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Rebel Tactics*

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Abstract

I study a model of mobilization and rebel tactical choice. Rebel leaders choose between *conventional* tactics that are heavily reliant on mobilization, *irregular* tactics that are less so, and withdrawal from conflict. The model yields the following results, among others. Increased non-violent opportunity has a non-monotone effect on the use of irregular tactics. Conflict has option value, so irregular campaigns last longer than the rebels short-term interest dictates, especially in volatile military environments. By demonstrating lack of rebel capacity and diminishing mobilization, successful counterinsurgencies may increase irregular violence. Conflict begets conflict by eroding outside options thereby increasing mobilization.

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Rebel tactics vary in important ways from conflict to conflict. For instance, Kalyvas and Balcells (2010) report that since the end of World War II, rebels focused on conventional war fighting in about one-third of civil wars while employing various irregular tactics in about two-thirds of civil wars. Surprisingly, both the empirical and theoretical conflict literatures have tended to treat each rebel tactic in isolation—developing separate explanations and models of terrorism, guerilla warfare, insurgency, conventional war fighting, and so on. (Though see Kalyvas (2004); Sambanis (2008); Laitin and Shapiro (2008) for exceptions.) This is unfortunate because rebels choose tactics strategically in response to political, economic, geographic, demographic, and military constraints. If changes in the economic, political, or strategic environment alter the attractiveness of one tactic or another, then studying the tactics in isolation may lead us to miss important substitutabilities or complementarities between them, have incorrect or incomplete intuitions about their causes, and make invalid inferences from data on their correlates.

As such, I present a model of endogenous mobilization and dynamic tactical choice by a rebel organization. The rebels have two tactics available to them, which I refer to as *conventional* and *irregular*. For the purposes of this analysis, the key difference between the two tactics is that conventional tactics are most effective when the rebels can field a large number of fighters, whereas irregular tactics—such as terrorism or guerilla attacks—can be used effectively even by a small group of extremists.

The model yields six results. First, the quality of the (economic or political) outside option has different effects on the likelihood of conventional and irregular conflict. A decrease in opportunity increases mobilization and, thus, increases the use of conventional tactics. More surprisingly, the effect of opportunity on the use of irregular tactics is non-monotone. Irregular tactics are used by rebel groups that believe they are capable of fighting the government, but lack high levels of mobilization. When opportunity is poor, if the population perceives the rebels to be capable of fighting the government, enough people will mobilize such that the rebels will use conventional tactics. When opportunity is very good, then not only will the population not mobilize in the short-run, the rebel leaders withdraw from conflict. Thus, all else equal, the use of irregular tactics is highest in societies where non-violent opportunity is at moderate levels, such that mobilization is low, but extremists are still willing to fight.

This non-monotonicity in the use of irregular tactics highlights the importance of jointly studying the causes of terrorism, insurgency, and civil war, not only in theoretical models, but empirically. A standard intuition, which informs much empirical work on all forms of political violence, is that conflict should increase as opportunity diminishes.[1] My model suggests that this intuition is incorrect for irregular tactics, such as terrorism. The expectation that there will be a monotone relationship between opportunity costs and the use of, say, terrorism is an artifact of considering terrorism in isolation from other forms of conflict. When we consider the possibility of an endogenous choice among rebel tactics we find that the use of terrorism and other irregular tactics is expected to be maximized at some interim level of outside opportunity, rather than having a monotone relationship with opportunity. This suggests that standard empirical attempts to identify an effect of opportunity on the occurrence or amount of irregular conflict may be misspecified.

Second, engaging in conflict has option value for the rebel leaders, in the sense that it allows the rebel organization to survive to fight another day. When the rebel organization is close to defeat, the rebel leaders hold out hope that economic or military circumstances might change in a way that is more favorable to attracting mobilization. Hence, rather than withdraw from conflict and give up, during the last gasps of conflict, rebel leaders continue to engage in irregular conflict longer than is in their short-term interests. This is especially true when the military environment is highly volatile, so that large shocks to rebel capacity (in either direction) are likely. These facts speak to two substantive debates in the conflict literature—one on "gambling for resurrection" and the other on the duration of civil conflicts.

Third, successful counterinsurgencies demonstrate a lack of capacity in the rebel organization. This leads to an endogenous decrease in public mobilization. In the case of a moderately successful counterinsurgency, the rebel leaders transition from conventional to irregular tactics. Hence the model suggests that successful government operations against rebel groups engaged in conventional war fighting can lead to increases in urban terrorism, guerilla attacks, or other forms of irregular war fighting. Even more successful counterinsurgency may lead the rebels to withdraw from conflict entirely.

The finding that successful counterinsurgency can lead to an increase in the use of irregular tactics offers a theoretical interpretation of events such as the 2010 suicide bombings in the Moscow subway. Such attacks can be seen as a sign of the success of the Russian counterinsurgency in Chechnya. As a result of Russian efforts, the rebels lost enough popular

[1] This intuition is the same as that articulated by Becker (1968) in his seminal work on the economics of crime. For empirical research examining this intuition for civil wars see, among many others, Collier and Hoeffler (2004); Miguel, Satyanath and Sergenti (2004); Bazzi and Blattman (2011). For empirical research examining this intuition for terrorism see, among many others, Krueger and Maleckova (2003); Blomberg, Hess and Weerapana (2004); Drakos and Gofas (2006); Pape (2005); Krueger and Laitin (2008); Benmelech, Berrebi and Klor (2012). For empirical work suggesting the relationship between opportunity and mobilization may be more complicated, see, Berman et al. (forthcoming); Dube and Vargas (Forthcoming).

support that the most effective tactic available to them was terror. (See Lyall, 2009, 2010, on the Russian counterinsurgency.) A similar argument might account for shifts away from conventional warfare and toward guerilla and terrorist attacks by the North Vietnamese following the Tet Offensive, by the Sunni insurgency in Iraq following the 2007 "Surge", or by the IRA in the 1920's following their civil war defeat (a pattern that has been repeated throughout the IRA's history).[2]

Fourth, successful irregular campaigns demonstrate to the population that rebel capacity is relatively high. Consequently, such campaigns lead to an increase in mobilization that intensify conflict and may ultimately allow rebel leaders to shift from irregular to conventional tactics. Hence, the model is consistent with a variety of historical examples in which successful terrorist or guerilla campaigns helped spark a larger insurgency or civil war.[3]

Fifth, the model predicts that conflict begets conflict. Fighting damages the economy. Hence, the more intense fighting is in one period, the worse the outside option is expected to be in future periods. As such, periods of intense conflict are likely to be followed by periods of even more intense conflict, since, on average, intense conflict in one period lowers the opportunity costs of mobilization in future periods.

Finally, the model predicts that the ideological extremism or social isolation of rebel leaders will be positively correlated with irregular conflict, but not with conventional conflict. When the rebel leaders are very extreme or isolated, it is more likely that a scenario will arise in which the population is not willing to mobilize, but the rebel leaders will still engage in conflict. In the absence of strong mobilization by the population, the best tactical choice available to the rebel leaders is irregular conflict. Thus, extremism or isolation on the part of the rebel leaders increases the risk of irregular conflict. Such a relationship does not exist with respect to conventional conflict because conventional tactics are only attractive when mobilization is high.

[2] For related discussions see Douglass (2012) on Vietnam, Biddle, Friedman and Shapiro (2012) on Iraq, and English (2003), especially chapters 2 and 3, on the IRA.

[3] For instance, the Algerian War of Independence (Kalyvas, 1999), the Russian Revolution (DeNardo, 1985), the Sunni insurgency in Iraq in 2003–2004, the M-19 in Colombia in the 1970's and 1980's, or the Second Palestinian Intifada. For other models of "vanguard violence" leading to larger insurrections, see, among others, Olson Jr. (1965); Tullock (1971); Popkin (1979); DeNardo (1985); Finkel, Muller and Opp (1989); Kuran (1989); Lohmann (1994); Lichbach (1995); Ginkel and Smith (1999); Chwe (1999); Baliga and Sjöström (Forthcoming); Bueno de Mesquita (2010).

1 The Model

There are two kinds of players: the rebel leaders (a unitary actor) and a continuum of population members of unit mass. Each population member is described by a parameter, η. It is common knowledge that the η's are distributed uniformly on $[\underline{\eta}, \overline{\eta}]$.

There are two kinds of periods: conflict periods and peace periods. The time line for a conflict period, t, is as follows:

1. The rebel organization has a capacity κ_{t-1}.

2. Each member of the population, η, separately decides whether to mobilize, $a_t^\eta \in \{0, 1\}$, where $a_t^\eta = 1$ is interpreted as population member η mobilizing.

3. The rebel leaders observe the measure of population members who mobilized, λ_t, and choose a tactic $a_t^R \in \{I, C, W\}$, with I representing irregular tactics, C representing conventional tactics, and W representing withdrawal from conflict. Withdrawing is only allowed if $\lambda_t = 0$.

4. If $a_t^R \in \{I, C\}$, there is conflict. During the fighting, a new capacity, κ_t, is determined. If $a_t^I = W$, there is no conflict.

During a peace period, there is no mobilization decision nor is there any conflict. The game starts in a conflict period. It transitions to a peace period if the rebel leaders withdraw from conflict. Withdrawing from conflict is an absorbing state—the game cannot transition from a peace period to a conflict period. As noted above, rebel leaders can only withdraw from conflict if there is not a positive measure of population members who have mobilized to fight. The game lasts 2 periods.

Rebel capacity, κ_t, is the realization of a random variable distributed according to an absolutely continuous cumulative distribution function, $F_{\kappa_{t-1}}$, with mean κ_{t-1} and support $(0, \infty)$. The associated density is $f_{\kappa_{t-1}}$. These distributions are ordered by first-order stochastic dominance. That is, F_κ first-order stochastically dominates $F_{\kappa'}$, if $\kappa > \kappa'$. The distributions and κ_0 are common knowledge.

In each period, the outside option has a common component, u_t, which is the realization of a random variable distributed according to an absolutely continuous cumulative distribution function, $G_{u_{t-1},\lambda_{t-1}}$, with support $[\underline{u}, \overline{u}]$. The associated density is $g_{u_{t-1},\lambda_{t-1}}$. These distributions are ordered by first-order stochastic dominance in both u_{t-1} and $-\lambda_{t-1}$. The first of these implies that the better is the outside option today, the better is the expected outside option tomorrow. The idea behind the second is that the more people who mobilize for conflict today, the more intense is the fighting, and so the more damage is done to tomorrow's expected outside option. The distributions, λ_0, and u_0 are common knowledge. The realization of u_t is observed by all players.

1.1 Technology of Conflict

In a period t, the returns to conventional conflict are:

$$B_t^C = \kappa_t \theta_C \lambda_t$$

and the returns to irregular conflict are

$$B_t^I = \kappa_t \left(\theta_I \lambda_t + \tau \right).$$

The parameters $\theta_C, \theta_I > 0$ capture facts about the society that determine how responsive the effectiveness of conventional and irregular tactics are to mobilization, respectively. For instance, rough terrain might increase θ_C, while a highly urbanized population might make θ_I larger (Fearon and Laitin, 2003). The parameter τ captures how effective irregular tactics are when carried out by the rebel leaders alone, without the participation of the population.

The following are the critical substantive assumptions about the technology of conflict.

Assumption 1 *1.* $\tau > 0$

2. $\theta_C > \theta_I + \tau$.

Both assumptions are related to the same substantive idea, which is that the effectiveness of conventional tactics is more responsive to the level of mobilization than is the effectiveness of irregular tactics. The first assumption insures that, if no one mobilizes, irregular tactics are more effective than conventional tactics. The second assumption says that, if the whole population mobilizes, conventional tactics are more effective than irregular tactics. An implication of this assumption is that $\theta_C > \theta_I$—increased mobilization has a bigger impact on the efficacy of conventional tactics than on the efficacy of irregular tactics.

1.2 Payoffs

All players discount the future by $\delta > 0$ and have von Neuman-Morgenstern expected utility functions given as follows.

The rebel leaders' instantaneous payoff from conventional conflict in period t is:

$$U_t^R(a_t^R = C, \lambda_t, \kappa_t, u_t) = B_t^C.$$

The rebel leaders' instantaneous payoff from irregular conflict in period t is:

$$U_t^R(a_t^R = I, \lambda_t, \kappa_t, u_t) = B_t^I.$$

The rebel leaders' instantaneous payoff in a period in which there is no conflict is:

$$U_t^R(a_t^R = W, \lambda_t, \kappa_t, u_t) = u_t + \eta_R,$$

where η_R measures the rebel leaders' ideology or idiosyncratic outside option.

Population members who mobilize have the same instantaneous payoffs as do the rebel leaders, except they bear a cost $c > 0$ for mobilizing. So a mobilized population member's instantaneous payoff from mobilizing when the tactics employed are conventional is:

$$U_t^\eta(a_t^R = C, a_t^\eta = 1, \lambda_t, \kappa_t, u_t) = B_t^C - c$$

and when the tactics employed are irregular is:

$$U_t^\eta(a_t^R = I, a_t^\eta = 1, \lambda_t, \kappa_t, u_t) = B_t^I - c.$$

A population member η's instantaneous payoff from mobilizing when the rebel leaders withdraw is:[4]

$$U_t^\eta(a_t^R = W, a_t^\eta = 1, \lambda_t, \kappa_t, u_t) = u_t + \eta - c.$$

A population member η's instantaneous payoff from not mobilizing is

$$U_t^\eta(a_t^R, a_t^\eta = 0, \lambda_t, \kappa_t, u_t) = u_t + \eta.$$

I assume $\eta_R < \underline{\eta}$. The idea is that the rebel leaders find ending conflict less desirable than any member of the population. This could be because their leadership role in the rebellion has foreclosed some outside options or because of greater ideological commitment to conflict.

[4] This situation is possible because each population member is measure 0.

1.3 Solution Concept

The solution concept is pure strategy subgame perfect Nash equilibrium (extended to games with moves by Nature). I impose an additional equilibrium selection criterion. There is a coordination game between population members. Period-by-period, I select the equilibrium in which the population coordinates on the highest level of mobilization that is consistent with equilibrium in that period. I refer to a pure strategy subgame perfect Nash equilibrium satisfying this selection criterion as simply an *equilibrium*.

It is worth commenting on what this selection criterion is doing in the model. In the second period, the selection criterion simply selects the highest mobilization equilibrium. This selection in the second period has an effect on the feasible outcomes in the first period. In particular, if the population were allowed to use the existence of a zero-mobilization equilibrium in the second period as a threatened punishment following certain histories (as they could under subgame perfection), then they might be able to use this self-punishment threat to sustain higher levels of mobilization in the first period. Thus, the selection criterion fulfills a role similar to a Markovian restriction by ruling out the use of non-payoff relevant aspects of a history to sustain cooperation among population members.

2 Verisimilitude of Key Assumptions

Before turning to the analysis, I discuss several key assumptions.

First, the efficacy of conventional tactics is more responsive to mobilization than is the efficacy of irregular tactics. (See Berman, Shapiro and Felter, 2011, for a discussion of the role of public support in rebellion.) This, I believe, is a standard view in the literature. For instance, Sambanis (2008) writing about terrorism (irregular) and insurgency (conventional), says:

> Terrorism is inherently a clandestine activity and does not require mass level support. . . insurgents during a civil war require much more active support from civilians.

Of course, frequently both types of tactic are used simultaneously within the context of a civil war (Kalyvas, 2004). In my model, rebel leaders choose only one tactic. However, this should not be taken too literally. Rather, one should think about factors that increase the incentives for the rebel leaders to choose a particular tactic (within the model) as being incentives that would lead the optimal mix of tactics to tilt more toward that tactic within a richer model where rebel leaders engaged in multiple tactics simultaneously.

Second, there is some characteristic of rebel organizations, κ_t, that reflects the organization's capacity relative to the government and is separate from mobilization. There are a variety of determinants of rebel efficacy beyond the number of people willing to fight. For instance, κ_t might reflect the rebel organization's institutional design (Weinstein, 2007; Berman, 2009), sources of funding or weaponry (Weinstein, 2007), internal factional conflict (Kydd and Walter, 2002; Bueno de Mesquita, 2005*a*), control over territory (Carter, 2010), and so on.

Third, the technology of conflict does not allow for the possibility of rebel victory. Instead, the rebels generate flow payoffs from fighting the government (perhaps by taking territory, extracting concessions, or controlling resources). This assumption is relatively innocuous. A model where the returns to conflict were normalized and interpreted as the probability of victory would yield very similar results, although there would be some chance of the game ending with rebel victory in the first period. An interesting feature of the current model is that it generates behavior by rebel leaders similar to the "gambling for resurrection" behavior seen in international disputes (Downs and Rocke, 1994), despite the fact that there is no possibility of rebel victory, no electoral incentives, and no agency problems. I return to this topic later.

Several other assumptions are for technical convenience. In reality, it is differentially costly to participate in conventional and irregular conflict. While allowing for such heterogeneity would certainly change equilibrium mobilization levels and cut-points for changes in tactical choice, it seems unlikely that any key results hinge on homogenous costs. Similarly, the fact that the returns to conflict are linearly increasing in rebel capacity and mobilization makes the model tractable, but the core intuitions about the relationship between mobilization and tactical choice seem unlikely to depend crucially on linearity (as opposed to the single-crossing nature of the two technologies of conflict).

Finally, it is worth noting that, while I assume that the efficacy of irregular tactics is responsive to mobilization, this assumption is not necessary for the analysis. Indeed, all results presented hold in a model where the payoff to irregular conflict is constant in mobilization. Nonetheless, I believe the assumption is a reasonable one in terms of verisimilitude, for two reasons. First, at least for small enough groups, increased mobilization may actually expand the ability to engage in operations. Second, theoretical and empirical findings suggest that terrorist organizations, for example, screen potential recruits for ability or quality (Bueno de Mesquita, 2005*b*; Benmelech and Berrebi, 2007; Benmelech, Berrebi and Klor, 2012). The capacity to attract a larger group of potential recruits may give rebel organizations using irregular tactics increased access to highly effective operatives.

3 Analysis

In this section, I characterize equilibrium play.

3.1 Second Period Tactical Choice

If the second period is a conflict period, the rebel leaders choose a tactic by comparing expected payoffs given the capacity with which they enter the period (κ_1), the value of the outside option ($u_2 + \eta_R$), and the level of mobilization (λ_2).

The rebel leaders' expected payoffs from withdrawing from conflict are $u_2 + \eta_R$, from conventional tactics are $\kappa_1 \theta_C \lambda_2$, and from irregular tactics are $\kappa_1(\theta_I \lambda_2 + \tau)$. Comparing these, the rebel leaders' tactical choice is straightforward and stated without proof.

Proposition 1 *In the second period, the rebel leaders' equilibrium strategy calls for the following behavior:*

- *If* $\lambda_2 > 0$, *then*
  - *Symmetric tactics if* $\lambda_2 \geq \frac{\tau}{\theta_C - \theta_I}$
  - *Irregular tactics if* $\lambda_2 < \frac{\tau}{\theta_C - \theta_I}$.
- *If* $\lambda_2 = 0$
  - *Irregular tactics if* $\kappa_1 \geq \frac{u_2 + \eta_R}{\tau}$
  - *Withdraw from conflict if* $\kappa_1 < \frac{u_2 + \eta_R}{\tau}$.

3.2 Second Period Mobilization

Population members decide whether to mobilize given the outside option, the rebel organization's capacity, and the rebel leaders' strategy. The largest group of population members that is willing to mobilize can be determined by focusing on what I will refer to as a *marginal participant*—a population member who is just indifferent between mobilizing and not, given a particular level of mobilization.

Marginal Participants

Suppose a share, λ, of population members mobilize for conflict. For this mobilization level to be consistent with equilibrium: (i) everyone within that group must prefer mobilizing to not mobilizing, given total mobilization of λ and the implied tactical choice and (ii) everyone not within that group must prefer not mobilizing to mobilizing, given total mobilization of λ and the implied tactical choice. If $\lambda \in (0,1)$, there is only one way for both of these conditions to hold. First, the person in the mobilized group with the best outside option must be exactly indifferent between mobilizing and not mobilizing—call this person the λ-*marginal participant*. Second, every population member with an outside option that is worse than the λ-marginal participant's must mobilize. Third, every population member with an outside option that is better than the λ-marginal participant's must remain unmobilized.

Consider a λ-sized group of the lowest outside option population members. The λ-marginal participant is the person in that group who has the best outside option. Label the λ-marginal participant's type as $\eta^*(\lambda)$. Given that the η's are distributed uniformly on $[\underline{\eta}, \overline{\eta}]$ and have mass 1, we can directly calculate $\eta^*(\lambda)$:

$$\eta^*(\lambda) = \begin{cases} \underline{\eta} & \text{if } \lambda = 0 \\ \underline{\eta} + \lambda(\overline{\eta} - \underline{\eta}) & \text{if } \lambda \in (0,1) \\ \overline{\eta} & \text{if } \lambda = 1. \end{cases} \tag{1}$$

Mobilization Levels

Define $\lambda_2^I(\kappa_1, u_2)$ to be the largest fraction of the population who, given that level of mobilization, all prefer irregular conflict to not mobilizing. That is, $\lambda_2^I(\kappa_1, u_2)$ is the largest $\lambda_2 \in [0,1]$ such that the following inequality holds:

$$\kappa_1 \left(\theta_I \lambda_2 + \tau\right) - c \geq u_2 + \eta^*(\lambda_2). \tag{2}$$

Similarly, define $\lambda_2^C(\kappa_1, u_2)$ to be the largest fraction of the population who, given that level of mobilization, all prefer conventional conflict to not mobilizing. That is $\lambda_2^C(\kappa_1, u_2)$ is the largest $\lambda_2 \in [0,1]$ satisfying:

$$\kappa_1 \theta_C \lambda_2 - c \geq u_2 + \eta^*(\lambda_2). \tag{3}$$

The following result characterizes the maximal level of mobilization that is sustainable for each tactic.

Lemma 1

$$\lambda_2^C(\kappa_1, u_2) = \begin{cases} 1 & \textit{if } \kappa_1 \geq \frac{u_2+\overline{\eta}+c}{\theta_C} \\ 0 & \textit{if } \kappa_1 < \frac{u_2+\overline{\eta}+c}{\theta_C} \textit{ and } u_2 + \underline{\eta} > -c \\ \frac{u_2+\underline{\eta}+c}{\kappa_1\theta_C-(\overline{\eta}-\underline{\eta})} & \textit{else.} \end{cases}$$

$$\lambda_2^I(\kappa_1, u_2) = \begin{cases} 1 & \textit{if } \kappa_1 \geq \frac{u_2+\overline{\eta}+c}{\theta_I+\tau} \\ 0 & \textit{if } \kappa_1 < \min\left\{\frac{u_2+\overline{\eta}+c}{\theta_I+\tau}, \frac{u_2+\underline{\eta}+c}{\tau}\right\} \\ \frac{u_2+\underline{\eta}+c-\kappa_1\tau}{\kappa_1\theta_I-(\overline{\eta}-\underline{\eta})} & \textit{else.} \end{cases}$$

All proofs are in the appendix.

Figure 1 summarizes Lemma 1. First focus on mobilization for conventional conflict. If rebel capacity (κ_1) is very strong relative to the outside option (u_2), then the full population is willing to mobilize for conventional conflict. If rebel capacity is low relative to the outside option, then one of two things is possible. If the outside option is very good (i.e., even the population member with the worst outside option is not willing to bear the costs of mobilization), then mobilization is zero for conventional conflict. If rebel capacity is low, but the outside option is also low, then there is an interior level of mobilization for conventional conflict.

Something similar holds for irregular conflict. If rebel capacity is very strong relative to the outside option, then the full population is willing to mobilize for irregular conflict. Notice that the threshold for full mobilization for irregular conflict is more strict than for conventional conflict—thus, if the full population is willing to mobilize for irregular conflict, they are also willing to mobilize for conventional conflict. This is because, at high levels of mobilization, conventional tactics are more effective. There is zero mobilization for irregular conflict if capacity is sufficiently low that even the population member with the worst outside option would not mobilize (at zero mobilization) for irregular conflict. For levels of capacity, relative to the outside option, in between these extremes, there is an interior level of mobilization for irregular conflict.

FIGURE 1 ABOUT HERE

Lemma 1 highlights that different levels of mobilization are sustainable for different tactics, depending on rebel capacity and the outside option. As the following result shows, these differences in mobilization help characterize the equilibrium outcome. Notably, whenever there is conflict, the tactic that can attract greater mobilization is the equilibrium tactical choice.

Proposition 2 *The second-period equilibrium outcome is conventional tactics with mobilization $\lambda_2^C(\kappa_1, u_2)$ if and only if the following two conditions holds:*

1. $\lambda_2^C(\kappa_1, u_2) > 0$ *and*

2. $\lambda_2^C(\kappa_1, u_2) \geq \lambda_2^I(\kappa, u_2)$.

The second-period equilibrium outcome is irregular tactics with mobilization $\lambda_2^I(\kappa_1, u_2)$ if and only if one of the following two conditions holds:

1. $\lambda_2^I(\kappa_1, u_2) > \lambda_2^C(\kappa_1, u_2)$, *or*

2. $\lambda_2^I(\kappa_1, u_2) = \lambda_2^C(\kappa_1, u_2) = 0$ *and* $\kappa_1 \tau \geq u_2 + \eta_R$.

In light of Proposition 2, several second-period equilibrium outcomes are clear cut. If $\kappa_1 \geq \frac{u_2+\overline{\eta}+c}{\theta_C}$—which encompasses three regions of Figure 1—the equilibrium outcome is full mobilization and conventional conflict. If $\kappa_1 \in [\frac{u_2+\underline{\eta}+c}{\tau}, \frac{u_2+\overline{\eta}+c}{\theta_C})$ and $u_2 \geq -(\underline{\eta} + c)$, then mobilization is positive only for irregular conflict and the outcome is irregular conflict.

There are two cases where the combination of Figure 1 and Proposition 2 do not fully characterize outcomes in the second period. The first case is when $\kappa_1 < \min\{\frac{u_2+\underline{\eta}+c}{\tau}, \frac{u_2+\overline{\eta}+c}{\theta_C}\}$, so that mobilization is zero for both tactics. Here the outcome is either irregular conflict or withdrawal from conflict. From Proposition 1, the outcome is withdrawal only if rebel capacity is low enough relative to the outside option—in particular, $\kappa_1 < \frac{u_2+\eta_R}{\tau}$.

The second case is in the triangle where mobilization is interior for both irregular and conventional conflict. As Propositions 2 states, in this case the equilibrium outcome will be whichever tactic can attract more mobilization. The following result shows that, for higher levels of rebel capacity, more population members are willing to mobilize for conventional conflict than for irregular conflict, while for lower levels of capacity, more population members are willing to mobilize for irregular conflict than for conventional conflict. These two possibilities are illustrated in Figure 2.

Lemma 2 *Suppose $u_2 + \underline{\eta} < -c$ and $\kappa_1 < \frac{u_2+\overline{\eta}+c}{\theta_C}$. Then $\lambda_2^C(\kappa_1, u_2) \geq \lambda_1^I(\kappa_1, u_2)$ if and only if*

$$\kappa_1 \geq \frac{(\theta_C - \theta_I)(u_2 + \underline{\eta} + c)}{\tau\theta_C} + \frac{\overline{\eta} - \underline{\eta}}{\theta_C}.$$

Figure 2 about here

Combining Figure 1 with the conditions from Proposition 1 and Lemma 2 fully characterizes the equilibrium outcome in the second period. These outcomes are summarized in Figure 3.[5]

Figure 3 about here

An important point, which is straightforward from Figure 3 and the preceding analysis, is that worse outside options and higher rebel capacity both increase mobilization.

Remark 1 *Equilibrium second-period mobilization is weakly decreasing in* u_2 *and weakly increasing in* κ_1.

First Period Tactical Choice

In the first period, unlike the second period, tactical choice affects both instantaneous payoffs and continuation values. Thus, in deciding whether to fight in the first period, the rebel leaders must take into account the long-run implications of withdrawing from conflict.

Let s^2 be the second-period equilibrium strategy profile. Then, let $v_R(\kappa_1, u_2; s^2)$ be the expected value of the second period to the rebel leaders if they enter the second period with relative capacity κ_1 and the common component of the outside option is u_2.

Suppose that in the first period the rebel leaders have expected capacity κ_0, the value of the common component of the outside option is u_1, and the fraction of population members who have mobilized is λ_1. The rebel leaders' expected payoff from withdrawing from conflict in the first period is:

$$u_1 + \delta \int_{\underline{u}}^{\overline{u}} \tilde{u} g_{u_1,0}(\tilde{u})\, d\tilde{u} + \eta_R(1+\delta).$$

The rebel leaders' expected payoff from pursuing conventional conflict is:

$$\kappa_0 \theta_C \lambda_1 + \delta \int_0^{\infty} \int_{\underline{u}}^{\overline{u}} v_R(\tilde{\kappa}, \tilde{u}; s^2) g_{u_1,\lambda_1}(\tilde{u}) f_{\kappa_0}(\tilde{\kappa})\, d\tilde{u}\, d\tilde{\kappa}$$

[5] It is worth noting, here, that if mobilizing for irregular conflict were less costly than mobilizing for conventional conflict, the analysis would be slightly different. In particular, it would be possible to have $\lambda_2^I > \lambda_2^C$, but still have conventional conflict preferred by the rebel leaders. Of course, in such a circumstance, mobilization of λ_2^I would not be consistent with equilibrium, so the rebel leaders' tactical choice would put another constraint on equilibrium mobilization for each tactic. Otherwise, however, the analysis would be qualitatively the same.

The rebel leaders' expected payoff from pursuing irregular conflict is:

$$\kappa_0(\theta_I\lambda_1 + \tau) + \delta \int_0^\infty \int_{\underline{u}}^{\overline{u}} v_R(\tilde{\kappa}, \tilde{u}; s^2) g_{u_1,\lambda_1}(\tilde{u}) f_{\kappa_0}(\tilde{\kappa})\, d\tilde{u}\, d\tilde{\kappa}$$

Comparing these expected payoffs, the rebel leaders' tactical choice in the first period is as follows.

Proposition 3 *In the first period, the rebel leaders' equilibrium strategy calls for the following behavior:*

- *If* $\lambda_1 > 0$
  - *Symmetric conflict if* $\lambda_1 \geq \frac{\tau}{\theta_C - \theta_I}$
  - *Irregular conflict if* $\lambda_1 < \frac{\tau}{\theta_C - \theta_I}$.
- *If* $\lambda_1 = 0$, *then there exists a* $\underline{\kappa}(\cdot)$ *such that:*
  - *Irregular conflict if* $\kappa_0 \geq \underline{\kappa}(u_1)$
  - *Withdraw from conflict if* $\kappa_0 < \underline{\kappa}(u_1)$.

Moreover, $\underline{\kappa}(\cdot)$ *is non-decreasing in* u_1 *and* η_R *and if* $\underline{\kappa}(u_1) > 0$, *then* $\underline{\kappa}(u_1) < \frac{u_1+\eta_R}{\tau}$.

The key fact in Proposition 3 is that the rebel organization is less likely to withdraw from conflict in the first period that in the second period. In the second period, when there is zero mobilization, the rebel leaders withdraw from conflict if the instantaneous payoff from irregular conflict is less than the instantaneous payoff of withdrawing—i.e., if $\kappa_2 < \frac{u_2+\eta_R}{\tau}$. In the first period, the rebel leaders apply a stricter standard, only withdrawing if $\kappa_1 < \underline{\kappa}(u_1) < \frac{u_1+\eta_R}{\tau}$. In the first period, continuing to fight has option value—it allows the rebel organization to fight another day, when conditions may be more favorable, while still allowing the option of future withdrawal.

It is also worth noting that there are two reasons that the rebel leaders become less willing to withdraw from conflict in the first period as the outside option gets worse (i.e., $\underline{\kappa}(\cdot)$ non-decreasing in u_1). There is a direct effect—when the outside option is worse, the lifetime expected payoff of withdrawing is lower. But there is also an indirect effect—when the current outside option is worse, the future outside option is expected to be worse, which means that future mobilization is expected to be higher, which makes the expected payoff of future conflict higher.

First Period Mobilization

Each member of the population is of measure zero. Consequently, individual mobilization decisions do not affect continuation values, since no population member's action affects tactical choice or λ. Since individuals think only about instantaneous payoffs when making mobilization decisions, mobilization behavior in period one is exactly the same as in period two, simply substituting in the appropriate parameter values and realizations of random variables. As such, it does not require separate analysis.

Figure 4 summarizes equilibrium play in the first period. The dashed line in the figure represents the threshold for withdrawing from conflict that the rebel leaders would have used in the second period. Hence, the difference between the dashed line and the curve marked $\underline{\kappa}(u_1)$ represents the additional conflict that occurs due to the option value of continuing the fight.

FIGURE 4 ABOUT HERE

4 Implications

Several substantive points follow from the analysis above.

4.1 Tactics and the Outside Option

To think about the effect of the outside option on equilibrium tactics, fix a relative capacity, κ_t. For any such κ_t, a conflict (be it conventional or irregular) occurs if and only if the outside option is sufficiently low. This can be seen in Figures 3 and 4. Thus, the model is consistent with a standard opportunity costs intuition—the better the outside option, the less likely is conflict.

More interesting is the effect of the outside option on the choice between conventional and irregular tactics. Fix a κ_t low enough that all three tactical choices are feasible. For any such κ_t, conventional tactics are used only if the outside option is low enough. The effect of the outside option on the use of irregular tactics, however, is non-monotone. For very bad outside options, the rebel leaders engage in conventional conflict. For very good outside options, the rebel leaders withdraw from conflict entirely. It is only for moderate outside options that the rebel leaders use irregular tactics.

The intuition for the result on conventional conflict is straightforward. As opportunity diminishes, the population becomes more willing to mobilize, making conventional conflict more likely. The intuition for the result on irregular conflict is more subtle. In societies where the outside option is weak, if the rebel organization has high enough capacity to support any violent activity, it will attract enough mobilization to support conventional conflict. However, in societies where the outside option is somewhat better, it is possible for the rebel leaders to be willing to engage in conflict, but not attract the mobilization necessary to support conventional war fighting. Were the rebel leaders able to attract more mobilization, they would switch to conventional tactics, but the strong outside option prevents this from occurring. If the outside option is good enough, even the rebel leaders are not willing to engage in conflict, both because the outside option is tempting and because they expect a good future outside option to lead to low future mobilization. Hence, irregular conflict only occurs for moderate outside options.

These findings highlight the importance of considering the endogenous choice of tactics when investigating the causes of terrorism, insurgency, and civil war, not only in theoretical models, but empirically. For instance, a model of terrorism alone might predict a monotone relationship between the use of terrorism and the outside option, much as there is a monotone relationship between the outside option and conflict in general here. And it is commonplace to regress measures of terrorism or civil war against measures of the outside option—such as unemployment, inequality, political freedom, or economic growth—looking for a monotone relationship. (See Krueger and Maleckova (2003); Abadie (2006); Blomberg, Hess and Weerapana (2004); Pape (2005), among many others, for such studies of terrorism and Collier and Hoeffler (2001); Elbadawi and Sambanis (2002); Miguel, Satyanath and Sergenti (2004), among many others, for such studies of civil war.) However, by considering the endogenous choice among tactics, this model suggests that the predicted relationship between opportunity and the use of irregular tactics is instead non-monotone. Such effects, deriving from the substitutability between rebel tactics, are likely to be missed in studies that treat these phenomena in isolation.

4.2 The Last Gasps of Conflict

The model predicts that, in the first period, the rebel leaders may continue to engage in irregular conflict even after the short-term payoff from violence has fallen below the short-term payoff from withdrawing from conflict. This fact is straightforward from the discussion of option value surrounding Proposition 3 and Figure 4.

In the second period, when there is no future, with zero mobilization there is conflict if and only if the instantaneous payoff of irregular conflict is greater than the instantaneous payoff of withdrawing—i.e., $\kappa_1 \geq \frac{u_2+\eta_R}{\tau}$. The fact that $\underline{\kappa}(u_1) < \frac{u_2+\eta_R}{\tau}$ means that in the first period there are circumstances in which the instantaneous payoff of fighting is lower than the instantaneous payoff of withdrawing, but the rebel leaders fight on. They do so to avoid shutting down their organization in the hope that there will be a shock—to their capacity or to outside opportunity—that allows them to continue the conflict to greater effect. The option value of conflict makes the rebel leaders hold on longer than myopic rationality would suggest they would be willing to.

This finding relates to two literatures in the study of conflict. The first is a literature on "gambling for resurrection" in inter-state wars (Downs and Rocke, 1994). In that literature, voter uncertainty coupled with a desire to stay in office leads beleaguered elected officials to engage in wars that have negative expected payoffs for citizens because a war victory is the politician's only hope for reelection. Here, rebel leaders gamble for resurrection even in the absence of agency problems or the possibility of outright victory. Instead, gambling for resurrection is driven by the fact that if the rebel group stays active it can realize the benefits of future positive shocks (to capacity or mobilization), while avoiding future negative shocks by withdrawing later.

The second is a literature on the duration of conflict. In general, intra-state wars last longer than inter-state wars, though the variation in the length of intra-state conflicts is also quite large (Fearon, 2004). Fearon (2004) argues that civil wars are particularly likely to last a long time when highly variable state strength undermines a government's capacity to commit to a negotiated settlement with rebels. (This is closely related to the idea in Fearon (1998) and Acemoglu and Robinson (2001) that commitment problems due to power shifts cause conflict.) The model here provides a different account of how variability in state strength (the inverse of rebel capacity) can prolong conflict. Increased variability of rebel capacity or state strength increases the option value to rebel leaders of continuing conflict and, hence, increase the duration of conflict. This fact is formalized in the following result.

Proposition 4 *Let f'_{κ_0} be more risky than f_{κ_0} in the sense of second order stochastic dominance. If $\lambda_1 = 0$, then the expected payoff to the rebel leaders of irregular conflict in the first period is higher under f'_{κ_0} than under f_{κ_0}, while the expected payoff of withdrawing from conflict is equal under f'_{κ_0} and f_{κ_0}.*

A similar intuition holds for the economic or political environment that determines the outside option. When outside option becomes more volatile, the option value of continuing conflict increases because a large negative shock to the outside option significantly increases mobilization and the returns to fighting. Hence, highly volatile outside options are also expected to increase the duration of conflict, as formalized in the next result.

Proposition 5 *Let $g'_{u_1,0}$ be a mean-preserving spread of $g_{u_1,0}$. If $\lambda_1 = 0$, then the expected payoff to the rebel leaders of irregular conflict in the first period is higher under $g'_{u_1,0}$ than under $g_{u_1,0}$, while the expected payoff of withdrawing from conflict is equal under $g'_{u_1,0}$ and $g_{u_1,0}$.*

4.3 Dynamics of Rebel Tactics

Here I consider how outcomes in the first period affect mobilization and tactical choice in the second period.

Focus on a society with $u_2 > -\left(\underline{\eta} + c + \frac{(\overline{\eta}-\underline{\eta})\tau}{(\theta_C-\theta_I)}\right)$, so that an outcome other than conventional conflict occurs for some realizations of κ_1. Rebel organizations perceived as sufficiently capable at the beginning of the second period attract mobilization and engage in conventional conflict. Rebel organizations perceived as somewhat less capable engage in irregular conflict. And, at least for some values of the outside option, rebel organizations perceived as weak withdraw from conflict.

Whenever the rebel leaders engage in irregular conflict, they would have been willing to engage in conventional conflict, had they attracted enough support. Hence, changes in the population's perception of the rebel organization's capacity can change both the level of mobilization and the tactic used. Predictions about the dynamics of tactical choice, and their cause, follow from this.

From Counterinsurgency to Irregular Warfare

Particularly successful counterinsurgencies in period 1 (i.e., κ_1 much lower than κ_0) degrade the population's perception of rebel capacity. Hence, a large scale (conventional) conflict that suffers some important defeats will lose support in period 2. If the defeats are not too severe, the rebel leaders will not withdraw from conflict, but simply switch tactics to irregular war fighting. If the defeats are severe enough, the rebel leaders will withdraw from conflict entirely. Thus, the model suggests that increased use of terrorism, guerilla attacks, and other irregular tactics may be a sign of successful, rather than failed, counterinsurgency. Rebels turn to irregular tactics because they are perceived as too weak to attract the support necessary to make conventional tactics viable alternatives.

This idea sheds light on a variety of cases. I briefly mention three illustrative examples.

Successful Russian counter-insurgency efforts in the Second Chechen War convinced many Chechen's to withdraw support from the rebels. In response, Chechen rebels shifted tactics, resulting in dramatic terrorist attacks in Moscow in 2010. Those attacks, deadly though they were, may have been a sign of the weakness of the Chechen rebellion.

During the Vietnam War, successful American and South Vietnamese operations—especially those that shifted local control over a village—led to decreased mobilization in support of the North Vietnamese forces in those villages (Douglass, 2012). Consistent with this fact and the model presented here, the North Vietnamese shifted away from conventional tactics and toward irregular attacks by the Viet Cong following the successful American and South Vietnamese response to the Tet Offensive.

The Irish Republican Army suffered a defeat in the civil war of the early 1920's. Following this defeat, they lost considerable support among the Irish population, who were largely in favor of the 1921 treaty with the British that led to the creation of the Irish Free State and instigated the civil war. In response to this loss of popular mobilization, the remaining IRA rebels turned increasingly to guerilla tactics and assassinations, rather than direct engagement with British or Free State forces (English, 2003).

Vanguard Violence

On the flip side, a rebel organization that has success with an irregular campaign may convince the population (and itself) that it is relatively strong. Doing so increases mobilization and intensifies conflict. If the irregular campaign is sufficiently successful, mobilization increases enough that the rebel leaders transition from irregular tactics to larger scale conventional tactics. It is not an increase in the rebels' perception of their own capacity that causes this transition. The expected payoff from conventional conflict relative to irregular conflict depends only on mobilization (λ_2), not capacity. It is because mobilization is increasing in capacity (κ_1) that increased capacity leads to a transition from irregular to conventional tactics. Hence, the model is consistent with cases like the Israeli-Palestinian conflict, the Algerian War of Independence, the Russian Revolution, the M-19 insurgency in Colombia, and many other conflicts, where high levels of terrorism, guerilla attacks, and other irregular tactics sparked a larger scale uprising and a switch to a rebellion more focused on conventional war fighting.

4.4 Conflict Begets Conflict

Fighting worsens expected future outside options. As a result, in the model, conflict begets conflict in two senses. All else equal, an exogenous increase to the intensity of period 1 conflict (i.e., mobilization) increases both the probability of conflict and the expected level of mobilization in period 2. I show these results in turn below.

As is clear from Figure 3, for a fixed κ_1, there is conflict in period 2 if and only if the outside option is sufficiently bad. Define the function $\mathcal{E}(\kappa_1) = \min\{\kappa_1\theta_C - (\overline{\eta} + c), \kappa_1\tau - \eta_R\}$. That is:

$$\mathcal{E}(\kappa_1) = \begin{cases} \kappa_1\tau - \eta_R & \text{if } \kappa_1 < \frac{\overline{\eta}+c-\eta_R}{\theta_C-\tau} \\ \kappa_1\theta_C - (\overline{\eta}+c) & \text{if } \kappa_1 \geq \frac{\overline{\eta}+c-\eta_R}{\theta_C-\tau}. \end{cases}$$

There is conflict in the second period if and only if $u_2 \leq \mathcal{E}(\kappa_1)$. Clearly $\mathcal{E}(\cdot)$ is increasing in κ_1—the higher the rebel group's capacity, the better the outside option can be and still sustain conflict. The probability of conflict occurring in period 2, from the perspective of a period 1 in which there was conflict, is

$$\int_0^\infty G_{u_1,\lambda_1}(\mathcal{E}(\tilde{\kappa}))f_{\kappa_0}(\tilde{\kappa})\,d\tilde{\kappa}.$$

An exogenous (non-equilibrium) shock to the intensity of period 1 conflict (i.e., a higher λ_1) induces a first-order stochastic worsening of the distribution G_{u_1,λ_1} which, by the definition of first-order stochastic dominance, increases $G_{u_1,\lambda_1}(\mathcal{E}(\tilde{\kappa}))$ and therefore increases the probability of conflict in period 2.

Similarly, define $\lambda_2(\kappa_1, u_2)$ as equilibrium mobilization. From Lemma 1, λ_2^C and λ_2^I are non-increasing in u_2. Moreover, from Lemma 2, at the transition between conventional and irregular conflict, they are equal. Hence, for any κ_1, $\lambda_2(\kappa_1, u_2)$ is non-increasing in u_2. Given this, expected mobilization in period 2, from the perspective of a period 1 in which there was conflict, is

$$\int_{\underline{u}}^{\overline{u}}\int_0^\infty \lambda_2(\tilde{\kappa},\tilde{u})f_{\kappa_1}(\tilde{\kappa})g_{u_1,\lambda_1}(\tilde{u})\,d\tilde{\kappa}\,d\tilde{u}.$$

An exogenous (non-equilibrium) shock to the intensity of period 1 conflict (i.e., an increase in λ_1) induces a first-order stochastic worsening of the distribution of second period outside options, g_{u_1,λ_1}. Since $\lambda_2(\tilde{\kappa},\tilde{u})$ is non-increasing in $\tilde{u}$ and is strictly decreasing on part of the support of the distribution, by the definition of first-order stochastic dominance, this implies that, all else equal, expected period 2 mobilization is increasing in period 1 mobilization.

4.5 Rebel Leader Extremism and Isolation

The distance between the parameters η_R and $\underline{\eta}$ can be thought of as a measure of the rebel leaders' extremism or isolation. When η_R is very small relative to $\underline{\eta}$, the rebel leaders are much less willing to abandon conflict than are members of the population—either because of greater ideological commitment or because their leadership role in the rebellion has isolated them from opportunities available to other members of society. The consequence of an increase in such extremism or isolation (i.e., an increase in $|\eta_R - \underline{\eta}|$) is that the rebel leaders become more likely to engage in irregular conflict. This is because, when the rebel leaders are very extreme or very isolated, it is more likely that a scenario will arise in which the population is not willing to mobilize, but the rebel leaders still want to fight. In such situations, the best tactical choice available to the rebel leaders is irregular conflict.

One can seen this formally in Propositions 1 and 3 from the fact that the boundaries between irregular conflict and withdrawing from conflict—$\frac{u_2+\eta_R}{\tau}$ in the second period and $\underline{\kappa}(u_1)$ in the first period—are both increasing in η_R and constant in $\underline{\eta}$. Graphically it is clearest in Figure 3 where, if η_R decreases, the size of the area in which there is irregular conflict increases at the expense of the area where the rebels withdraw from conflict, while nothing else changes.

This has two implications. First, it suggests that a high level of ideological motivation among core rebel leaders is expected to be positively associated with the occurrence of irregular conflict, but not conventional conflict. Second, it suggests that a good strategy for ending irregular conflicts with relatively weak rebel groups is to improve the outside option for the rebel leaders, perhaps by offering immunity. Doing so makes rebel leaders less likely to continue an irregular conflict in the absence of public support.

5 Conclusion

I present a model of dynamic mobilization for rebellion and tactical choice by rebels. Tactical choice depends on mobilization—conventional tactics are relatively more attractive when mobilization is high, while irregular tactics are relatively more attractive when mobilization is low. Mobilization is sensitive to both the outside option and perceptions of the rebel organization's capacity. While the model produces a variety of results, three key intuitions bear repeating.

First, successful rebel campaigns indicate high rebel capacity. Hence, consistent with the notion that extremist vanguards play a critical role in many conflicts, the model predicts that successful irregular campaigns spark mobilization, allowing a shift to larger scale rebellion using conventional tactics. Similarly, successful counterinsurgencies indicate diminished rebel capacity. As a result, effective counterinsurgencies dynamically reduce mobilization, leading rebel leaders to transition from conventional to irregular tactics, or even to withdraw from conflict. Thus, successful counterinsurgencies can lead to an increase in terrorism, guerilla attacks, and other forms of irregular war fighting.

Second, fighting has option value for rebel leaders—it leaves the rebel organization ready to fight another day, should future circumstances favor rebellion, while still leaving open the possibility of future withdrawal from conflict. Hence, the rebel organization is sometimes willing to fight even when the short-term returns to conflict are negative. This is especially true in highly volatile military or economic environments, where significant shifts in the relative capacity of the rebels and government or in incentives to mobilize are likely.

Finally, a change in the outside option (be it economic or political) has different effects on the likelihood of conventional and irregular conflict. A decrease in opportunity increases mobilization. Since conventional tactics are preferred when mobilization is strong, as opportunity decreases and mobilization increases, the use of conventional tactics increases. More importantly, the effect of opportunity on the use of irregular conflict is non-monotone. Irregular tactics are preferred by rebel leaders that want to fight, but lack high levels of mobilization. If opportunity is very poor, mobilization will be so strong that the rebels pursue conventional conflict. If opportunity is very good, then the rebel leaders withdraw from conflict. Thus, irregular conflict only occurs if the outside option is moderate—low enough that the rebel leaders are willing to fight but high enough that mobilization stays relatively low.

This non-monotonicity in the use of irregular tactics illustrates the importance of jointly studying the causes of multiple forms of political violence—e.g., terrorism, insurgency, guerilla warfare, conventional war fighting, and so on. Much of the literature examines hypotheses derived from general models of conflict while focusing on a single rebel tactic. As a result, the empirical literatures on terrorism, civil wars, guerilla warfare, and so on, all work with very similar intuitions (and right-hand sides of regressions). My model illustratesx the danger of this approach—deriving empirical intuitions from a general model of conflict leads us to incorrectly expect (and look for) monotone relationships. When we consider the possibility of an endogenous choice among rebel tactics, we find that the likelihood of irregular tactics being used is maximized at some interim level of outside opportunity. The standard intuition holds only for conventional tactics. And, indeed, it is straightforward that if we considered many tactics, each with different levels of labor-intensivity, the monotonicity intuition would hold only for the use of the most labor intensive tactic.

While potentially useful for future empirical work on the use of irregular tactics, the particular non-monotonicity identified here is perhaps best viewed as a proof of concept for the value of disaggregating rebel tactics more generally. There are many potentially relevant dimensions of rebel strategy—e.g., levels of violence, civilian vs. military targets, urban vs. rural organization, identity vs. economic vs. ideological mobilization, and so on. Endogenizing rebel choices on these dimensions might lead to a variety of interesting interactions between putative causes of conflict and tactical choice. Here substitutability plus differentiation with respect to labor intensivity of conventional and irregular tactics led to a non-monotonicity with respect to outside options. Elsewhere various technologies of conflict combined with substitutability or complementarity among tactics might lead to other counterintuitive relationships between tactical choice and, say, political freedom, state capacity, geography, economic inequality, ethnic divisions, and so on. Hence, the results presented here highlight a more general point for the conflict literature—the importance of studying not just when, but how, rebels fight.

Appendix: Proofs of Numbered Results

Proof of Lemma 1. First focus on conventional conflict. $\lambda_2^C = 1$ if and only if, at full mobilization, population member $\overline{\eta}$ will mobilize for conventional conflict, or:

$$\kappa_1\theta_C - c \geq u_2 + \overline{\eta} \iff \kappa_1 \geq \frac{u_2 + \overline{\eta} + c}{\theta_C},$$

as required.

$\lambda_2^C = 0$ if (i) at zero mobilization, population member $\underline{\eta}$ is unwilling to participate in irregular conflict and (ii) there is no sustainable positive level of mobilization for conventional conflict. Condition (i) is true if and only if:

$$-c < u_2 + \underline{\eta},$$

as required. Condition (ii) requires that $\kappa_1\theta_C\lambda_2 - c < u_2 + \eta^*(\lambda_2)$ for all λ_2. Given that the left- and right-hand sides of this inequality are linear in λ_2, it suffices to show that it holds at $\lambda_2 = 0$ (guaranteed by the condition above) and at $\lambda_2 = 1$. This latter condition requires $\kappa_1 < \frac{u_2+\overline{\eta}+c}{\theta_C}$, as required.

Substituting from Equation 1 into Equation 3, if λ_2^C is interior it is characterized by:

$$\kappa_1\theta_C\lambda_2^C - c = u_2 + \underline{\eta} + \lambda_2^C(\overline{\eta} - \underline{\eta}) \iff \lambda_2^I = \frac{u_2 + \underline{\eta} + c}{\kappa_1\theta_C - (\overline{\eta} - \underline{\eta})}.$$

Now consider irregular conflict. $\lambda_2^I = 1$ if, at full mobilization, population member $\overline{\eta}$ is willing to participate in irregular conflict. This is true if and only if:

$$\kappa_1(\theta_I + \tau) - c \geq u_2 + \overline{\eta} \iff \kappa_1 \geq \frac{u_2 + \overline{\eta} + c}{\theta_I + \tau},$$

as required.

$\lambda_2^I = 0$ if (i) at zero mobilization, population member $\underline{\eta}$ is unwilling to participate in irregular conflict and (ii) there is no sustainable positive level of mobilization for irregular conflict. Condition (i) is true if and only if:

$$\kappa_1 \tau - c < u_2 + \underline{\eta} \iff \kappa_1 < \frac{u_2 + \underline{\eta} + c}{\tau},$$

as required. Condition (ii) requires that $\kappa_1(\theta_I \lambda_2 + \tau) - c < u_2 + \eta^*(\lambda_2)$ for all λ_2. Given that the left- and right-hand sides of this inequality are linear in λ_2, it suffices to show that it holds at $\lambda_2 = 0$ (guaranteed by the condition above) and at $\lambda_2 = 1$. This latter condition requires $\kappa_1 < \frac{u_2+\overline{\eta}+c}{\theta_I+\tau}$, as required.

Substituting from Equation 1 into Equation 2, if λ_2^I is interior it is characterized by:

$$\kappa_1(\theta_I \lambda_2^I + \tau) - c = u_2 + \underline{\eta} + \lambda_2^I(\overline{\eta} - \underline{\eta}) \iff \lambda_2^I = \frac{u_2 + \underline{\eta} + c - \kappa_1 \tau}{\kappa_1 \theta_I - (\overline{\eta} - \underline{\eta})}.$$

■

Proof of Proposition 2. First consider the conditions for conventional conflict.

1. Suppose $\lambda_2^C = 0$. Then, by Assumption 1, irregular conflict is preferred to conventional conflict. This establishes the necessity of the first condition.

2. Now assume $\lambda_2^C > 0$. We want that conventional tactics are preferred to irregular tactics at λ_2^C if and only if $\lambda_2^C \geq \lambda_2^I$.

   (a) Suppose $\lambda_2^C = 1$. Then, by Assumption 1, conventional tactics are preferred.

   (b) Now consider the case of $\lambda_2^C \in (0, 1)$. I make use of the following claim.

   Claim 1 *If $\lambda_2^C \in (0, 1)$, then $u_2 + \underline{\eta} < -c$.*

   Given the claim, I restrict attention to $u_2 + \underline{\eta} < -c$. It suffices to show the following two things: (i) when $\lambda_2^C \geq \lambda_2^I$, then conventional tactics are preferred to irregular tactics at mobilization λ_2^C (necessity) and (2) When $\lambda_2^C < \lambda_2^I$, irregular tactics are preferred to conventional tactics at mobilization λ_2^I (sufficiency).

Consider (i). To get a contradiction, suppose that $\lambda_2^C \geq \lambda_2^I$ and that $\kappa_1\theta_C\lambda_2^C < \kappa_1(\theta_I\lambda_2^C + \tau)$. From the fact that $\kappa_1\theta_C\lambda_2^C < \kappa_1(\theta_C\lambda_2^C + \tau)$, we have the following

$$u_2 + \eta^*(\lambda_2^C) = \kappa_1\theta_C\lambda_2^C - c < \kappa_1(\theta_I\lambda_2^C + \tau) - c.$$

Note two facts. First, it follows from the fact that $u_2 + \underline{\eta} < -c$, that at $\lambda = 0$ $\kappa_1(\theta_I\lambda + \tau) - c$ is greater than $u_2 + \eta^*(\lambda)$. Second, $\kappa_1(\theta_I\lambda + \tau) - c$ and $u_2 + \eta^*(\lambda)$ are both linear in λ. Hence, $\kappa_1(\theta_I\lambda + \tau) - c$ is greater than $u_2 + \eta^*(\lambda)$ for all $\lambda \leq \lambda_2^C$. This implies that $\kappa_1(\theta_I\lambda + \tau) - c$ crosses $u_2 + \eta^*(\lambda)$ at some $\lambda > \lambda_2^C$ which implies $\lambda_2^I > \lambda_2^C$, a contradiction.

Consider (ii). To get a contradiction, suppose that $\lambda_2^C < \lambda_2^I$ and that $\kappa_1\theta_C\lambda_2^I > \kappa_1(\theta_I\lambda_2^I + \tau)$. From the fact that $\kappa_1\theta_C\lambda_2^I > \kappa_1(\theta_I\lambda_2^I + \tau)$, we have the following

$$\kappa_1\theta_C\lambda_2^I - c > \kappa_1(\theta_I\lambda_2^I + \tau) - c = u_2 + \eta^*(\lambda_2^I).$$

Note two facts. First, it follows from the fact that $u_2 + \underline{\eta} < -c$, that at $\lambda = 0$, $\kappa_1\theta_C\lambda - c$ is greater than $u_2 + \eta^*(\lambda)$. Second, $\kappa_1\theta_C\lambda - c$ and $u_2 + \eta^*(\lambda)$ are both linear in λ. Hence, $\kappa_1\theta_C\lambda - c$ is greater than $u_2 + \eta^*(\lambda)$ for all $\lambda \leq \lambda_2^I$. This implies that $\kappa_1\theta_C\lambda - c$ crosses $u_2 + \eta^*(\lambda)$ at some $\lambda > \lambda_2^I$ which implies $\lambda_2^C > \lambda_2^I$, a contradiction.

All that remains is to prove the claim.

Proof of Claim 1. At $\lambda = 0$, $\kappa_1\theta_C\lambda - c$ is equal to $-c$. Suppose $u_2 + \underline{\eta} \geq -c$. There are two possibilities. The first is that $\kappa_1\theta_C\lambda - c$ never crosses $u_2 + \eta^*(\lambda)$, in which case $\lambda_2^C = 0$ and so $\lambda_2^C \notin (0, 1)$. The second is that $\kappa_1\theta_C\lambda - c$ crosses $u_2 + \eta^*(\lambda)$ from below, in which case $\lambda_2^C = 1$, so $\lambda_2^C \notin (0, 1)$. ■

Now consider irregular conflict. The first point is immediate from the argument about conventional conflict above. The second point is immediate from Proposition 1. ■

Proof of Lemma 2. From Lemma 1, both λ_2^C and λ_2^I are interior. Hence, the result follows from comparison and rearrangement. ■

Proof of Proposition 3. The following notation will be useful:

$$\hat{u}(u_1) \equiv \int_{\underline{u}}^{\overline{u}} \tilde{u} g_{u_1,0}(\tilde{u})\, d\tilde{u} \quad \text{and} \quad \hat{v}_R(\kappa_0, u_1, \lambda_1) \equiv \int_0^\infty \int_{\underline{u}}^{\overline{u}} v_R(\tilde{\kappa}, \tilde{u}; s^2) g_{u_1,\lambda_1}(\tilde{u}) f_{\kappa_0}(\tilde{\kappa})\, d\tilde{u}\, d\tilde{\kappa}.$$

- When $\lambda_1 > 0$ the result follows from a simple comparison of payoffs.

- Next consider the case where $\lambda_1 = 0$. Comparing expected utilities, the rebel leaders will choose irregular tactics if and only if:

$$\kappa_0 \tau + \delta \hat{v}_R(\kappa_0, u_1, 0) \geq u_1 + \delta \hat{u}(u_1) + \eta_R(1+\delta).$$

Rewrite this inequality as:

$$\begin{aligned}
&\kappa_0\tau + \delta\Bigg(\int_{\underline{u}}^{-\eta_R} \int_0^\infty v_R(\tilde{\kappa}, \tilde{u}; s) f_{\kappa_0}(\tilde{\kappa}) g_{u_1,0}(\tilde{u})\, d\tilde{\kappa}\, d\tilde{u} \\
&\quad + \int_{-\eta_R}^{\frac{\tau(\overline{\eta}+c)-\theta_C\eta_R}{\theta_C-\tau}} \left[\int_0^{\frac{\tilde{u}+\eta_R}{\tau}} \tilde{u} f_{\kappa_0}(\tilde{\kappa})\, d\tilde{\kappa} + \int_{\frac{\tilde{u}+\eta_R}{\tau}}^\infty v_R(\tilde{\kappa}, \tilde{u}; s) f_{\kappa_0}(\tilde{\kappa})\, d\tilde{\kappa} \right] g_{u_1,0}(\tilde{u})\, d\tilde{u} \\
&\quad + \int_{\frac{\tau(\overline{\eta}+c)-\theta_C\eta_R}{\theta_C-\tau}}^{\overline{u}} \left[\int_0^{\frac{\tilde{u}+\overline{\eta}+c}{\theta_C}} \tilde{u} f_{\kappa_0}(\tilde{\kappa})\, d\tilde{\kappa} + \int_{\frac{\tilde{u}+\overline{\eta}_c}{\theta_C}}^\infty v_R(\tilde{\kappa}, \tilde{u}; s) f_{\kappa_0}(\tilde{\kappa})\, d\tilde{\kappa} \right] g_{u_1,0}(\tilde{u})\, d\tilde{u} \Bigg) \\
&\qquad\qquad \geq u_1 + \eta_R(1+\delta) + \delta \int_{\underline{u}}^{\overline{u}} \int_0^\infty \tilde{u} f_{\kappa_0}(\tilde{\kappa}) g_{u_1,0}(\tilde{u})\, d\tilde{\kappa}\, d\tilde{u}.
\end{aligned}$$

Subtracting $\delta \left(\int_{-\eta_R}^{\frac{\tau(\overline{\eta}+c)-\theta_C\eta_R}{\theta_C-\tau}} \int_0^{\frac{\tilde{u}+\eta_R}{\tau}} \tilde{u} f_{\kappa_0}(\tilde{\kappa})\, d\tilde{\kappa} g_{u_1,0}(\tilde{u})\, d\tilde{u} + \int_{\frac{\tau(\overline{\eta}+c)-\theta_C\eta_R}{\theta_C-\tau}}^{\overline{u}} \int_0^{\frac{\tilde{u}+\overline{\eta}+c}{\theta_C}} \tilde{u} f_{\kappa_0}(\tilde{\kappa})\, d\tilde{\kappa} g_{u_1,0}(\tilde{u})\, d\tilde{u} \right)$ from both sides, the rebel leaders prefer irregular conflict to withdrawal if and only if:

$$\begin{aligned}
&\kappa_0\tau + \delta\Bigg(\int_{\underline{u}}^{-\eta_R} \int_0^\infty v_R(\tilde{\kappa}, \tilde{u}; s) f_{\kappa_0}(\tilde{\kappa}) g_{u_1,0}(\tilde{u})\, d\tilde{\kappa}\, d\tilde{u} \\
&+ \int_{-\eta_R}^{\frac{\tau(\overline{\eta}+c)-\theta_C\eta_R}{\theta_C-\tau}} \int_{\frac{\tilde{u}+\eta_R}{\tau}}^\infty v_R(\tilde{\kappa}, \tilde{u}; s) f_{\kappa_0}(\tilde{\kappa}) g_{u_1,0}(\tilde{u})\, d\tilde{\kappa}\, d\tilde{u} + \int_{\frac{\tau(\overline{\eta}+c)-\theta_C\eta_R}{\theta_C-\tau}}^\infty \int_{\frac{\tilde{u}+\overline{\eta}_c}{\theta_C}}^\infty v_R(\tilde{\kappa}, \tilde{u}; s) f_{\kappa_0}(\tilde{\kappa}) g_{u_1,0}(\tilde{u})\, d\tilde{\kappa}\, d\tilde{u} \Bigg) \\
&\qquad \geq u_1 + \eta_R(1+\delta) + \delta\Bigg(\int_{\underline{u}}^{-\eta_R} \int_0^\infty \tilde{u} f_{\kappa_0}(\tilde{\kappa}) g_{u_1,0}(\tilde{u})\, d\tilde{\kappa}\, d\tilde{u} \\
&+ \int_{-\eta_R}^{\frac{\tau(\overline{\eta}+c)-\theta_C\eta_R}{\theta_C-\tau}} \int_{\frac{\tilde{u}+\eta_R}{\tau}}^\infty \tilde{u} f_{\kappa_0}(\tilde{\kappa})\, d\tilde{\kappa} g_{u_1,0}(\tilde{u})\, d\tilde{u} + \int_{\frac{\tau(\overline{\eta}+c)-\theta_C\eta_R}{\theta_C-\tau}}^{\overline{u}} \int_{\frac{\tilde{u}+\overline{\eta}+c}{\theta_C}}^\infty \tilde{u} f_{\kappa_0}(\tilde{\kappa})\, d\tilde{\kappa} g_{u_1,0}(\tilde{u})\, d\tilde{u} \Bigg).
\end{aligned}$$

The first term on the left-hand side is increasing linearly in κ_0. The rest of the terms are continuation values conditional on realizations of the random variables such that there is conflict in the second period. Since the payoff from conflict is increasing in κ_1 and the distribution of κ_1 is FOSD increasing in κ_0, these terms are also increasing in κ_0. Hence, the entire left-hand side is increasing in κ_0. Moreover, as κ_0 goes to infinity, the left-hand side goes to infinity. The right-hand side is constant in κ_0

Now, to see that $\underline{\kappa}(u_1)$ exists for every u_1, consider two cases:

1. Fix a u_1 such that the left-hand side is less than the right-hand side at $\kappa_0 = 0$. Since, as κ_0 goes to infinity, the left-hand side goes to infinity, the fact that the left-hand side is increasing in κ_0 and the right-hand side is finite and constant in κ_0 implies the existence of a unique cut-point, $\underline{\kappa}(u_1)$, as required.
2. Fix a u_1 such that the left-hand side is greater than the right-had side at $\kappa_0 = 0$. Then the left-hand side is greater than the right-hand side for all κ_0, so $\underline{\kappa}(u_1) = 0$.

Next I show that $\underline{\kappa}(\cdot)$ is non-decreasing in u_1. The first-term on the left-hand side is constant in u_1. The rest of the terms on the left-hand side are continuation values conditional on realizations of the random variables such that there is conflict in the second period. Since the payoff from conflict is increasing in second period mobilization (λ_2), second period mobilization is decreasing in u_2, and the distribution of u_2 is FOSD increasing in u_1, these terms are all decreasing in u_1. Hence, the left-hand side is decreasing in u_1. The first term on the right-hand side is increasing in u_1. The remaining terms are expected values of u_2 conditional on realizations of the random variables such that there is no conflict in the second period. Since the distribution of u_2 is FOSD increasing in u_1, these terms are all increasing in u_1. Hence, the right-hand side is increasing in u_1. The fact that the left-hand side is decreasing in u_1 and the right-hand side is increasing in u_1 implies that, when $\underline{\kappa}(u_1)$ is interior, it is increasing in u_1. When $\underline{\kappa}(u_1)$ is a corner at zero, it is constant in u_1. Hence $\underline{\kappa}(\cdot)$ is non-decreasing in u_1.

Next I show that $\underline{\kappa}(\cdot)$ is non-decreasing in η_R. To see this, note that the first-term on the left-hand side is constant in η_R. The rest of the terms on the left-hand side are continuation values conditional on realizations of the random variables such that there is conflict in the second period. Hence, they too are constant in η_R, so the entire left-hand side is constant in η_R. The right-hand side is strictly increasing in η_R. The fact that the left-hand side is constant in η_R and the right-hand side is increasing in η_R implies that, when $\underline{\kappa}(u_1)$ is interior, it is increasing in η_R. When $\underline{\kappa}(u_1)$ is a corner at zero, it is constant in η_R. Hence $\underline{\kappa}(\cdot)$ is non-decreasing in η_R.

Finally, I show that for all u_1 such that $\underline{\kappa}(u_1) > 0$, we have $\underline{\kappa}(u_1) < \frac{u_1+\eta_R}{\tau}$. If

$\underline{\kappa}(u_1) > 0$, then we have:

$$\begin{aligned}
\underline{\kappa}(u_1)\tau &= u_1 + \delta\hat{u}(u_1) + \eta_R(1+\delta) - \delta\hat{v}_R(\kappa_0, u_1, 0) \\
&\leq u_1 + \delta\hat{u}(u_1) + \eta_R(1+\delta) - \delta(\hat{u}(u_1) + \eta_R) \\
&= u_1 + \eta_R,
\end{aligned}$$

where the inequality follows from the fact that the optimality of the rebel leaders' second period strategy implies that $\hat{v}_R$ is bounded below by $\hat{u}(u_1) + \eta_R$, which is the expected payoff from withdrawing from conflict for certain in the second period.

■

Proof of Proposition 4. The expected payoff to withdrawing from conflict in the first period when mobilization is zero is:

$$u_1 + \eta_R(1+\delta) + \delta \int_{\underline{u}}^{\overline{u}} \tilde{u} g_{u_1,0}(\tilde{u})\, d\tilde{u},$$

which does not depend on the distribution of κ_1.

The payoff to irregular conflict is:

$$\kappa_0\tau + \int_0^\infty \int_{\underline{u}}^{\overline{u}} v_R(\tilde{\kappa}, \tilde{u}; s^2) g_{u_1,0}(\tilde{u})\, d\tilde{u} f_{\kappa_0}(\tilde{\kappa})\, d\tilde{\kappa}.$$

The continuation value $v_R(\tilde{\kappa}_1, \tilde{u}_2; s^2)$ is the upper envelope of linear functions of $\tilde{\kappa}$ and is, thus, convex in $\tilde{\kappa}$. Define the function $H(\cdot)$ as follows:

$$H(\kappa_1) \equiv \int_{\underline{u}}^{\overline{u}} v_R(\kappa_1, \tilde{u}; s^2) g_{u_1,0}(\tilde{u})\, d\tilde{u}.$$

Since convexity is preserved under integration, $H(\cdot)$ is convex in κ_1. We can now write the rebel leaders' expected payoff to irregular conflict as:

$$\int_0^\infty H(\tilde{\kappa}) f_{\kappa_0}(\tilde{\kappa})\, d\tilde{\kappa}.$$

Since $H(\cdot)$ is convex, it is straightforward from the definition of second-order stochastic dominance that

$$\int_0^\infty H(\tilde{\kappa}) f'_{\kappa_0}(\tilde{\kappa})\, d\tilde{\kappa} > \int_0^\infty H(\tilde{\kappa}) f_{\kappa_0}(\tilde{\kappa})\, d\tilde{\kappa},$$

as required. ■

Proof of Proposition 5. As in the proof of Proposition 3, let $\hat{u}(u_1)$ be the expected value of u_2, given u_1 and $\lambda_1 = 0$. Notice, since $g'_{u_1,0}$ is a mean-preserving spread of $g_{u_1,0}$, we have:

$$\hat{u}(u_1) = \int_{\underline{u}}^{\overline{u}} \tilde{u} g_{u_1,0}(\tilde{u})\, d\tilde{u} = \int_{\underline{u}}^{\overline{u}} \tilde{u} g'_{u_1,0}(\tilde{u})\, d\tilde{u}.$$

The expected payoff to withdrawing from conflict in the first period when mobilization is zero under either $g'_{u_1,0}$ or $g_{u_1,0}$ is:

$$u_1 + \delta \hat{u}(u_1) + \eta_R(1+\delta).$$

The payoff to irregular conflict under a distribution $g_{u_1,0}$ is:

$$\kappa_0 \tau + \int_0^{\infty} \int_{\underline{u}}^{\overline{u}} v_R(\tilde{\kappa}, \tilde{u}; s^2) g_{u_1,0}(\tilde{u})\, d\tilde{u} f_{\kappa_0}(\tilde{\kappa})\, d\tilde{\kappa}.$$

The rebel leaders' second period payoff, if they take the outside option, is linear in u_2. It is straightforward from Lemmas 1 and 2 that second period mobilization is linear in u_2, so the rebel leaders' second period payoff from either type of conflict is also linear in u_2. Thus, the continuation value $v_R(\tilde{\kappa}_1, \tilde{u}_2; s^2)$ is the upper envelope of linear functions of $\tilde{u}_2$ and, so, is convex in $\tilde{u}_2$. Given this, an argument identical to that in the proof of Proposition 4 establishes the result. ■

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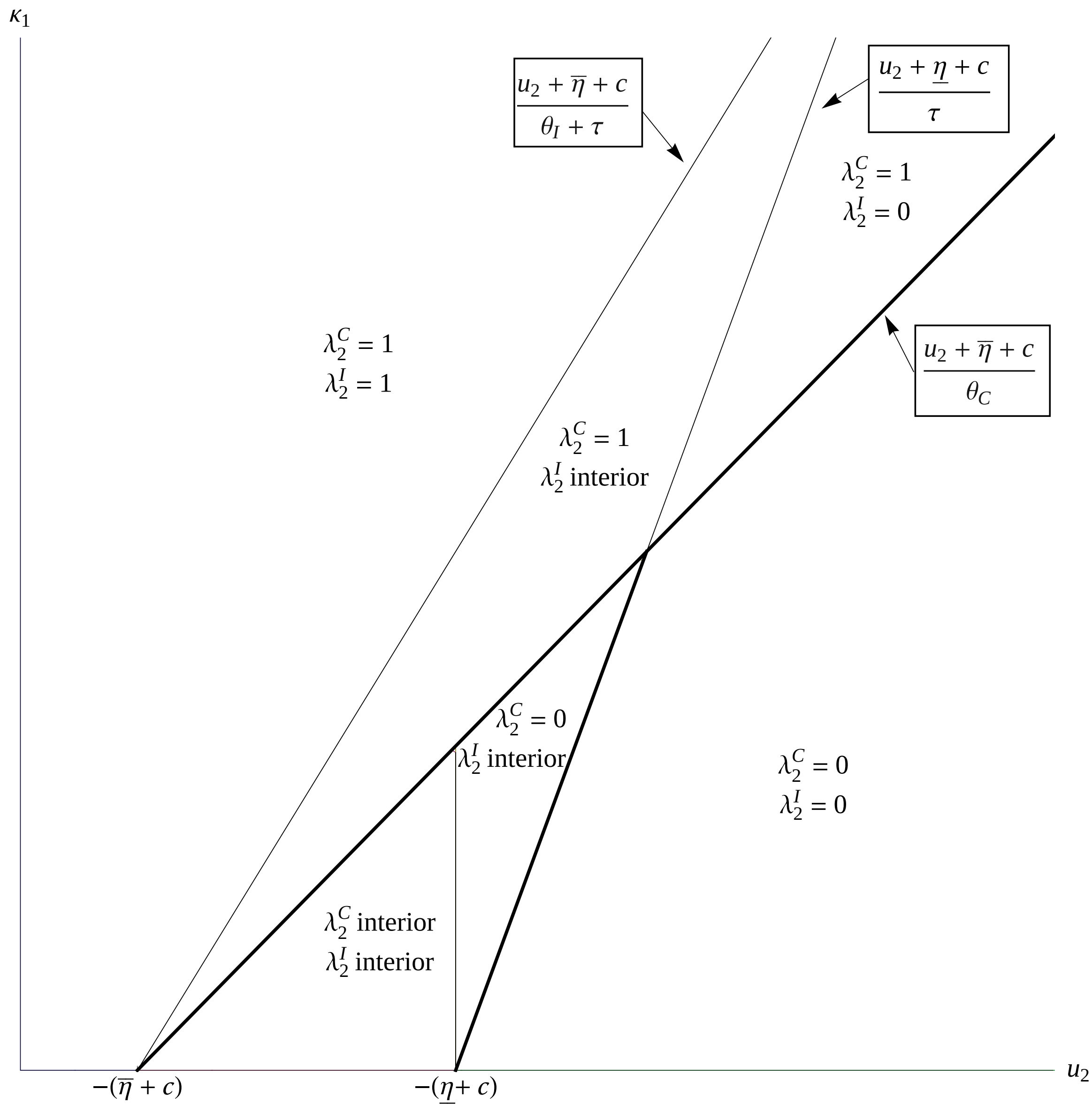

Figure 1: Second period mobilization for conventional and irregular violence as a function of the realization of the outside option (u_2) and rebel capacity (κ_1).

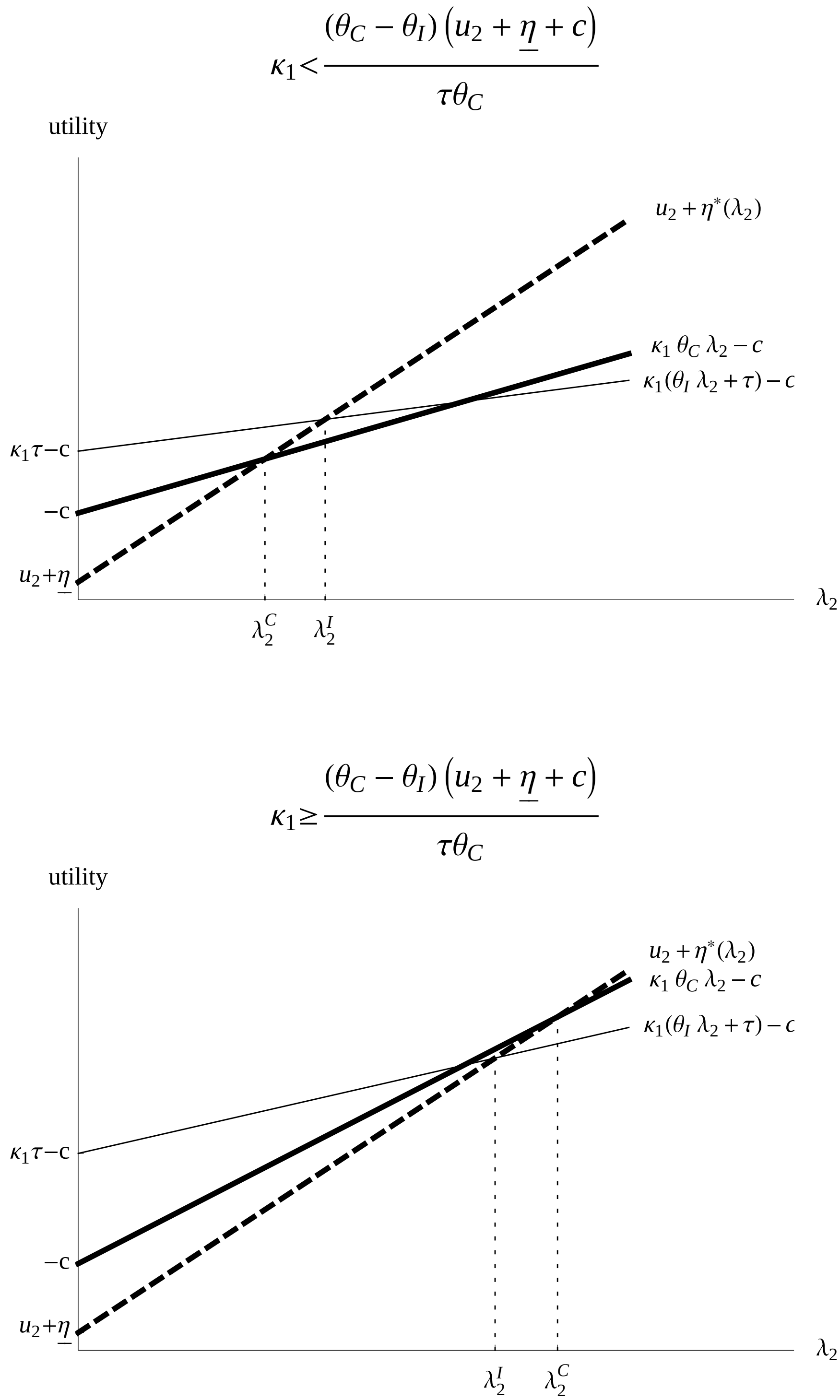

Figure 2: When λ_2^I and λ_2^C are both interior, $\lambda_2^C > \lambda_2^I$ if and only if κ_1 is sufficiently large.

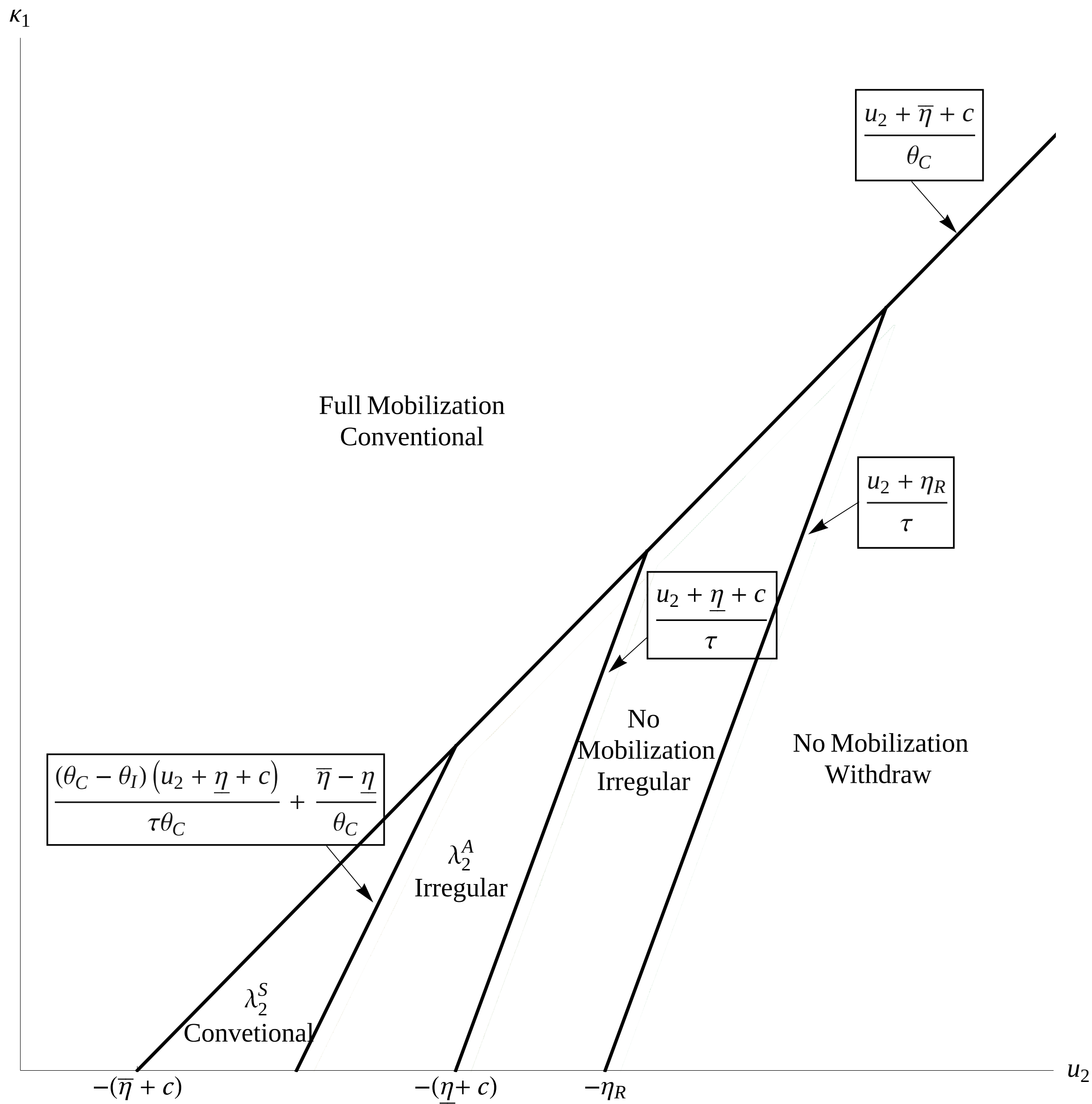

Figure 3: Mobilization and tactical choice in period 2 as a function of the realized outside option (u_2) and rebel capacity (κ_1).

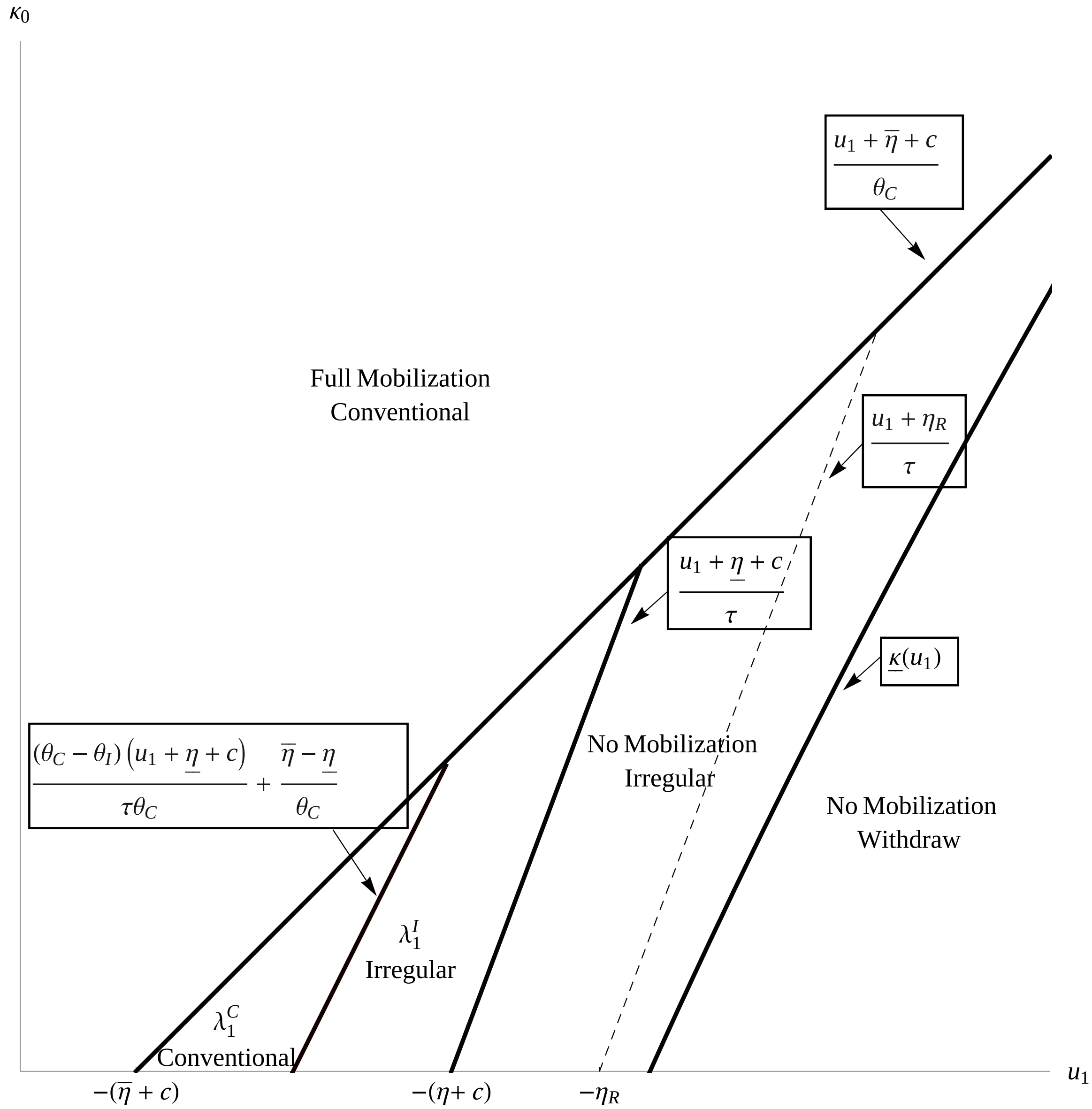

Figure 4: Mobilization and tactical choice in period 1 as a function of the realized outside option (u_1) and rebel capacity (κ_0). The dashed line denotes where the dividing line between irregular conflict and withdrawal from conflict would lie if there were no option value from conflict.