1-\pi_l)V_a(R_g) + \delta \frac{\pi_l V_a(R_l) + (1-\pi)U_a(m, b_g(c2), 0)}{1-(1-\pi)\delta}. \quad (10)$$

This equation takes into account the initial period of unsanctioned reward for defection and protection offered by being part of the rebel army, represented through the probability of military success, as defined by π_l. The equation also accounts for the desertion to the government's army, thereby avoiding punishment that would be meted out by rebel organization while also incorporating the benefits offered by the government's army and their protection, $1-\pi_l$, as well as the risk of being killed by former comrades in the rebel army, $\pi_l V_a(R_l)$.

Defection can play an important role in determining a rebel victory. Indeed, Russell (1974) argues that

> no mass rebellion can succeed without defection of some of the regime's armed forces. . . . In a situation where people are rebelling, the behavior of the armed forces has been shown to be a decisive factor in the outcome of the rebellion. For revolutionaries to come to terms with this means that they must devote a great deal of thought to how to encourage defections from the police and the army. (Quoted in Herbst 2000, 26)

The tipping point at which a regime is doomed is when governmental troops join the rebels. In a weak state environment, the government lacks the organizational abilities to ensure allegiance of its troops. Ideologically based groups will have an advantage in inducing defection. Foxhole conversions are all too common. In sharp contrast, ethnically based groups have a more difficult time securing defectors, especially if the identity of the group is with respect to the ethnic group supposedly in control of the government. Then again, such ethnically homogeneous groups also will have less of a problem with defection themselves. Thus, for ethnic rebellions, defection from either army is likely to determine military success.

With regard to military success, the critical probability of success is defined as $V(c_l)_a = V(c_g)_a$ when $b(c1)_l = b(c2)_g = b_{\max}$. These reflect competing benefit structures, where benefits are weighed against the severity of punishments. In an environment of competition, agents will choose the group that offers the highest utility. In turn, a principal will find it most desirable to hire those agents least likely to defect and desert. This leads to another proposition.

Proposition 2. An agent, a, located at x_a such that $\pi_l(x_a; \varepsilon_l, \varepsilon_g, x_l, x_g) \geq \pi_l^o$ chooses the rebel organization, l, and does not deviate thereafter, given that the following conditions hold in equilibrium:

(a) $\pi_l >> \frac{1}{2}$;
(b) $\partial b^o(c1)_l(\pi_l)/\partial \pi_l \leq 0$;
(c) $b(c2)_l = b_{\max}$.

Lemma 2.1. All agents for which the probability of success as part of a rebel group exceeds 50%, $\pi_l > \frac{1}{2}$, can be induced to join a rebel group through the offer of benefits above the agent's reservation level.

Proof. Start with an agent's initial decision to affiliate with a rebel group such that

$$\frac{\pi_l U_a(m_l, b(c1)_l, 0)}{1-\delta\pi_l} = \frac{(1-\pi_l)U_a(m_l, b(c1)_g, 0)}{1-\delta(1-\pi_l)}. \tag{11}$$

By assumption, the marginal utility of benefits depends on the probability of success, π_l, because defeat in the battlefield will terminate the benefit stream. Thus, when $b(c1)_l = b(c1)_g$, the marginal utility of benefits to the rebel group will be greater than for the government if $\pi_l > \frac{1}{2}$, and the marginal utility of benefits will be greater for the government if $\pi_g > \frac{1}{2}$. A Bertrand-type (simultaneous) competition in benefit allocations between the rebel group and the government means that in equilibrium, the rebel group with $\pi_g > \frac{1}{2}$ can pay lower wages than the government that is competing for the same agents.

Lemma 2.2. A rebel group will only recruit those agents for which π_l is high enough to guarantee that the benefits allocated to agents are high enough to ensure no desertion.

Proof. The relevant incentive compatibility constraint (excluding aspects of military risk associated with each side's relative probabilities of success) is $V(c1)_a \geq V(dd1)_a$ or

$$\frac{\pi_l U_a(m_l, b(c1)_l, 0)}{1-\delta\pi_l} \geq U_a(s_a^\circ, b(c1)_l, 0) + \delta\frac{(1-\pi_l)U_a(m_l, b(c2)_g, 0)}{1-\delta(1-\pi_l)}. \tag{12}$$

The rebel principal, l, can affect $V(c1)_a$ by increasing $b(c1)_l$; alternatively, the government can increase $b(c2)_g$ high enough to induce the agent to defect. Again, we see the emergence of a Bertrand-type game played by the two principals where benefits are increased to induce an agent's loyalty or defection with respect to the rebel group and the government. Suppose that the rebel group has offered the maximum set of benefits, $b_{l\max}$, whereas the government's $b(c2)_g$ is below $b_{g\max}$. In such a situation, the government can offer a higher set of benefits that, in turn, induces the agent to defect from the rebel group because the rebel group cannot respond because it is paying out at its maximum. The rebel group never makes an offer to such an agent whose loyalty would be so tenuous. Thus, it is only worthwhile for a rebel group to recruit only those agents for which the rebel group has guaranteed a sufficiently high probability of success so as to meet the reservation level of benefits and the compatibility constraint to ensure against defection. Alternatively, a group can compensate in different ways. By developing an ideological focus, a group can shift its benefit stream from pecuniary to nonpecuniary benefits (in terms of functional preferences and solidary norms). As noted above, ethnically based groups are inherently less likely to experience problems with defection.

Consider π_l^o such that $V(c_l)_a = V(c_g)_a$ and such that $b(c1)_l = b(c2)_g = b_{\max}$. For $\pi_l \geq \pi_l^\circ$, the incentive compatibility constraint is satisfied for lower levels of benefits, $b(c1)_l$, while $b(c2)_g = b_{\max}$, as stated above in proposition 2: (b): $\partial b^o(c1)_l(\pi_l)/\partial\pi_l \geq 0$ and (c): $b(c2)_l = b_{\max}$.

Finally, if $b(c1)_l = b(c2)_g = b_{\max}$, then for $\pi_l = \frac{1}{2}$, the incentive compatibility condition $V(c_l)_a(\pi_l^\circ) \geq V(c_g)_a(\pi_l^\circ)$ becomes

$$U_a(m, b_{\max}, 0)\frac{1-\delta}{2-\delta} \geq U_a(s_a^\circ, b_{\max_a}, 0), \tag{13}$$

which is never satisfied. Thus, as in proposition 2: (a) $\pi_l >> \frac{1}{2}$. QED.

The implication of Proposition 2 is that although a slight military advantage can attract an agent initially, the incentive compatibility constraint requires a much stronger advantage if the principal is to deter desertion (as opposed to deterring defection). Figure 2 shows how two armies, the government's and the rebel's, compete over potential members and how they are allocated between the two organizations. Several features in this figure are worthy of note. The y-axis is the probability of success, π_l, for the rebel group vis-à-vis the government's army. π_l^o represents the rebel group's given probability of success, and $1 - \pi_l^o$ is its reciprocal. The critical value of the probability of success, $\frac{1}{2}$, is represented with 0.5. The x-axis represents distance. The unit space ranges from 0 to 1, in a geographical space. The bounded nature of space is important. The rebel group is able to recruit along a distance from 0 to x_l, which is determined by the intersection of the probability function π_l and the value of π_l^o. The shape of π_l is determined by the nature of equation (7). Correspondingly, the distance from x_g to 1 represents the range of governmental recruits, which is determined by the intersection of the function of the probability of success and the value of $1 - \pi_l$.

Figure 2 also demonstrates the importance of distance between the principal and potential agent in recruitment. The important point is that although agents may be initially attracted to the organization with the military advantage, the organizations (rep-

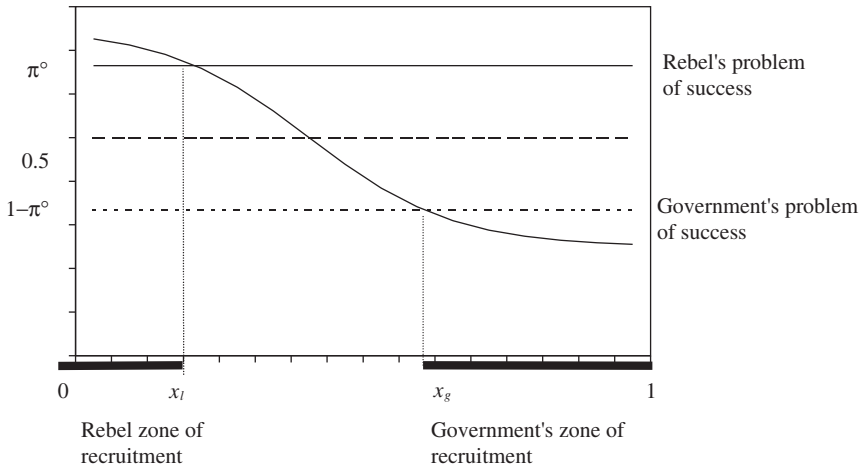

Figure 2: The Effect of Distance in Rebel Recruitment
SOURCE: Adapted from Polo (1995).

resented by their respective principals) prefer to recruit only those agents unlikely to defect. In this way, a rebel organization recruits only agents who are relatively close to their geographical center. This result is evident in the empirical analyses of Collier and Hoeffler (2001) and Fearon and Laitin (1999). This recruitment pattern has implications that determine whether rebel groups will be able to successfully raise an army in opposition to the government.

Proposition 3. There exists a minimum distance, $D_{\min}$, between the state and the rebel group under which no principal offers contracts to any agent, a, located in [0, 1]. For $D > D_{\min}$, the subsets of agents that join either army are unconnected.

Proof. Start with the extreme where $D = 0$, such that $x_l = x_g$. In such a situation, $\pi_l = \varepsilon_l/(\varepsilon_l + \varepsilon_g)$ for $x \in [0, 1]$, given equation (7). As D increases, π_l will decrease. There thus exists a minimum distance, $D_{\min}$, such that $\max(x_a)\, \pi_l = \pi_l^o$. For $D > D_{\min}$, the incentive compatibility constraint holds for two groups of agents, $\pi_l > \pi_l^o$ and $\pi_l < 1 - \pi_l^o$. Because π_l decreases with the distance of the agent from the principal (x_a), the two subsets of agents will array themselves with respect to D (the distance between the two principals) and are not connected. For $D \leq D_{\min}$, the incentive compatibility constraint does not hold. QED

The implication of this proposition is that, with regard to military conflict between the governmental and the rebel armies, the function π_l (the probability of the rebel army's military success) is very flat because the two organizations are located close to one another. Indeed, Figure 3 shows that when a rebel group and the government are located close to one another, military advantage becomes a ratio of military effectiveness, and recruitment will be difficult. The problem does not stem from military con-

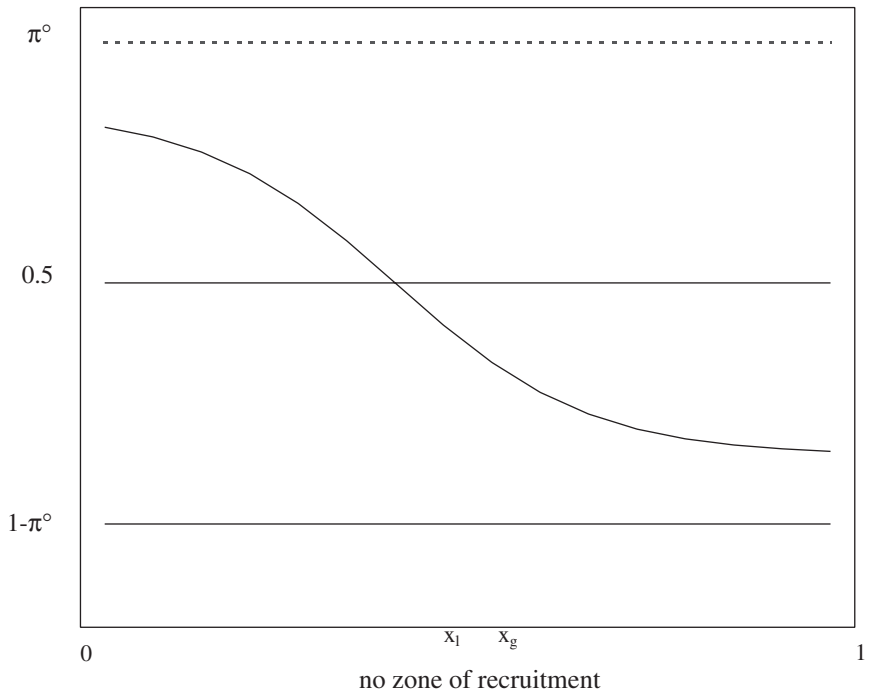

Figure 3: The Probability of the Rebels' Military Success and its Effects on Rebel Recruitment

flict but because the potential for defection is too great to prevent the initial recruitment of members. Figure 3 shows how the function π_l intersects either π_l^o or $1-\pi_l^o$.

This result is borne out often when considering the geography of rebellion. Sanctuary within a country or within a neighboring country plays an instrumental role in giving the rebel movement a chance to develop and grow. Sanctuary implies a place to retreat away from governmental forces. Typically, such sanctuaries are in remote territories well away from the center of government. Collier and Hoeffler (2001) find that the relative risk of a rebellion occurring in countries with widely geographically dispersed populations is 50% greater than in countries with an average population density. Even better for such rebel groups is when such areas are the repositories of lootable resources, such as the diamonds in eastern Sierra Leone, which is the center of control of the Revolutionary United Front (RUF).

Nonetheless, geographical distance is not always necessary. Ideology and ethnicity can compensate for the lack of geographical distance. For ethnicity or ideology to overcome close geographic proximity, the rebel group must ensure that the incentive compatibility constraint is high enough to ensure no desertion (see equation (12)). By increasing $b(c1)_l$ through the allocation of nonpecuniary rewards, the rebel principal, l, can affect $V(c1)_a$, as long as $V(c1)_a \geq V(dd1)_a$, such that the present value for an agent of cooperating is greater than the present value of defection and desertion. The National Resistance Movement, headed by Museveni in Uganda, is a good example. "Its main

camps were only 20 miles from Kampala" (Ngoga 1998, 91). Museveni focused on a clear political agenda, distinguishing himself ideologically from the government of Uganda (Herbst 2000, 38). Ethnicity can also compensate for geographical distance. Look no further than the Palestinian rebellion in Israel to see an example of how a rebellion is sustained through ethnic identity. Obviously, ethnicity and ideology can play hand in hand. The more a rebel leader can appeal to the provision of nonpecuniary rewards, the better she is able to recruit and maintain the allegiance of her rebel soldiers.

COMPETITION BETWEEN REBEL GROUPS

Rebel groups do not always compete with only the government. They also can compete with rival rebellions or even renegade factions of their own movement. When there is no state, the possibility for competition between two rebel groups is significant. Indeed, a good deal of literature on warlordism and the rise of the state reflects this kind of competition (Azam and Hoeffler 2000; Greif, Bates, and Singh 2000). Most models of competing warlords do not address issues of recruitment and allegiance. For the most part, the competing organizations are black-boxed. The model presented in this article allows this box to be opened with implications for the political geography of conflict between groups. Most competing rebel groups arise in different parts of a country, but if geography is limited, a rival rebel group can distinguish itself ethnically or ideologically. The reasoning that applies to the competition between a rebel group and the government also applies to the competition between two rebel armies.

Proposition 4. There exists a critical distance $D\#$ between a rebel group and a rival rebel group that precludes the rival group's ability to recruit. Only if the rival group is located with sufficient distance, $D > D\#$, can this rival rebel group arise.

Proof. Substitute $D\#$ for $D_{\min}$ and refer to the proof for proposition 3. QED.

This proposition demonstrates how distance limits the number of rebel groups that can form in a country. This proposition also provides insight into how a rebel group can splinter. Given sufficient geographic distance, a group can splinter and form a rival rebel movement. If there is splintering, it is most likely to cleave along ethnic or ideological lines, whereby the new group is able to distribute nonpecuniary benefits, thereby raising the participation and incentive compatibility constraints to agents and providing a means for recruiting and retaining recruits for the splinter rebel army. Refer again to equation (11). By increasing $b(c1)_l$ through the allocation of nonpecuniary rewards, an alternative rebel principal, r (the leader of a rival rebel group or a splinter group), can affect $V(c_r)_a$. As long as the rival rebel leader can provide benefits that ensure against defection and desertion, she will be able to recruit and sustain a rival rebel army. It is important to note, however, that if the nonpecuniary rewards are indistinguishable between two groups, geography will limit the number of rebel groups that can exist.

CONCLUSION

The microfoundations provide a useful way for understanding rebellion. A number of substantive propositions emerge from this study of how distance affects recruitment and allegiance within rebel groups. More specifically, it allows us to examine the composition and distribution of a rebel group. This, in turn, sets up a number of propositions that have been empirically examined. The geographical spread of rebel forces with regard to the government's strongholds has been examined, as noted above by Collier and Hoeffler (2001) and Fearon (2001). Indeed, geographical nonproximity is significant. Similarly, aspects of ethnic heterogeneity in a rebel group and with respect to society at large have been examined (Collier, Hoeffler, and Soderbom 1999; Fearon and Laitin 1999). Comparisons between ideological, ethnic, and loot-seeking groups have also been made (Sambanis 2001). Indeed, a number of empirically testable propositions emerge from this analysis. As for actually measuring the parameters developed in this model, this will be difficult. Many variables remain for the most part immeasurable. An issue for future empirical investigation would be the empirical analysis of the geographic distribution of rebel groups vis-à-vis their respective governments with regard to ethnicity and ideology.

By examining the microfoundations of rebellion, our understanding of rebel groups that rely on children for their armies also can be improved. Although many children who fight with rebel armies were forced conscripts, some joined voluntarily. Faced with dismal conditions at home, involving poverty, boredom, or, in some areas, no family, the level of reservation benefits for a child is quite low. Indeed, this may be the fundamental reason that nonideological rebel groups rely so heavily on child labor. One "Congolese rebel officer explained why *kadogos* (boy fighters) 'make very good soldiers': it was because 'they obey orders; they are not concerned with getting back to their wife and family; and they don't know fear' " (Children under arms 1999, 22). In terms of the models presented here, children offer a possibility for rebel groups to meet the reservation level of benefits and the compatibility constraint that they might not be able to meet with adult recruits. The model presented here offers a number of testable propositions with regard to the use of children soldiers.

Using a formal model featuring the organizational structure of rebellion, this study demonstrates that physical geography, ethnicity, and ideological distance play an important role in determining military success, deterring defection within a rebel group, and shaping recruitment.

REFERENCES

Addison, Tony, Philippe LeBillon, and Mansoob Murshed. 2000. On the economic motivations for conflict in Africa. Paper presented at the Proceedings of the ABCDE Europe Conference, Conseil d'Analyse Économique and the World Bank, June, Paris.

Azam, Jean-Paul. 2001. The redistributive state and conflicts in Africa. *Journal of Peace Research* 37: 429-44.

Azam, Jean-Paul, and Anke Hoeffler. 2000. Looting and conflict between ethno-regional groups: Lessons for state formation in Africa. Paper presented at the joint World Bank and Princeton University Workshop, March, Princeton, NJ.

Brehm, John, and Scott Gates. 1994. When supervision fails to induce compliance. *Journal of Theoretical Politics* 6:323-44.

———. 1997. *Working, shirking, and sabotage: Bureaucratic response to a democratic public*. Ann Arbor: University of Michigan Press.

Children under arms. 1999. *The Economist*, 10 July, 21-23.

Collier, Paul. 2000. Rebellion as a quasi-criminal activity. *Journal of Conflict Resolution* 44:839-53.

Collier, Paul, and Anke Hoeffler. 2001. Greed and grievance in civil war. Mimeo, World Bank, Washington, DC.

Collier, Paul, Anke Hoeffler, and Mans Soderbom. 1999. *On the duration of civil war.* Washington, DC: World Bank, Development Economic Research Group.

Fearon, James D. 2001. Why do some civil wars last so much longer than others? Paper presented at the World Bank, University of California, Irvine, May.

Fearon, James, and David D. Laitin. 1999. Weak states, rough terrain, and large-scale ethnic violence since 1945. Paper presented at the annual meetings of the American Political Science Association, September, Atlanta, GA.

———. 2000. Violence and the social construction of ethnic identity. *International Organization* 54:845-77.

Fiorentini, Gianluca, and Sam Peltzman, eds. 1995. *The economics of organised crime*. Cambridge, UK: Cambridge University Press.

Greif, Avner, Robert Bates, and Smita Singh. 2000. Organizing violence: Wealth, power, and limited government. Paper presented at the joint World Bank and Princeton University Workshop, March, Princeton, NJ.

Grossman, Herschel I. 1991. A general equilibrium model of insurrections. *American Economic Review* 81 (4): 912-21.

Hegre, Håvard, Tanja Ellingsen, Scott Gates, and Nils Petter Gleditsch. 2001. Toward a democratic civil peace? Democracy, political change, and civil war, 1816-1992. *American Political Science Review* 95:33-48.

Herbst, Jeffrey. 2000. The organization of rebellion in Africa. Paper presented at the joint World Bank and Princeton University Workshop, March, Princeton, NJ.

Hirshleifer, Jack. 1989. Conflict and rent seeking functions: Ratio vs. difference models of relative success. *Public Choice* 63:101-12.

———. 2000. The macrotechnology of conflict. *Journal of Conflict Resolution* 44:773-92.

Holmstrom, Bengt, and Paul Milgrom. 1991. Multitask principal-agent analyses: Incentive contracts, assett ownership, and job design. *Journal of Law Economics and Organization* 7:24-52.

Kuran, Timur. 1989. Sparks and prairie fires: A theory of unanticipated political revolution. *Public Choice* 61:41-74.

Lichbach, Mark Irving. 1995. *The rebel's dilemma*. Ann Arbor: University of Michigan Press.

Miller, Gary J. 1992. *Managerial dilemmas: The political economy of hierarchy.* Cambridge, UK: Cambridge University Press.

Mueller, John. 2001. The remnants of war: Thugs as residual combatants. Paper presented at the Nobel Institute Research Seminar, May, Oslo, Sweden.

Neary, Hugh M. 1997. A comparison of rent-seeking models and economic models of conflict. *Public Choice* 93:373-88.

Ngoga, Pascal. 1998. Uganda: The National Resistance Army. In *African guerrillas*, edited by Christopher Clapham. London: James Currey.

Polo, Michele. 1995. Internal cohesion and competition among criminal organizations. In *The economics of organised crime*, edited by Gianluca Fiorentini and Sam Peltzman. Cambridge, UK: Cambridge University Press.

Roemer, John E. 1985. Rationalizing revolutionary ideology. *Econometrica* 53:85-108.

Russell, D.E.H. 1974. *Rebellion, revolution, and armed force*. New York: Academic Press.

Sambanis, Nicholas. 2001. Do ethnic and non-ethnic civil wars have the same causes? A theoretical and empirical inquiry (Part 1). *Journal of Conflict Resolution* 45 (3): 259-282.

Skaperdas, Stergios. 1996. Contest success functions. *Economic Theory* 7:283-90.

Tullock. Gordon. 1974. *The social choice dilemma: The economics of war and revolution*. Fairfax, VA: Center for the Study of Public Choice.