Ethnic Grievances or Ethnic Networks? The Influence of Rumor Networks on Rebel Group Formation *

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Abstract

How do rumors influence the onset of organized armed conflict? While observers commonly note that rumors predominate in conflict settings, theories and empirical analyses have not yet identified whether and why they influence the start of organized armed conflict. In this paper, we advance a new conceptualization of initial rebel group formation that aims to do so. Using a novel game-theoretic network model, we show why the structure of trusted communication networks among civilians where rebel groups form – which carry credible rumors about the rebels – can influence whether incipient rebels groups become viable. We argue further that in rural Sub-Saharan Africa, structures favorable to nascent rebels are likely to underlie ethnically homogeneous localities, but not heterogeneous ones. In doing so, we advance a new explanation for why ethnicity influences conflict onset, and show that ethnic grievances are not a necessary condition for the emergence of "ethnic rebellion." Other work has overlooked the importance of rumor networks during the early stages of conflict because these stages are typically hidden from view; insurgent group formation is rarely documented or captured in datasets. We illustrate our arguments using evidence from Uganda that provides a rare window into the initial stages of insurgent group formation.

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1 Introduction

Rumors and propaganda are ubiquitous features of warfare, yet they are largely absent from dominant theories of organized armed conflict onset. Information control is likely particularly important during a phase of civil warfare onset that is among the least studied: the uncertain and often secretive *initial* stages of insurgency, before each side's capabilities are fully demonstrated. As the opening words of Jeremy Weinstein's *Inside Rebellion* read, "Word of the rebels came first in the form of rumors."

These phases are among the least studied because there are formidable barriers to observing nascent insurgencies, which are often clandestine and based in remote regions of states with under-resourced news media. As a result, case studies and other rich evidence about the early stages of group formation are extremely rare, particularly for groups that fail before producing substantial violence. For related reasons, the start of rebel groups are often poorly-measured and early-failed groups are omitted from standard quantitative datasets of civil war that underpin most recent analyses of conflict onset.[1] This fundamental problem for the study of civil conflict has led to a dearth of theory about armed group formation.

The aim of this paper is to examine explicitly the initial stages of insurgency, using a novel game-theoretic network model and unusual evidence about insurgent group formation from Uganda, including evidence about several groups that failed too early to be captured in standard conflict datasets. In particular, we seek to understand: Among rebel groups that begin to form, why do only some become viable challengers to a government? We define rebel groups as armed groups with a discernable command structure that seek to violently challenge a state, and conceptualize rebel groups as having started the process of formation – thus, in effect, entering the population we aim to study – after a group builds this command structure and develops plans to

[1] Lewis (2014) demonstrates these omissions in case studies and datasets. She finds that over 80% of quantitative analyses of conflict onset from 2003 to 2013 in major political science journals are based on one of four standard datasets – Correlates of War, the Armed Conflict Dataset, or those of Fearon (2003) or Sambanis (2004) – none of which capture the initial stages of insurgency.

commit an initial act of violence against the state. We conceptualize *viability* as a threshold that incipient rebel groups surpass once they have the capacity to minimally threaten the state by operating a base with a sizeable number of troops on the state's territory.[2]

Our theoretic approach explains how the structure and geographic dispersion of trusted information networks among civilians where a rebel group initially operates – those that carry credible rumors about the rebels – influences whether the group becomes viable. Because nascent rebel groups are typically small and vulnerable, we argue, rebels need local civilians to keep quiet about their activities if they hope to become viable; information leaks to the government about incipient rebels' identity and whereabouts can be devastating. Each civilian's decision about whether or not to provide information about rebels to the government depends on his expectations about the nascent rebels' future capabilities relative to the government, about the gains from a successful rebellion, and about the expectations and actions of his fellow civilians. To form these expectations, civilians draw on information from their established networks of trusted communication. Some networks are better suited to both coordinate information about the rebels and to encourage mutual secret-keeping.

When applied to the settling of rural societies in weak states – arguably the most common setting for rebel group formation[3] – this model has important implications for our understanding of how ethnicity influences the early stages of civil conflict. We argue that distinct features of kinship networks in rural, Sub-Saharan Africa tend to underlie ethnically homogeneous areas, and that features of such networks make it

[2]For the empirical analyses below, we operationalize this concept as maintaining a base on the target country's territory with at least 100 troops for at least 3 months, although the analyses are not sensitive to these cut-offs.

[3]The few existing social science studies on the inception of armed movements tend to focus on relatively strong state contexts, or contexts of powerful foreign occupiers (Petersen, 2001; Lawrence, 2010). Given that the most robust finding of the literature on civil war onset is that its occurrence is inversely related to a county's GDP per capita (Hegre and Sambanis, 2006), it is also clearly important to understand these dynamics in weak states. Further, as we show below, insurgency is most likely to be used as a technology of conflict in weak states.

more likely that rebels will become viable there. Because of different kinship structures underlying ethnically heterogeneous areas, while attempts at organized rebellion do occur, civilians are more likely to provide information to the government about the vulnerable rebels forming in their midst – which leads to the rebels' demise before they present a substantial threat.

The paper thus advances a new understanding of how ethnicity influences conflict onset, emphasizing that ethnic grievances need not be the initial impetus for rebellion in a given community in order for the ethnic make-up of a community to influence the take-off of nascent rebel groups. While many of the implications of our model are consistent with the empirical findings of a growing body of literature that links geographic concentration of ethnic groups with civil war onset (Toft, 2003; Weidmann, 2009; Cederman, Weidmann and Gleditsch, 2011), our reasoning for *why* this is the case differs from others'. Existing accounts tend to assume that co-ethnics share common preferences over whether to rebel or not, often because of a shared perception among co-ethnics that they are unjustly excluded or otherwise mistreated by the central government. One of our primary theoretical contributions is to show precisely how local ethnic demography can influence the initial stages of internal conflict – and specifically the logic of why homogeneity in the local civilian population helps already-formed, incipient rebel groups to become viable threats – irrespective of the preferences of the local population.

We illustrate this and other key implications of the model with new evidence on rebellion in Uganda. A focus on Uganda overcomes the main obstacle to studying the early stages of rebel group formation that has plagued earlier work: they are poorly documented, if at all. Uganda has a blanket amnesty law for former rebels who disavow violence, thus the actors in these conflicts who are still alive can speak freely about their experiences. The analysis presented here draws heavily on evidence from interviews one of the authors conducted throughout Uganda with former insurgents, counterinsurgents, intelligence officials, other national and local officials, civilians liv-

ing in communities where rebels formed, and other actors and observers of these rebellions. This approach allows us to retrace the initial stages of rebellion, not only for a relatively-well documented rebel group that became viable, (although it did not become sufficiently violent to be included in the COW and similar datasets,) but also for one that failed so early that it is omitted from existing historical accounts and standard conflict dataset observations on Uganda. Uganda is also a highly policy-relevant case, since its recent history and ethnic demography has a great deal in common with nearby countries that continue to suffer from rebel-related violence, particularly the Democratic Republic of Congo, Central African Republic and South Sudan.

The paper is organized as follows. We begin by briefly describing how this study relates to the broader literature on civil conflict onset, and then present a theoretical framework and formal model of the initial stages of insurgency that centers on the importance of civilians and particularly attributes of civilians' communication networks in areas where a rebel group forms. The presentation of evidence from Uganda then proceeds in two sections. First, we provide background on the conditions under which rebel groups formed in Uganda, noting in particular that, contrary to existing theories' expectations, there is no clear, systematic pattern to where rebel groups initially launched. Second, we illustrate the core implications of the model with evidence from a paired case study of rebellion in eastern Uganda. Finally, we conclude with a brief discussion of the implications of this research.

2 Armed Conflict Onset, Rumors, and the Role of Ethnicity

Since the turn of the century, recognition that the majority of warfare occurs within states, between a state and at least one non-state actor, has led to an explosion of research on the causes of internal warfare and a litany of explanations for it. Much

of the debate has centered on whether and why ethnicity propels conflict, particularly in developing countries. While an initial wave of work based on cross-national data found no correlation between ethnic diversity and civil war onset onset (e.g. Fearon and Laitin (2003); Goldstone et al. (2010); Collier and Hoeffler (2004)), a subsequent cluster of research using subnational data found a relationship between geographically-concentrated ethnic groups and civil conflict onset (Toft, 2003; Weidmann, 2009; Cederman, Weidmann and Gleditsch, 2011). However, uncertainty remains about *why* this relationship holds.[4] As Blattman and Miguel (2010, 27) point out: "The finding that many civil conflicts are fought partially along ethnic lines alone is insufficient to make the case that ethnic-based grievances are driving the fighting... Heightened ethnic tension during a civil war might then be a result of the fighting rather than its cause."

We advance this debate and the broader literature on conflict onset in three ways. First, we directly examine the initial stages of insurgency; a necessary step towards understanding whether violence initially emerges from ethnic grievances, or vice versa, or both. While scholars have long probed the origins of internal warfare, most recent research about internal conflict only briefly references, if at all, how groups of individuals with political goals initially come together and build organizations with intent to commit violence against the state. Some studies center on rebellion-building activities like rebel recruitment or finance but take for granted the existence of an organization to absorb these resources. In other words, despite their clear importance to understanding the start of civil conflict and the voluminous literature on civil war onset that has emerged, the initial stages of insurgency remain in theoretical and empirical obscurity. Our model, combined with rich, new evidence from Uganda, allows us to shed new light on this topic.

[4]While Cederman, Wimmer and Min (2010) found a robust correlation between ethnic group marginalization from central power and armed rebellion, Lewis (2014) shows that their findings are driven by dubious assumptions about what constitutes a "politically relevant ethnic group" and imprecise measurement of the start of armed rebellion.

In doing so, we call attention to a phenomenon that prior studies of conflict onset had largely overlooked: the prevalence of "small" insurgent groups and the intriguing question of why only some aspiring rebels manage to build viable groups. This is an important step since small, early-failed groups are a recurring feature of qualitative accounts of insurgency from the Central African Republic, to Sri Lanka, to Pakistan – yet authors commonly acknowledge that information about such groups is typically too scant to provide much, if any, detail. For example, Timothy Wickham-Crowley's seminal study of numerous successful and failed Latin American guerilla movements examines only the "major" and "important" guerilla movements. He explains, "(G)uerilla movements appeared throughout Latin America in the 1960s, but most died an early death... failures left but few traces on the historical record, too few for the close analysis required here" (Wickham-Crowley, 1993, 16). Lewis (2014) shows that there is good reason to believe that this problem plagues also the standard conflict datasets upon which the vast majority of recent conflict studies rely. Thus, likely due to a lack of available information about what happens when rebel groups initially form, this process is under-theorized (Blattman and Miguel, 2010), and the frequency of early rebel failure is largely overlooked and never explained.

Second, by directly examining the early stages of insurgency, we are able to specify the importance of rumor networks in influencing conflict onset. While such networks play a central role in theories and evidence on how interethnic riots start, typically in urban contexts (e.g. Varshney (2003); Bhavnani, Findley and Kuklinski (2009)), little work addresses their relevance to the start of armed groups, especially rural insurgents. Furthermore, while foundational work has shown the fundamental importance of information and beliefs to the extent and character of violence amidst civil war (Kalyvas, 2006), and recent research has shown the importance of social networks to sustaining rebellion (Parkinson, 2013), our contribution is to bring some of these insights to why rebellions begin; information control should be crucial during the the uncertain and often secretive initial stages of insurgency, before each side's capabilities are fully

demonstrated. This paper also builds on Staniland (2014)'s insight that pre-war, local networks are important to insurgent group trajectories. We specify why certain kinship network structures shape how trusted information travels among civilians, and show why these networks matter to incipient rebels' chances for survival.

This contribution also adds to a small but growing literature relating a group's network structure to cooperative outcomes (see, e.g. Jackson and Wolinsky, 1996; Cho, 2011; Lippert and Spagnolo, 2011; Nava and Piccione, 2013; Wolitzky, 2013; Patty and Penn, 2013; Galeotti, Ghiglino and Squintani, 2013; Larson, 2014*b*,*a*). Not only is the model we present here the first to apply such a network approach to the context of nascent rebellions, this model is also to our knowledge the first to show how groups' networks allow them to adapt to novel situations and solve unanticipated coordination and collective action problems.

Third, and most relevant for the debate about the causes of "ethnic rebellion" described above, we advance knowledge about *why* geographically-concentrated ethnic groups are associated with rebellion. In contrast to the argument that co-ethnics launch rebellions together because they share identity-based grievances against the state, we argue that ethnicity's relevance lies in how it structures communication among the relevant actors when and where insurgencies initially form. In doing so, we provide evidence for the possibility that ethnic grievances are not a necessary condition for the start of rebellion; in fact, we show that in Uganda grievances did not precede rebellion. This paper thus may help to reconcile why despite empirical findings that rebellion tends to be associated with ethnically-concentrated groups, political economy experiments in Sub-Saharan Africa have not found evidence of strong, common preferences among co-ethnics (Habyarimana et al., 2009).

3 Forming a Viable Rebel Group

Our theory of the early stages of insurgency holds that whether or not civilians reveal information about the rebels to the government is a crucial determinant of whether nascent rebels become viable. We focus on the role of trusted gossip among civilians which coordinates support for rebels and allows groups to enforce behavior in weak state contexts.

3.1 The Context

Our theory pertains to weak state contexts, conceptualized as having little institutional penetration of its territory beyond the capital city.[5] Weak states are arguably the most common environment for insurgencies to form; since 1989, in states in the bottom half of the national income distribution among those which experienced civil war, non-state actors were more than twice as likely to use insurgency as their technology of warfare, as opposed to conventional warfare, than those in the top half of the distribution.[6]

Two features of weak states are relevant. One, because of this limited state presence, a common (if often overlooked) attribute of weak states is that their civil intelligence capacity is low. Two, in weak state contexts, when the formal provision of security or public goods may be lacking, informal institutions which can draw on personal tries and trusted communication in order to provide law, order, or services become particularly important (Dixit, 2003; Banerjee et al., 2010).

Rebel groups form when a small number of individuals decide to join together and employ violence in order to challenge the authority of a central government. Various individuals may have different reasons compelling them to rebel, but we assume that

[5] In the weak state context envisioned in this paper, outside the capital city there is scant presence of state-run security institutions such as military bases or state-sponsored village committees tasked with security provision. Police stations may be nominally present, but generally lack the resources and capacity to operate effectively over a large territory, and are easily avoided since they are clustered near trading centers.

[6] For this analysis, we used civil war data from Kalyvas and Balcells (2010) and GDP data from Fearon and Laitin (2003).

all seek, at a minimum, to become a *viable* fighting force so that they can potentially go on to defeat or extract concessions from the government.

Two conditions distinguish this initial stage of conflict from later stages. First, nascent rebels typically have few material resources, such as guns or financing. Second and relatedly, they are highly vulnerable to defeat. The first assertion marks a distinction between this conceptualization of rebellion and that of many others. In particular, Weinstein (2007) envisions nascent rebel groups' production functions as being constituted of a mix of initial social and material endowments, implying that some rebel groups may begin with a sizeable material resource base. However, the vast majority of rebel groups in weak states are initially endowed with minimal material resources; they acquire the ability and networks to attain funds and weapons over time, if they are to succeed in sustaining themselves as a group.[7]

One could reasonably object that many rebel groups do initially draw on significant resources, from either natural resources or external patrons. However, rebel groups that come to rely on high-value natural resources must first gain coercive capacity sufficient to overtake the area containing those resources and to develop networks that enable them to profit from them. A similar logic applies to rebel groups that come to be sponsored substantially by foreign governments. Since the end of the Cold War, it is unusual to find external sponsors that build proxy armies from the ground up for the purpose of destabilizing another government, and they are not likely to finance a group until that group has demonstrated its coercive capacity.[8]

The second assertion, that nascent groups are highly vulnerable, is straightforward. At a later phase, rebel groups may be strong enough to survive attacks or the capture

[7]For example, in his in-depth study of 13 civil wars for which natural resources were "most likely" to play a role, Ross (2004, 50-51) finds that none of the armed groups used natural resource sales or extraction to fund their startup costs.

[8]Note that we assume that rebels in this stage are not gaining significant resources from or coordinating with any other rebel groups that may be operating simultaneously in other regions of the target state. Recent work on rebel alliances stresses that such alliances largely serve instrumental purposes (Christia, 2012); by this logic, it is difficult to imagine why any existing group would ally with a resource-poor, nascent group that has not demonstrated the ability to be a viable threat.

of top commanders. But for incipient groups, a small number of people with a small number of weapons, information acquired by the government about the rebel leaders' identities and whereabouts likely spell the end of the rebellion: rebel leaders will be captured, killed, or co-opted– or more likely, a combination of those outcomes– which will lead to the cessation of organized violence.[9]

In sum, we assume that nascent rebels seek to begin building an organization that will use violence against the government; however, initially they are resource-poor and vulnerable. They seek to to recruit and train a small, well-screened fighting force, and to plan their initial attacks. In order to do so, if they hope to at least build a viable force, *rebels need secrecy from the government* about their identities, their location, and their intent to violently challenge the state. The main threat to this secrecy is civilians, the people outside the initial cadre of rebels who interact with or observe the group as it forms. If civilians in the locality in which the rebels launch maintain secrecy about the rebels' existence, identity and location, then the rebels will substantially increase their likelihood of becoming a viable force.

We turn now to a model which captures this setting and relates civilians' trusted communication networks to their ability to coordinate support for the rebels and keep their secrets from the government.

4 A Model of Communal Behavior in Weak States

In order to isolate the role of rumors in the early stages of rebellion, we present a novel model of interactions among civilians that builds from the empirical context and explicitly accounts for networks of trusted communication along which rumors spread via gossip. We consider a set of civilians in day-to-day interactions with each other who suddenly discover rebels operating nearby. Rebels have an interest in persuading

[9]Of course, disorganized violence, or "banditry," may last beyond this outcome if many rebel soldiers remain alive and armed despite the disbanding of their leadership and organization.

civilians to support them, the government has an interest in extracting information from civilians, and civilians try to maintain civil quotidian interactions as usual while deciding whether to rat on the rebels or not.

This model is a generalization and adaptation of the model in Calvert (1995) or a single-group version of the model in Fearon and Laitin (1996). The model is a generalization in that it accounts for networks that transmit gossip about behavior and is an adaptation in that the strategic setting is modified to better match the context of early rebellions and the experience of unexpectedly having rebels operating nearby. The model shows not just how networks matter for overcoming coordination and collective action problems, but also how groups engaged in indefinite day-to-day interactions can use these to respond to new opportunities that unexpectedly arise.

4.1 Model Setup

Consider a set N of n individuals (here, "civilians") who interact at random and play one round of prisoner's dilemma when they meet with payoffs

$$\begin{array}{cc} & \begin{array}{cc} C & D \end{array} \\ \begin{array}{c} C \\ D \end{array} & \begin{pmatrix} 1,1 & -\beta,\alpha \\ \alpha,-\beta & 0,0 \end{pmatrix} \end{array}$$

where $\alpha > 1$, $\beta > 0$ and $\frac{\alpha-\beta}{2} < 1$. Players have common discount factor $\delta < 1$.

Gossip about rounds (clarified below) spreads through a "communication network" defined by the pair (g, N) with $n \times n$ adjacency matrix g where $g_{i,j} = g_{j,i} = 1$ indicates a link between $i \neq j \in N$. To simplify notation, we will refer to the network as g. Links in the networks are undirected and unweighted, and the network is common knowledge to individuals in N.

Gossip spreads rapidly through the network, saturating the component in which

it originated but degrading at rate $(1-\epsilon)$, $0 \leqslant \epsilon \leqslant 1$.[10] The information content of gossip degrades by an amount $1-\epsilon^{\ell(i,j)}$ where $\ell(i,j)$ is the length of the shortest path between sender i and receiver j.[11]

In time period $t^{gov} > 0$, three events unexpectedly happen in lieu of a usual prisoner's dilemma match. One, a rebel group begins operating nearby and all civilians learns a little information about the group, enough to damage the rebel group's prospects if the government knew this information.[12] In particular, let the probability that the rebels are successful, p, be a decreasing function of the number of informants $(\#I)$ such that the marginal impact of each additional informant is decreasing ($\frac{dp}{d\#I} < 0$ and $\frac{d^2p}{d(\#I)^2} < 0$).

Two, the rebels seek out a trusted contact $i^{seed} \in N$ from among the civilians and provide him with a framed, compelling account of the rebels' position, which may include goals, promises, glowing assessments of capabilities, arguments for why rebellion is crucial, etc. Gossip about this framed message– a valuation of the rebels at B and an account that supporting the rebels is the right thing to do– spreads from i^{seed} through the network, losing potency as usual at rate $1-\epsilon$.

Three, the government arrives in the area and asks all civilians individually and simultaneously about the rebels, offering $\gamma > 0$ for information (and hence for becoming an informant), 0 for silence. Interactions with the government are observable only to neighbors in g (a civilian's trusted contacts). The government leaves, and in $t^{gov}+1$, normal prisoner's dilemma interactions resume.[13]

[10] A component of a network is a maximally connected subnetwork, or more intuitively, a subset of nodes in the network which contains as many nodes as possible such that there is a finite path between any two of them.

[11] The length of a path is the number of links in that path. The information content may degrade in the sense that it becomes more error-prone as it is passed from person to person as in the game of telephone, or it may be believed less as it extends farther from the source and becomes third-hand and fourth-hand and so on, or it may matter less to people as it moves a greater social distance as we might expect in a network with high homophily (McPherson, Smith-Lovin and Cook, 2001).

[12] Civilians may observe training exercises, identify some rebels, detect the location of bases, etc. It can be that merely confirming the existence of a nascent rebel group is valuable to the government.

[13] A lot happens in one "round." The comparative statics remain unchanged if more rounds are disrupted by the rebels' arrival and the government's interrogation. As the discussion below makes clear, often villages

Hence, the infinitely repeated game G proceeds as follows: at the beginning of each round, nature creates a roster of random pairings. Civilians observe only their own pairing and play one round of prisoner's dilemma. Messages are spread through the network, ending the round and the next round begins. In round t^{gov}, prisoner's dilemma matches unexpectedly halt, rebels spread a compelling message starting at i^{seed}, the government arrives and all civilians are presented with the simultaneous individual decision to inform on the rebels or not. Messages are spread through the network ending the round, and in $t^{gov}+1$ random prisoner's dilemmas resume as before t^{gov}.

4.2 Gossip and Collective Action Problems

Gossip containing three types of information flows through the network g: information about prisoner's dilemma rounds, information framed and sent by the rebels, and information about who informed the government.

The relevant content about prisoner's dilemma rounds is determined by the strategies civilians play to enforce day-to-day cooperation, which make use of this information. Specifically, players gossip about deviations from the strategy (formalized in the appendix). The victim of a deviation gossips to his neighbors who gossip to the neighbors and so on through the network with the usual degradation; the probability that the news reaches a player j with a shortest path $\ell(i,j)$ to the victim i is $\epsilon^{\ell(i,j)}$.[14]

The relevant content of gossip about informing the government is news that a player informed the government and spreads from neighbors of the informant through

have no history of rebel activity. Consequently, the arrival of rebels is unexpected. Simultaneous and observable visits is a simplification– we could imagine a team of government emissaries arriving at all houses at the same time, and villagers can see how satisfied or frustrated the officials are when they leave in view at the same time. Or villagers could be asked privately at different times, after which the government reward γ arrives in full view. Making the decision sequential and yet observable in the model is feasible, but requires additional cumbersome conditions that don't change the direction of the comparative statics.

[14]This information process is a simplification. To add realism, we could consider the spread of news from the victim through the network *excluding the offender* as in Larson (2014*b*). This wouldn't change the comparative statics below; it would simply add a condition that bottlenecks in the network undermine cooperation. True bottlenecks are unlikely in large networks.

the network in the same way; the probability that news reaches a player j with a shortest path $\ell(i,j)$ to the informant i is $\epsilon^{\ell(i,j)-1}$.[15]

The relevant content of gossip sent by the rebels is a framed, compelling message that convinces i^{seed} that the rebels offer benefit B to each civilian if successful and that keeping the rebels' secrets is the right thing to do.[16] Let B be the benefits that i^{seed} believes the village would receive if the rebels are successful after hearing the message. Gossip about these benefits and what to do about them spreads through the network, losing potency so that the benefit that i expects to gain from the rebels if they succeed, b_i, is $B\epsilon^{\ell(seed,i)}$. If the message does not reach a player j (because $\ell(seed,j) = \infty$), then $b_j = 0$.

It is conceivable that the rebels' message is so compelling and that the rebels are so fragile that civilians are highly personally motivated to not inform the government. If this is the case, then our key network results are immediate: fragmented networks keep some from hearing the compelling message, and networks with long paths make the least convinced supporter less convinced, both of which reduce secret-keeping and consequently the probability of rebel success. However, for a plausible range of parameters, even though the group may collectively benefit from everyone keeping quiet, civilians have an individual incentive to free-ride on the secret-keeping of others and inform the government.[17]

Call MI_i the marginal impact of an additional informant on the probability of

[15]The probability is $\epsilon^{\ell(i,j)}$ if i is the *neighbor* of the informant, but it will be more convenient to have the probability in terms of the informant herself, hence the minus one.

[16]The actual content could be promises of benefits if the rebels win, assurances that the rebels are likely to succeed, pleas that draw on and construct grievances, etc. Below we note that rebels often have a personal contact in the village that they use to insert information into a village; we argue that such a civilian is predisposed to be persuaded by the rebel's message.

[17]This collective action problem is related to but different in kind from the collective action problems traditionally studied in civil conflict which focus on high-risk, public civilian mobilization for insurrection (Lichbach, 1998; Petersen, 2001; Popkin, 1979; Wood, 2003). Typical measures to enforce collective behavior are off the table when the collective action is secrecy– public shaming and public promises of selective benefits would tip off a government and undermine the measures trying to promote secrecy. Here we show that personal networks can transmit gossip which allows sufficient social sanction to overcome the collective action problem in equilibrium. These networks allow civilians to use their personal communication and day-to-day interactions to achieve sanction for free-riding.

rebel success given i other informants so that $MI_i = p(i) - p(i+1)$. If $b_i(MI_0) > \gamma \ \forall i$, then the impact one civilian has on reducing the probability of the rebels' success is enough to prevent informing the government among those who have heard the message. When $b_i(MI_0) < \gamma$ and $n\gamma < p(0)\sum_{i \in n} b_i$, informing on the rebels takes the form of a collective action problem. The civilians would be better off if everyone kept the rebels' secrets, but all have an individual incentive to inform the government and let the rest keep the secrets.

We show that when informing the government poses a collective action problem, civilians can turn to their day-to-day interactions to sanction informants which successfully enforces secret-keeping so long as (1) enough civilians have coordinated their willingness to do so and (2) gossip about informants reaches enough others quickly, both of which depend on properties of the trusted communication network.

4.3 Strategies to Enforce Secret-Keeping

First consider a strategy that civilians can play in a modified game $\tilde{G}$ in which there is no round t^{gov}. This is the game that civilians believe they are playing ex ante. In this strategy, civilians use an in-group policing strategy with finite punishment modified to account for news that spreads along a network.[18] The precise statement of messages and the strategies as mappings from messages to actions can be found in the appendix.

Definition 1 (σ^{NWIGP})**.** *All players play C in the first round. Every time players are paired subsequently, play C unless a message reveals that an opponent deviated in*

[18]Given that a group will threaten a finite punishment, in-group policing ensures that the maximal finite punishment is threatened because everyone who has enough information to punish will punish. Finite punishments can sustain maximal cooperation when the action set is binary as it is here, and are desirable in their efficiency off-the-equilibrium-path, which is particularly valuable in rural settings using word-of-mouth communication; we might expect the propensity for error to be high, making finite punishment adaptive. Finally and crucially, infinite punishment is unresponsive to new events. In the setup here, players are presented with a new, unexpected choice mid-game. If punishment were infinite, in all histories in which some players are already receiving punishment by t^{gov}, these players would inform the government. There would be no way for civilians to respond to this choice– they were already inflicting as much pain as possible forever. Finite punishments allow groups to respond to new events and enforce new norms.

t, in which case play D for the next T pairings after t. Players who have deviated in t play C with all others; for the next T pairings after t opponents who are aware of the deviation will play D against them.[19]

Now the question is: what should players do in round t^{gov} when the government asks them for information given that this event is unanticipated ex ante.

Gossip about the rebels can serve as a coordination device which adapts σ^{NWIGP} to the new game. Civilians know the network structure and the way that news spreads and so know which other civilians are being told that keeping the rebels' secrets is the right thing to do. These civilians can adapt σ^{NWIGP} to treat informing the government as an uncooperative act akin to playing D against a fellow in-group member that is worthy of social sanction afterwards. This option takes the set of cooperative acts to be the coordinated product of shared norms, a set that can possibly be expanded.

Consider the following strategy that can be implemented from t^{gov} onward by those who have heard the gossip that keeping the rebels' secrets is the right thing to do:

Definition 2 (**Secret-Keeping Strategy**). *In t^{gov} do not offer information to the government. In every subsequent pairing, play C unless a message reveals that an opponent deviated* ***or informed on the rebels*** *in t, in which case play D for the next T pairings after t. Players who have deviated in t play C with all others; for the next T pairings opponents who are aware will play D against them.*

Now we'll consider the following strategy profile for t^{gov} onward which distinguishes between those who have received gossip about the rebels and those who have not, again stated more precisely in the appendix:

Definition 3 (σ^{NWRAT}). *Those who have heard that supporting the rebels is the right thing to do play the following: In t^{gov} do not offer information to the government. In*

[19]Note that the strategy has players play the punishment phase "for the next T pairings" as opposed to "until $t + T$." This will allow this strategy to partially adapt to the unmodified game G: players will know what to do about the lost round when the government steps in.

every subsequent pairing, play C unless a message reveals that an opponent deviated ***or informed on the rebels*** *in t, in which case play D for the next T pairings after t. Players who have deviated in t play C with all others; for the next T pairings opponents who are aware will play D against them.*

Those who have not heard that supporting the rebels is the right thing to do play the following: In t^{gov} *offer information to the government. In every subsequent pairing, play C unless a message reveals that an opponent deviated in t, in which case play D for the next T pairings after t. Players who have deviated in t play C with all others; for the next T pairings opponents who are aware will play D against them.*

Note that when the network is connected, everyone receives the message from the rebels and so all play the strategy profile's first option. When the network is not connected, different components contain civilians that have either all heard or all not heard the message. In the secret-keeping equilibrium, σ^{NWRAT} will entail all players in the component contacted by rebels using day-to-day interactions to enforce secrecy among themselves, all players in any other components informing the government and not punishing this action, and all players interacting cooperatively with all other players in prisoner's dilemma interactions, enforced by threats of day-to-day punishment for misdeeds they hear about.

In the next section I show the conditions under which full cooperation under σ^{NWIGP} is a sequential equilibrium ex ante (which ensures that players would chose and execute this strategy profile until the unexpected events in t^{gov}), and the conditions under which full cooperation and secret-keeping σ^{NWRAT} forms a sequential equilibrium from t^{gov} forward given any history (which ensures that players would always comply with a with a switch to σ^{NWRAT} and execute that strategy profile for the remainder of the game).

4.4 Full Cooperation and Secret-Keeping

First take the case of a connected network[20] so that gossip seeded by the rebels reaches everyone (although some may receive a degraded message). In this theoretically unusual but empirically realistic setting, we need an equilibrium concept that accounts for an unexpected one-time event.

Definition 4 (**Switching Sequential Equilbrium**). *In a game with a shock in period t, strategy profiles σ^A and σ^B and beliefs μ^A and μ^B comprise a* ***switching sequential equilibrium*** *iff σ^A and μ^A comprise a sequential equilibrium to the game without the shock ex ante, and σ^B and μ^B comprise a sequential equilibrium to the game beginning in t given any history of play. Playing σ^A through $t-1$ and σ^B from t onward is* ***switching sequentially rational*** *if playing σ^A is sequentially rational ex ante and playing σ^B is sequentially rational in t given any history.*

Now we can state the following conditions for full cooperation and secret-keeping under σ^{NWIGP} and σ^{NWRAT} to be a switching sequential equilibrium:

Proposition 1 (**Full Cooperation and Secret-Keeping on Connected Networks**). *Playing σ^{NWIGP} through $t^{gov}-1$ and then switching to σ^{NWRAT} in t^{gov} is switching sequentially rational for game G and connected network g if*

$$\alpha - 1 \leqslant \frac{\delta^T(1+\beta)}{n-1}\sum_{j\neq i}\epsilon^{\ell(i,j)} \;\forall i \in N,$$
$$\beta \leqslant \frac{\delta^T(1+\beta)}{n-1}\sum_{j\neq i}\epsilon^{\ell(i,j)} \;\forall i \in N,$$

and

$$\gamma \leqslant \frac{\delta^T(1+\beta)}{n-1}\sum_{j\neq i}\epsilon^{\ell(i,j)-1} + b_i(MI_0) \;\forall i \in N,$$

[20] A connected network is one in which there exists a finite path between any pair of nodes– not to be confused with a complete network in which every possible link is present.

where MI_n is the marginal impact a single civilian has on the probability of rebel success given that n others are ratting to the government, and $b_i = B\epsilon^{\ell(seed,i)}$.

The appendix contains the proof of these sufficient conditions, along with a statement of the necessary and sufficient conditions and a discussion of beliefs that extend the behavior to switching sequential equilibrium. The first condition ensures that second defections against any i, the binding case, aren't profitable; the second ensures that refraining from complying with punishment by any i isn't profitable; and the third, our main focus, ensures that the social sanction i faces from ratting to the government and the consequences to i of his information via the rebels' expected success outweigh the government payment for information.

When $\gamma \leqslant b_i(MI_0)$, no collective action problem is present, and secret-keeping depends only on $B\epsilon^{\ell seed,i}$ for all $i \in N$. When $\gamma > b_i(MI_0)$, individuals prefer to free-ride on the secret-keeping of others, but the level of the social sanction can still generate secret-keeping so long as the first term is large enough (which also depends on the trusted communication network).

To consider networks that are not connected, we need to identify the components of the network. Call $C(i)$ the component of the network that i is in. Now we have:

Proposition 2 (**Full Cooperation and Secret-Keeping on Fragmented Networks).** *Playing σ^{NWIGP} through $t^{gov}-1$ and then switching to σ^{NWRAT} in t^{gov} is switching sequentially rational for game G and fragmented network g if, $\forall i$ such that $b_i \neq 0$,*

$$\alpha - 1 \leqslant \frac{\delta^T(1+\beta)}{n-1} \sum_{j \neq i \in C(i)} \epsilon^{\ell(i,j)} \ \forall i,$$

$$\beta \leqslant \frac{\delta^T(1+\beta)}{n-1} \sum_{j \neq i \in C(i)} \epsilon^{\ell(i,j)} \ \forall i,$$

and

$$\gamma \leqslant \frac{\delta^T(1+\beta)}{n-1} \sum_{j \neq i} \epsilon^{\ell(i,j)-1} + b_i(MI_{\#I}) \ \forall i \text{ such that } b_i > 0$$

where $\#I$ is the number of civilians in components other than $C(i^{seed})$.

Once again the proof, binding conditions, and statement of beliefs that extend the behavior to switching sequential equilibrium can be found in the appendix. Since they face no social sanction for doing so and $\gamma > 0$, civilians in components outside the reach of the rebels' message inform the government.

These conditions depend on the structure of the communication network g and suggest that some networks are better at enforcing secret-keeping than others.

4.5 Networks and Secret-Keeping

Propositions 1 and 2 reveal features of trusted communication networks that make secret-keeping easier to enforce.

Proposition 2 implies a straightforward relationship between networks with multiple components and the number of secret-keepers in equilibrium. Consider the best case scenario for secret-keeping: the rebels' trusted contact resides in the largest component of the network. Call a network's "fragmentation" the proportion of nodes not in the largest component:

Definition 5 (Network Fragmentation). *Enumerate a network's k components $C_1 \dots C_k$ in descending order of size so that C_i is the set of all nodes in the ith component, and C_1 is the set of nodes in the largest component. A network g's fragmentation can be written*

$$Frag(g) = \sum_{i=2}^{k} \frac{\#C_i}{n}$$

for $k > 1$ and $Frag(g) = 0$ for $k = 1$.

In other words, connected networks have no fragmentation. Networks with multiple components are most fragmented when the components are the same size. Now the following comparative statics follows immediately: networks that are fragmented result in informants in equilibrium; the more fragmented a network, the greater the number of informants.[21]

Corollary 1 (**The Perils of Fragmentation).** *The larger the value of Frag(g), the greater the number of informants in equilibrium under* σ^{NWRAT} *and the lower the probability of rebel success* p*.*

Second, networks such that all nodes have short paths to all other nodes make complete secret-keeping easier[22] for connected networks or within the largest component of fragmented networks.

Corollary 2 (**The Benefits of Being Close).** *The larger the smallest decay centrality value,* $\sum_{j \neq i} \delta^{\ell(i,j)}$*, of a civilian within a network (component), the easier it is to enforce full secret-keeping in the network (component).*

Third, because full secret-keeping is easiest to enforce when b_i is large for all i, the fewer links that news from the rebels must traverse to reach everyone the better. This suggests that some networks offer better choices for i^{seed}:

Corollary 3 (**Diameter and the Worst Possible Seed).** *In a connected network, the worst possible seed is one that requires the longest shortest path in the network to reach all other civilians. The smaller the diameter of the network, the better the worst possible seed is for complete secret-keeping.*

[21] In equilibrium, those who have not heard the rebels' message inform the government and no one punishes them because all who hear about their action are in the same component and also have not heard the rebels' message. It can be shown that even if everyone, even those in components who have not heard the rebels' message, somehow coordinate on punishing informants, fragmented networks are still worse than unfragmented ones.

[22] The condition for complete secret-keeping is easier to satisfy in the sense that it can be satisfied for smaller minimum values of the discount factor δ.

The rebels' trusted contact may be a contact for reasons other than spreading news of a rebellion– they may be a relative, they may have conducted business together in the past– and so the rebels may be unlucky in where their one contact in the community is situated within the network. The network diameter bounds how unlucky they could be. On the other hand, perhaps rebels have strategically forged a relationship with someone in the community based on his network position or are simply lucky in where their one contact is situated within the network. A slightly different feature of the network determines just how lucky they could be.

Define a network's "time to saturation," a measure related to diameter but instead considers the shortest longest path required to reach all other nodes from a single node.

Definition 6 (**Time to Saturation).** *The minimum Time to Saturation of a network g can be written*

$$TTS(g) = \min_i \{\max_j \{\ell(i,j)\}\}$$

where $\ell(i,j)$ is the length of the shortest path between nodes i and j.

Now we can state the final corollary:

Corollary 4 (**Time to Saturation and the Best Possible Seed).** *In a connected network, the best possible seed is one with the smallest minimum time to saturation. The lower the minimum time to saturation, the better the best possible seed is for complete secret-keeping.*

Finally, we advance the following claim that is a natural consequence of the above corollaries and the fact that rebel groups require a minimum amount of geographic space to begin operating:

Claim 1 (**Geographic Dispersion).** *When favorable networks span a larger geographic area, the rebels face a greater chance of success.*

Rebels require secrecy from (1) all who are aware of them (2) whom the government approach. The larger the geographic area containing civilians who can be convinced to keep their secrets, the more room they have to conduct training exercises, mobilize, and so on. As our paired comparison below makes clear, space can matter. When networks are fragmented or paths are too long across the relevant geographic area, rebels face a greater risk of civilians informing on them.

In short, networks that spread news widely and quickly are best for maximizing the number of secret-keepers. Networks with separate fragments and civilians that are far away in the network from other civilians make enforcing secrecy more difficult. Places where favorable networks span large geographic areas are particularly helpful. Next we turn to a discussion of kinship networks in general in rural Sub-Saharan Africa and argue that they tend to have the basic property of being unfragmented with short paths, even across long geographic distances, which produces an empirical correlation between ethnic homogeneity and favorable networks of trusted communication. Then we present paired comparison of two nascent rebel groups that experienced different levels of success because, we argue, the successful rebel group operated near a community with networks that coordinated support and enforced secret-keeping well, and the failed rebel group did not.

5 Kinship Networks and Ethnic Demography in Rural Africa

The structure of trusted communication networks matters for how well a group of civilians can spread rumors that favor the rebels and enforce secret-keeping, which impacts whether a nascent rebel group can become viable. Networks that transmit information, however, are quite difficult to observe in practice. Part of the difficulty stems from the fact that trusted communication could in principle occur along links forged

for a variety of different reasons: shared religion, common affiliation with informal or formal civic organizations, and so on.

Here we focus on a particular source of channels of trusted communication: shared kinship. Kinship networks – networks of extended familial ties that underline ethnic or tribal identity in rural Africa[23] – are especially salient for quotidian social life and particularly for sharing trusted information in rural Africa.[24] These ties transmit information, establish bonds of trust, and determine the set of people particularly interested in a person's compliance with a group's norms.

The structure and geographic dispersion of kinship networks in rural Africa have been shaped by gradual processes of migration, familial land sharing agreements, and marriage. Areas with differences in these processes consequently have networks that differ. For example, while members of an extended family (known as clans, a subgroup of an ethnic group) tend to live in close proximity to one another, the common practice of exogamy – rules that necessitate that one marry outside one's own clan – typically lead to men seeking wives from areas outside their immediate home area. Exogamy thus generates kinship networks that span a rather large area; often dozens of miles. Groups that did not adhere to rules of exogamy would have kinship networks that span a narrower area. Likewise, variance in pressure to marry within one's ethnic group creates variance in networks. Groups that value exogamy and also marrying within one's ethnic group have resulting networks with many interconnections among clans within a given ethnic group.

The relations forged among clans by marriage are important to daily life; for example, as social anthropologist John Middleton says of the exogamous Lugbara people: "[M]arriage is not merely a union between two individuals, but one between two lin-

[23]We use the terms "ethnicity," and "tribe" interchangeably.

[24]While we would like to know every channel through which meaningful communication occurs, kinship connections offer a good proxy, especially in our setting of interest, rural Uganda. In other work, we devise a method for bypassing this proxy and detecting the communication network directly in such a setting (Larson and Lewis, 2014).

eages and two clusters of kinsfolk... Throughout a marriage the ties of a woman to her natal kin are remembered and are important... regular visits are made to see that they are well" (Middleton, 1965, p. 58). Such patterns, over time, generate dispersed areas where most inhabitants are part of the same ethnic group, yet their marriage relations mean that they are tied in an overlapping manner to other kinsfolk. Ties overlapping in this way generate short paths through a network.

Additionally, geographic constraints and migration patterns shape kinship networks. As land on a given clan's plot becomes increasingly scarce over generations, sons – especially those who are not the first born and therefore may not reap significant land through inheritance – often move to a nearby, uninhabited plot of land to claim their own area for their "subclan." Therefore, in regions that were initially scarcely populated when they were settled by an ethnic group, each clan's area often has kinship ties to several other areas through wives and brothers. Over generations, through these patterns of marriage and migration within an ethnic group's homeland, the connections between clans based in different areas can overlap a great deal. Furthermore, this local ethnic homogeneity is often sustained over time because such areas may be unappealing or inhospitable to external ethnic groups that migrate through the area. In this manner, exogamy, pressure to marry within an ethnic group and constraints on available land result in particular kinship networks: as ethnically homogeneous areas geographically expand, they evolve with underlying network structures that exhibit a lot of overlapping ties and that are unfragmented.[25] To the extent that these links serve as sources of trusted gossip, then the networks relevant to our theory are highly overlapping (with short paths) and unfragmented.

In contrast with such homogeneous regions, and despite the common characteri-

[25]This explains why ethnic homogeneity is a good proxy for trusted communication networks that are unfragmented and contain overlapping ties in this setting. It is not homogeneity per se that matters, but favorable communication networks which appear in homogeneous areas so long as the forces of exogamy, intra-ethnic marriage, and land scarcity are present. In our discussion of cases below, we provide evidence that in the homogeneous area, favorable communication networks were indeed present (and the rebel group became viable), and were absent in the heterogeneous area (and the rebel group failed).

zation of Sub-Saharan African rural peripheries as being populated by concentrated blocs of ethnic groups, some rural areas are quite diverse; they may be homogeneous at a highly local (e.g. village, or roughly one square mile) level, but at a slightly lower level of resolution (e.g. county or district, tens of square kilometers wide), numerous, distinct ethnolinguistic groups can inhabit a rural area. Such local ethnic demography typically comes about as a result of processes that also generate fragmented kinship networks. Such heterogeneity often exists along common migration routes, and comes about when several migrating ethnic groups pass through an area and some of their members decide to remain in that area, rather than continuing on with the group. Those that stay settle close to their co-ethnics in small clusters, making the area relatively attractive to other new migrant groups. In these areas, familial networks become significantly more geographically concentrated and insular, and the communication networks among the many ethnic groups there are fragmented – there are few strong familial ties that connect residents of such areas, and so few channels through which communication can span the fragmented ethnic groups.

Next we turn to two cases of nascent rebel groups in Uganda to identify the role that ethnic homogeneity (and the favorable communication networks that homogeneity generates in rural Africa) plays in the ability of the rebel groups to become viable. We show that not only is ethnic homogeneity a good indicator of how fragmented and overlapping communication networks are, but that, consistent with the model presented above, these networks also appear to serve as at least one of the mechanisms for rebel success or failure by determining how well civilians can collectively keep rebels' secrets.

6 Empirical Illustration and Assessment: Evidence from Uganda

Before presenting evidence illustrating the arguments above, we briefly present background on rebellion in Uganda since 1986. This discussion provides context and establishes that there are no discernible systematic patterns to initial rebel formation in Uganda that we may expect to influence whether and how rebels become viable.

6.1 Rebellion in Uganda since 1986

In January 1986, Yoweri Museveni– who is still President of Uganda today– and his National Resistance Movement (NRM) seized the central government. Prior to 1986, Uganda had suffered from 15 years of relative chaos and state decay: eight years under the notorious Idi Amin (1971-1979), followed by a civil war known as the Bush War. An estimated 800,000 Ugandans were killed as a result of political violence between 1971 when Amin seized power and the end of the civil war in 1985 (Tripp 2004, 4). The Bush War also had a major impact on the Ugandan economy, leading to high inflation and economic decline; in 1985, income per capita was at just 59% of its 1971 level (Kiyaga-Nsubuga 2004, 89). One Ugandan scholar writes: "By the time Obote fell in 1985, Uganda could no longer be described as a state. No one military or political organization commanded the legitimate use of violence in the country" (Kasozi 1994, 193).

As the new NRM government turned towards rebuilding the Ugandan state, it faced numerous insurgencies; in its first two decades in power, 16 distinct groups formed,[26]

[26]Only one of these groups, the LRA, is captured in the Correlates of War dataset; seven are captured in the finer-grained UCDP/PRIO Armed Conflict Dataset. Arriving at this number of distinct groups and ensuring that each group met the criteria described in the introduction for constituting a nascent rebel group, involved using documents from Uganda's Amnesty Commission, in combination with extensive interviews conducted by one of the authors with sources from military intelligence, former rebels, government officials, and civilians from conflict zones. This fieldwork took place throughout Uganda over about 14 months between 2009 and 2011. See Lewis (2012) for further discussion. The command structures of each of these

all of which built a nascent organization with a command structure and committed (or explicitly planned to commit) at least one act of violence against the Ugandan state (e.g. military, police, or other government targets). These groups shared several additional characteristics: their stated goal was to seize control of Uganda's central government;[27] their leaders were Ugandan citizens; the vast majority of their fighters were Ugandan; they sought to build a base on Ugandan territory; and they did not benefit from lootable, high-value natural resource wealth since little is present in Uganda.[28]

Furthermore, external sponsors provided little, if any, initial funding or weaponry to any of these rebel groups until they existed for at least two years and demonstrated a substantial fighting capacity. Even groups like the infamous Lord's Resistance Army, often described as a proxy for the government in Khartoum, did not receive substantial support from Sudan until 1994, after the LRA had fought for over 5 years (Gersony, 1997, 36).[29] While many of the other armed groups in Uganda at some point received support from Kenya, Sudan, or DRC, initially this support amounted to small quantities of light arms, at most. It was only after the rebel groups demonstrated a capacity to inflict harm on Ugandan military interests, typically 2 to 4 years after sustaining bases on Ugandan soil that foreign governments agreed to provide substantial weaponry to the rebels.

Figure 1 below displays the county where each of the 16 rebel groups launched in Uganda since 1986. The geographic dispersion of these rebel groups shows that sparks of rebellion do not appear to occur only on the periphery, as leading theories might

organizations was clearly distinct, and while some of the rebel groups occasionally communicated with one another and weighed coordinating arms shipments or attacks, actual coordination was extremely infrequent. No two rebel groups operated in the same region of Uganda at the same time.

[27]While it may seem implausible in retrospect that many of these groups could succeed in that goal, in interviews most former rebel leaders said they did believe it was possible at the time. Most cited current President Museveni's then-recently successful rebellion in the Bush War, which was initiated with just 26 men, expressing the sentiment: "If Museveni could do it, why couldn't I?" Herbst (2000, p. 254) argues that the NRA's success inspired the creation of new insurgent groups throughout Africa.

[28]Oil was discovered in Uganda, but not until 2006.

[29]Corroborated by interviews with several former LRA commanders and NRM counterinsurgents.

lead us to expect – they occur all over the country, even close to the capital city, Kampala. The Moran's I index of these points (which are positioned at the centroid of each county where groups first committed violence) is -0.01 and is far from statistical significance, indicating that these points are neither clustered nor dispersed; there is no spatial autocorrelation among them.

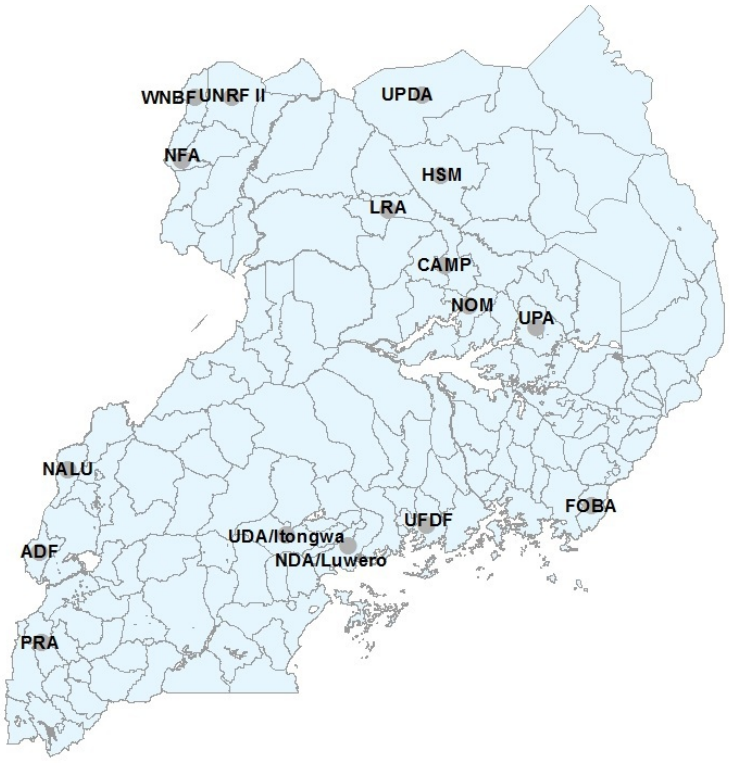

Figure 1: *Rebel Groups Launched in Uganda, 1986-2006.* Dots are located in the centroid of the county in which they committed a first act of violence. Source: Documents from the Ugandan Amnesty Commission, numerous author interviews with former rebels, counterinsurgents, local leaders and civilians (2009-2010).

Additionally, and crucially for the analysis that follows, there are no evident, systematic relationships between the locations of these rebel formations and factors that dominant theories associate with civil conflict onset. Recent findings suggest several variables' relevance to the opportunity and motivation for conflict initiation. We included the following covariates in regression analyses (using linear probability and logit

models and a cross-sectional dataset) on a binary measure of rebel formation at the county level: terrain such as mountains or jungles which favor insurgents in an asymmetric war (Buhaug, Cederman and Rod, 2008; Fearon and Laitin, 2003); proximity to international borders, which could lead to improved access to safe havens or resources provided by external actors (Cunningham, 2010; Salehyan, 2009); poverty of the local population, which could motivate or lessen the opportunity costs of participation in violence (Collier and Hoeffler, 2004; Dube and Vargas, 2010); exclusion from the central government, which could motivate rebellion (Cederman, Wimmer and Min, 2010); extent of ethnic homogeneity at the local level (Toft, 2003; Weidmann, 2009); state strength, which could lead to deterrence of defeat of rebels (Fearon and Laitin, 2003); and the extent of centralization in the traditional governance structures.[30] The central finding of this analysis is that none of these variables were significantly associated with the location of rebel formation at the 15% level (or lower). Thus, the spatial distribution of rebel formation in Uganda appears to be idiosyncratic, or at least, there is no clear systematic pattern that could then inform the later stages, after groups formed and sought to become viable.

Finally and importantly, consistent with the expectations of the theoretical discussion above, rebel groups that formed in homogeneous areas were more likely to become viable than those that formed in heterogeneous areas. Attempted rebellions that failed to become viable had an average ELF score of .47 while those that succeeded had an average ELF score of .20. This difference is statistically significant (p-value of one-tailed test is 0.03), and holds even when using alternative measures of local ethnic demography, such as the percentage of the total local population held by the largest ethnic group. Thus, while rebel groups attempted to launch even in both homogeneous and

[30]While such institutions have not been linked specifically to conflict outcomes, recent scholarship suggests their importance to overcoming a variety of collective action problems in Africa, particularly public goods provision and economic performance (Gennaioli and Rainer, 2007; Michalopoulos and Papaioannou, 2012). Traditional authorities may influence individuals' beliefs and behavior in times of crisis, such as during a period of rebellion initiation.

heterogeneous area, only those that formed in homogeneous areas were able to become viable.[31]

6.2 Paired Comparison of Two Rebel Groups

In this section, we illustrate key aspects of the theory above with case studies of two rebel groups from Uganda. We compare the initial stages of rebellion for these rebel groups, which both launched in 1987, in two distinct areas of eastern Uganda: the Uganda People's Army (UPA), which became viable, and Fight Obote Back Again (FOBA), which did not. The analysis presented here employs a straightforward application of the comparative method; cases were selected with the aim of matching cases as closely as possible on multiple factors that could plausibly influence the outcome of interest, rebel viability. Cases vary in the factor of which we seek to understand the influence: the extent of ethnic homogeneity. We selected these cases in order to limit the influence of theoretically-relevant structural variables that pose alternative possibilities for why some rebel groups become viable. These variables are: (1) structure of traditional political authority (decentralized or centralized), (2) political exclusion, (3) terrain, (4) proximity to international borders, (5) economic well being, and (6) state capacity. We provide evidence about each of these factors for each case study in the appendix.

Importantly, there is no strong evidence that intense ethnic or other geographically-concentrated grievances among civilians preceded conflict in either case, nor that grievances were stronger where the UPA began than where FOBA began. Because eastern Uganda was not directly affected by the Bush War, nor did its people other-

[31]This raises a question of selection: why do rebel groups not all attempt to launch in ethnically homogeneous areas if these are where they could become viable? While network structure may be difficult for rebels to know, if homogeneity is a sufficiently good proxy, then perhaps we should expect rebels to select their location based on ethnic demography. Even if rebels knew the ethnic demography of a region well enough to select on it, many constraints limit the practical choice of location. According to our theory, one key constraint is the location of trusted contacts within a community. If rebels have hope to win neighboring communities and having their secrets kept, they must have a solid trusted contact in that community. This option set may be small.

wise have direct experience with the NRM, the predominant sentiment there in 1986 and early 1987 was *uncertainty* about how the new NRM government would treat them. Neither area where UPA and FOBA each formed was particularly underrepresented in the central government when each rebellion began; the Iteso ethnic group that formed the basis of the UPA were about 6% of Uganda's population and held 3.2% of national-level cabinet seats, while the Samia and Japadhola groups that formed much of the early leadership of FOBA were 1.1% and 1.5% of Uganda's population and both held 3.2% of cabinet seats.[32] Furthermore, as we describe below, while ethnic grievance narratives about the causes of the UPA war do exist, upon scrutiny the events featured in these narratives were outgrowths of the rebel-related violence there – not precursors.

6.2.1 UPA

The UPA rebellion lasted only from 1987 to 1992, but during those years it presented a fierce challenge to the Ugandan government. It had at least two bases on Ugandan soil that operated without significant challenge from the government for approximately six months in 1987. At its height in 1989 and 1990, the UPA had well over 1,000 men, organized into eight brigades covering different portions of the Teso region in Uganda, an area of approximately 4,300 square kilometers.

Teso has long been one of Uganda's most homogeneous areas. The 1948 census found that only 9% of inhabitants in Teso district were not Iteso. In 1964, political scientist Fred G. Burke observed that Teso "is one of the most homogeneous districts in Uganda" and noted the presence of a "diffuse" political system and of "Teso nationalism" there (Burke 1964, 127, 164, 177). The Iteso are the fifth largest ethnic group in Uganda, comprising 6.4% of the Ugandan population according to the 2002 census.

The history of how Teso became so homogeneous indicates the dispersed, unfragmented nature of kinship networks in Teso, particularly of the primary tribal subgroup

[32]Population data comes from Uganda's 1991 census. Ethnic cabinet share data comes from 1988 in Lindemann (2011).

there: clans (or *atekerin* in the local language). Clans in Iteso culture represent lineages, or proximate lines of ancestry. The elders of a clan play an important role in regulating land rights and resolving minor conflicts, and members of each clan gather regularly for meetings, and for rituals surrounding marriage, birth, and death. Adults are generally responsible for enforcing behavioral norms of others in their clan; for example, they punish each other's children for bad behavior.

When the nomadic, pastoralist Iteso people first reached the area now known as Teso, it was largely uninhabited, and thus new settlements were rather dispersed. As Historian Fred Burke explains, "As plenty of land was available and no outside threat existed, the initial [land] holdings were large and scattered" (Burke 1964, 128). Upon reaching this land, the Iteso gradually became accustomed to settled agriculture. At first, the Iteso lived in clusters of clans in areas called *etem*, but mobility and voluntary migration within Teso has long been common since for several reasons (Uchendu and Anthony, 2009, p. 16, 19, 23). In part, the plentiful land in Teso made this possible; also, pastoralist heritage of the Iteso likely predisposes them to mobility; and finally, the custom of primogeniture– the firstborn male inheriting the family's entire wealth– means that excluded siblings often migrated to new land to seek wealth. Furthermore, polygamy is permitted and relatively common, and clans are patrilineal and exogamous, and wives become part of, and go to live with, the husband's clan. However, strong ties remain between the wife and her original clan; she will continue to visit them regularly, and her children will often also come to see the mother's clan as family.[33] These patterns have generated a patchwork of overlapping, extended family ties that comprise the Iteso tribe, which has "a wide geographical distribution as well as a marked geographical concentration in any area" (Uchendu and Anthony, 2009, p. 19). Over time, as people continually migrated within Teso and married outside of their

[33]These kinship ties, linking clans via marriage, have long had an important impact on social and political relations in Teso. As one anthropologist explains, "In the nineteenth century and earlier when there was no political authority accepted by all Iteso and therefore relations amongst them might be dangerously inflammable, good relations were promoted by a web of marriage ties" (Webster et al., 1973, pp. 94-95).

clan, familial ties took a dispersed and overlapping form; numerous members of one clan would have many clan members in other areas of Teso, and be related by marriage to numerous members of other clans.

Civilians rely on these networks for transactions and information, particularly in contexts that require trust– such as periods of political and security upheaval. In 1986, the turnover in Uganda's central government had brought about such upheaval and a great deal of uncertainty throughout Teso. "There was a collapse of authority in Teso," one local leader who had served as UPA intelligence said of the period. Amidst this atmosphere of uncertainty, in December 1986 two individuals from Teso who had served as military and police commanders for the Obote regime – Francis "Hitler" Eregu and Nathan Okurut – began to discuss the possibility of forming an armed rebel group. Soon, Eregu and Okurut reached out to and joined with several men who would form the leadership of the UPA. The initial priorities of these aspiring rebel commanders were to identify a core group of military leaders that would be responsible for different areas of Teso, who would become trainers of the foot soldiers later on, and to begin planning the group's initial attacks.

As soon as the UPA's initial attacks began in February 1987, rumors about the group spread rapidly among civilians throughout the region. One former rebel leader explained about how news spread initially about the UPA that, "information moves like wild fire in the bush," while another commented, "The news [of the new rebellion] went like a flame across Teso." An indication of the local, interpersonal nature of information-sharing in such contexts is that 28 out of 34 (82%) of civilians interviewed in the villages adjacent to the initial UPA base said that they learned about the existence of the rebel group for the first time through being informed by another person in their village, rather than through directly observing rebel activity, a meeting, or news media.

Interviews and focus groups with civilians indicate that soon after first hearing about the rebels, they believed that the rebels would succeed. Members of one focus

group reported that most people in their community seemed to initially support the rebels, since their trusted sources believed in the rebels' promise to take over the government, and to "help the people" when they did so. Many people in another focus group in a different area of Teso agreed that at first, most people "believed that they could win." It was not until after violence became severe, the group said, that they came to fear and doubt the rebels. As further evidence, over half (18 out of 34, 53%) of civilians interviewed (in 2010) who had lived in villages adjacent to initial rebel bases during the rebellion agreed with the statement that "in the beginning of the rebellion most people [s/he] knew believed that the rebels would succeed in capturing Kampala." Given that we would expect responses to be strongly, systematically biased against agreeing with this statement since everyone knows today that the rebels were defeated and never reached within hundreds of kilometers of Kampala, this number is rather high.

From the perspective of the counterinsurgents, these dynamics created an impression that almost every villager in Teso was supporting the rebels in the early stages of the war. A military officer who led the counterintelligence effort against the UPA rebels in Teso said that his biggest challenge was overcoming how successful the rebels were at "convincing" people that they were strong – even though they were a small group. "It was tough; people were brainwashed," he said. Another senior military officer from the Teso region who served in the Uganda militarys counterinsurgency operations against the UPA said:

> "The UPA was very successful at mobilizing people... [the people of Teso] were told lies and they believed them. Once you get a war in an area, the area is filled with rumors. But once we finally convinced the people to trust us, they were like computers: they could easily identify who the bad guys were. [Once that happened,] the war ended quickly."

According to accounts from rebels, former military officers, and civilians, information leaks about the rebels were quite rare in these initial months. A local paper

reported about Teso that "Especially during the first year of rebellion, "This was the height of the *'mam ajeni'* [I don't know] chorus response from the Teso peasants whenever NRA soldiers asked for the whereabouts of the rebels." A former rebel intelligence officer agreed, "Information leaks were rare. The NRA tried to infiltrate us, but were unsuccessful." A former local police officer explained that it was very difficult for his forces to penetrate Teso and obtain information about the rebels, making it seem that "everyone was a rebel." Further, a focus group in the subcounty where the UPA had their first base recollected that the UPA could gather citizens freely in the early stages of the rebellion, dozens of people at a time in broad daylight, without the government becoming aware of the meetings. They explained that while the locals knew about the rebel base near their community, they refrained from telling the government about it. The government did not discover the base for months. Without such secrecy, the UPA would likely have struggled to become a viable force. As one intelligence officer said: "We had to keep our secrets early [in the rebellion] in order to gain strength..."

It is noteworthy that, despite the shared impression among most former rebels, counterinsurgents, and civilians who lived in the area where the UPA formed that civilians initially did not share information about rebels with the government and a belief that the rebels would become strong, *such evidence does not necessarily indicate that most Iteso shared a preference for rebellion.* While it is of course difficult to ascertain true preferences for or against violent groups, particularly decades after the fact, most one-on-one interviews with Iteso civilians indicated mixed feelings about whether or not violent rebellion was a good idea. One former rebel commander discussed concern about what people believed "in their hearts" about the UPA, and tried to "chase away" anyone who did not seem to truly support the incipient movement.

Furthermore and contrary to expectations of theories emphasizing how grievance narratives among co-ethnics cause initial support for rebel groups, numerous grievance narratives that exist today in justifying the UPA rebellion appear to have been born out of incidents that occurred during the insurgency– not prior to it. In particular,

observers commonly cite the devastating raids of the Iteso's cattle by the neighboring Karamojong tribe in the late 1980s as a reason why the Iteso people disdained the NRM government and therefore supported rebels; they resented that the government did not do more to protect their cattle. However, the most severe cattle raids to hit Teso did not occur until several months after the UPA rebellion began, therefore the raids could not have generated widespread support for rebellion until after the rebels were already well under way. In fact, in one interview, a UPA rebel leader suggested that the rebels were aware that the cattle raiding could help their cause, and that the rebels were complicit in some raids.[34] In sum, it is difficult to draw a firm connection between pre-existing, anti-government grievances and civilians' initial refusal to share information about rebels from the government. Instead, the ethnic demography of Teso appears to have mattered most in generating a belief among civilians that a norm of withholding information about the rebel from the government should be upheld, and in enforcing that norm.

While the violence of the Teso rebellion worsened in 1989 and 1990, as the then-viable UPA's confrontations with the government intensified, by mid-1991, the government began to make substantial military gains against the rebels. As an increasing number of UPA rebels surrendered, often with promises to be absorbed into the NRA military or government, the counterinsurgents gained valuable information about the UPA that enabled more military gains. The rebellion began to unravel, culminating in a peace agreement in 1992.

6.2.2 FOBA

In contrast to the serious problem that UPA became for the Ugandan government, FOBA– despite aiming to overthrow the government and killing several local government officials– never became a considerable threat, and never was able to sustain a

[34]Recent anthropological work also stresses the political uses and the scant real evidence of the narrative that cattle raids in Teso were abetted by the NRM government (Jones, 2008, 101-104).

base on Ugandan territory for more than a few weeks. Their sole base was located in Kenya, about 5 kilometers over the border from Uganda; they tried repeatedly to build a base in Uganda but were repeatedly "flushed out" by the army, due to information leaks about their presence. While accounts vary widely, at its height, FOBA likely reached about 300 to 500 fighters.

Bukedi is located south of Teso on a well-worn migration path between eastern Uganda and western Kenya that is bounded by Mount Elgon to the north and Lake Victoria to the south. As a result, Bukedi has long served as a place of confluence, where Nilotics migrating south from Sudan to Western Kenya mixed with Bantus migrating eastwards from western and central Africa. Besides traveling through Bukedi, the only other route from Uganda eastwards to Kenya, (other then going all the way around massive Lake Victoria via Tanzania), is travel around the northern side of Mount Elgon. But doing so would mean traveling through Karamoja, the area of Uganda with the harshest dry, flat terrain, and that is populated by the fearsome Karamojong warriors. Likely because of Bukedi's temperate climate, its relatively fertile land, and its proximity to the abundant water source of Lake Victoria, numerous groups on transit migration through this area opted to stay. As historian Samwiri Karugire explains:

> "[L]ying on one of the major corridors of migration, [Bukedi] was to receive a heterogeneous collection of ethnic groupings and its population still reflects this... The result of this criss-crossing was that Bukedi had among its population Bantu ethnic groups (the Banyore, Bagwere, Bagwe and Samia), Nilotic Padhola, Nilo-Hamitic Iteso, and the Bankenyi.... This diversity of ethnic groups in an area so small reflects the different migrations at different periods of peoples whose paths crossed here" (Karugire, 1980, p. 9).

Similarly, historian Fred Burke contrasts Teso's homogeneity in 1964 with Bukedi's "bewildering variety of traditional organization, reflecting the reflective cultures of the many tribes inhabiting the area" (Burke, 1964, p. 224). Today, in contrast to the just one dominant language and about 3 different dialects of Teso, Bukedi has roughly 10 dialects of 3 distinct ethno-linguistic groups (Lewis, 2009). Burke explains that

colonists had to coax Bukedi's six small tribes into the single local political entity of Bukedi district, and states that:

> "British administration has attempted, in Bukedi, to develop a heterogeneous complex territory and people into a unified local government area. Outwardly the local political system resembles that of...tribally homogeneous Teso. But local government and politics in Bukedi have also been shaped by the welter of traditional cultures and social systems which characterize this problematically complex district. In Bukedi the crucial variables are those associated with the multiple, traditional tribal-kinship systems, with authority and solidarity clustering at levels lower than the district" (Burke, 1964, p. 222).

The fragmented nature of the resulting networks and the difficulty of spreading news that reaches everyone in every subgroup appeared to importantly shape events when a rebel group formed in Bukedi. The turnover of Uganda's government in early 1986 and the start of formation of a rebel group in early 1987 brought about a similar environment of uncertainty in Bukedi as it had in Teso. As one local leader explained: "There was confusion in the east beginning in 1985." Another local leader said of Bukedi, in the late 1980s as FOBA emerged, "It was a state of fear and uncertainty." Also similar to Teso, the inhabitants of Bukedi were not clearly tied by political history or identity to the new ruling NRM party – but on the eve of the rebellion, they had no strong reason to resent them, either.

The FOBA conflict began in 1987 with the actions of a small number of individuals who sought to build an anti-government army. In early 1987, Nelson Adula Omwero began gathering individuals, several with connections to the former regime or its security forces, near his home village to join him in a part of Bukedi that is now known as Busitema forest. Omwero had been a Sergeant in the prior Uganda army and had been then integrated into the NRM's new military, but then deserted in August 1986. Soon, Omwero made links with other individuals – mostly former leaders and members of Obote's former military from the Bukedi area – who formed FOBA's core leader-

ship, based from about 35 kilometers away in a swampy area near the Uganda-Kenyan border.

Like the UPA, FOBA lacked a large stock of weapons, and thus focused on obtaining more through successful attacks on police and NRM outposts. Another of FOBA's initial priorities was to secure the support of the population. One former FOBA leader, who had been a businessman prior to the rebellion, said that "When forming a rebel group, the first thing is the support of population... [This is] more important than weapons."

Rumors began to spread about FOBA as they committed their first attacks; however, kinship networks between Mella and Busitema are structured quite differently than they were around the areas of Teso where UPA launched. While the distance between Mella and Busitema is only about 50 kilometers, the area around Mella is quite homogeneously Iteso, while the area around Busitema is largely Basamia, with a sizeable Bagwe minority, and there are also areas dominated by Japhadola nearby, particularly in Osukuru and Iyolwa subcounties. While the Basamia and the Bagwe speak similar languages, and intermarriage between them is relatively common, their Bantu-based language is quite different from that of the Nilotic-based Iteso language, and both of those languages are quite different from the Luo-based Japhadola language. Intermarriage between these groups is quite rare, and thus there is very little overlap in any of the kinship groups that exist within these ethno-linguistic clusters. In sum, the familial network structure of this area is quite fragmented.

These fragmented kinship networks appear to have been disadvantageous for FOBA. For example, most civilians in Bukedi first learned about FOBA through directly observing them; they had not heard about them through their personal information networks. Compared to individuals interviewed in Teso about UPA, a smaller portion of the individuals interviewed in Bukedi recalled first learning about FOBA via other civilians – more first learned about the existence of a rebel group in their territory when seeing direct evidence of the rebels, such as seeing members of an armed group

moving around their community, or seeing a fire that the group had left in their wake. In Bukedi, about half (16 our of 31, or 52%) of individuals first learned about FOBA from rumors, rather than direct evidence. In contrast, recall that in Teso, a larger portion (82%) of those interviewed had learned about the rebels via word-of-mouth. It appears that the rebels, unable to rely on dispersed communication networks to spread information about their group, instead personally travelled throughout the region to directly communicate with the people. One former rebel explained, "We had to move village to village, explain why we were rebelling, and ask for support." The way rebel leaders had to spread news has two implications. First, this may have made civilians less willing to enforce a norm of not informing on the rebels to the government because they were not sure that others valued such a norm. Second, this suggests that the structure of communication networks was not conducive to spreading news widely and quickly in general. As the model above makes clear, such an area would have a relatively difficult time enforcing norms *even if* all agreed that keeping the rebels' information a secret were important.

That communication networks were not conducive to the effective spread of information is further corroborated by accounts suggesting that the information that civilians did receive about the rebels was rather incoherent. This incoherence is further evidence of the fragmented nature of communication networks in Bukedi. Among civilian interviewees, individuals from different areas had different impressions about basic facts of FOBA, such as who had led the group, and whether or not the group had a particular ethnic base. One local leader remarked that "FOBA was not properly politicized... it seemed that their objectives changed." When another local leader in Bukedi was asked if he agreed with this assessment, he did and added, "It's a very cosmopolitan area. It's not easy to communicate among the groups."

Further, several comments in interviews suggest that from the beginning of the insurgency, civilians in Bukedi did not expect the rebels to succeed. In one focus group, people reported that the rebels had wanted to give the citizens the "false" impression

that the rebels were a large group. A local leader who served as government intelligence in Busia during this period said that when one of the FOBA leaders first came to his area "people were skeptical." A group of former fighters claimed that FOBA would sometimes kill community members and try to blame the deaths on the government, but that the group had "failed propaganda because people did not trust [the information]." A local leader said, "But when we first heard about FOBA, it looked like a joke... I didn't take it seriously... No one was certain about the new government, but no one expected [the rebels] to last... The public was responsible for the break up [of FOBA], always reporting suspicious activities to authorities." Hence, not only were civilians reporting information to the government, they expected other civilians to do the same.

Numerous sources also cited information leaks in Bukedi as the key cause of FOBA's demise. While FOBA repeatedly attempted to hold meetings to mobilize civilians in Bukedi, when they tried to do so, information about the time and place of the meetings would be leaked to the government. One former FOBA leader lamented the difficulty of keeping secrets in Bukedi. He added, "To win, we would have needed more community support." Another former FOBA leader conceded, "It was difficult to keep secrets." Many other civilians in Bukedi reported that they freely provided the government with information about the rebels, while this type of disclosure among interviewees from Teso was quite rare. A UPA commander observed that information leaks appeared to be more common in Bukedi than Teso, stating, "[The military] infiltrated [FOBA] quickly... they didn't know how to keep their secrets."

Despite numerous attempts, the FOBA rebels were unable to maintain a base in Uganda and had few successes against Ugandan military targets. Instead, they targeted local government officials in the night and absconded to their base in western Kenya by dawn. Omwero was captured and jailed by the NRA in September 1988, never to be released alive. The group continued to commit some violence through 1989 and 1990 from their base in Kenya, but they did not gain ground in forming a base or in their original goals of advancing to Kampala. In the early 1990s, FOBA disbanded. One

former leader who fled into exile and later joined the NRA government said simply that he saw that "the military solution was not working," while a former intelligence official said the group "melted away" into the civilian population.

7 Conclusion

This paper has sought to advance knowledge about the process by which aspiring rebel groups become viable. This approach highlights the importance of civilians, and the structure of the networks they live in, in influencing whether nascent rebel groups become viable. While civilian "support" has long played a prominent role in theories of insurgency and counterinsurgency, we advance a new, more precise understanding of how civilian support matters in the initial stages of insurgent group formation. Our approach posits that civilians are important not because of the manpower or material support that they offer to rebels, but because their potential to provide information to the government about the vulnerable rebels presents an existential threat to incipient rebels. We focus on the networks of trusted communication that spread gossip among the civilians and present a novel game theoretic model which shows that when these networks are unfragmented, can spread information rapidly to everyone, and span a large geographic area, the civilians are best able to keep the rebels' secrets. When civilians have the right networks, the rebels can operate in secrecy and potentially become a viable challenger to the state.

Our focus on the structure and dispersion of civilian information networks also allows us to shed light on a long-standing debate about whether and how ethnicity causes intrastate warfare. By our account, a shared ethnic identity among civilians where rebels live matters not because co-ethnics share a particular view about whether or not rebellion is a just or good idea, but because ethnically homogeneous groups are able coordinate information well and enforce secret-keeping better than ethnically heterogeneous groups. An important implication of this approach, which contributes to

the ongoing debate about whether and how anti-government grievances propel internal warfare, is that co-ethnics in a given community do not need to share pro-rebellion preferences in order for local ethnic homogeneity to influence whether rebellion escalates there.

Evidence from extensive fieldwork on previously-understudied insurgencies substantiates the empirical relevance of several implications of our theory. In particular, case evidence from Uganda enables us to trace how distinct kinship network structures came about, and how they underlie local ethnic demographic patterns. Further, the case studies show that accounts from actors involved in rebel group formation are generally consistent with the idea that different network structures among civilians where rebels launched importantly affected whether civilians provided information about rebel activities to the government – which in turn, influenced whether nascent rebels became viable. Given the difficulty and rarity of micro-level evidence of rebel group formation, these case studies provide an important window into these phases; we leave for future work more controlled tests of the model's implications in and beyond Uganda.

Finally, an important implication of the arguments we have advanced here is that studying conflict onset by selecting only rebel groups that became viable risks misattributing the cause of conflict to ethnic grievances. Studying rebellions that attained viability and observing that they exhibited grievances overlooks the timing of the relationship and precludes the potential finding that the process of becoming viable came first. More problematically, if grievances are in fact the product of the earliest stages, if groups with the right networks coordinate grievances best, and if these groups are also the most likely to produce a viable challenger to the state, then the selection problem has a more pernicious consequence. Ethnic grievances are then a product of the earliest stages of rebellion, become strongest when rebel viability is most likely, and so would appear especially often in a dataset selected on viability. This selection problem could produce the erroneous inference that because grievances appear so frequently in the study of rebellions, especially among those that succeeded, they must be the cause.

Our paper suggests that observing grievances alongside viable, successful rebel groups is a natural result of the process that allowed the rebel groups to become viable in the first place. Ethnic networks coordinate ethnic grievances.

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A Appendix: Supporting Materials

A.1 Formal definition of strategies and messages

When i deviates from σ^{NWIGP} in a round with in-group member j, j sends a message $m_{j,i,t} = \{i, t\}$ to himself and his neighbors which spreads rapidly through the network g, reaching k with probability $\epsilon^{j,k}$. Call $M_{i,t}$ the set of individuals about whom i has received messages by the start of time t about rounds that have occurred since $t - T$. Now we have:
Network In-Group Policing σ^{NWIGP}:
All players play C in the first round. Subsequently, all players i in round t play C if matched with $j \notin M_{i,t}$ and D if matched with $j \in M_{i,t}$.

When i deviates from σ^{NWRAT} in a round with in-group member j, j sends a message $m_{j,i,t} = \{i, t\}$ to himself and his neighbors which spreads rapidly through the network g, reaching k with probability $\epsilon^{\ell(j,k)}$. When i informs the government, i's neighbors j who have received the rebels' message send a message $m_{j,i,t} = \{i, t\}$ which spreads rapidly through the network g, reaching k with probability $\epsilon^{\ell(i,k)-1}$. Call $M_{i,t}$ the set of individuals about whom i has received messages by the start of time t about rounds that have occurred since $t - T$. Now we have:
Network In-Group Policing and Informing σ^{NWRAT}:
All players play C in the first round. Subsequently, all players i in round t play C if matched with $j \notin M_{i,t}$ and D if matched with $j \in M_{i,t}$.
Since only played who received the rebels' message send messages about informants, and all players within a component either heard or did not hear the message, only those that heard the rebels' message will punish informants and punish those who do not punish informants, etc.

A.2 Proof of Propositions 1 and 2

Playing σ^{NWIGP} through $t^{gov} - 1$ and then switching to σ^{NWRAT} in t^{gov} is a switching sequential equilibrium of game G and connected network g if, $\forall i \in N$,

$$\alpha - 1 \leqslant \frac{\delta^T(1+\beta)}{n-1} \sum_{j \neq i} \epsilon^{\ell(i,j)},$$

$$\beta \leqslant \frac{\delta^T(1+\beta)}{n-1} \sum_{j \neq i} \epsilon^{\ell(i,j)},$$

and

$$\gamma \leqslant \frac{\delta^T(1+\beta)}{n-1} \sum_{j \neq i} \epsilon^{\ell(i,j)-1} + b_i(MI_0),$$

where MI_n is the marginal impact a single civilian has on the probability of rebel success given that n others are ratting to the government, and $b_i = B\epsilon^{\ell(seed,i)}$.

Proof. For the purpose of any round between i and an opponent j, say i is "known to be a defector" if $i \in M_{j,t}$, and "not known to be a defector" if $i \notin M_{j,t}$. There are four ways to deviate from σ^{NWIGP} in any history: (1) playing D when not known to be a defector against someone not known to be a defector, (2) playing D when known to be a defector against someone not known to be a defector, (3) playing C when not known to be a defector against someone known to be a defector, and (4) playing C when when known to be a defector against someone known to be a defector. Under σ^{NWRAT}, for those who have heard the rebels' message, (1)-(4) are possible and there is a fifth way: (5) inform the government. Messages about deviations fail to reach their recipient with a probability determined by the recipient's network position. By assumption of the communication technology, with probability $\epsilon^{\ell(i,j)}$ a message originating with i reaches j; with probability 1 - $\epsilon^{\ell(i,j)}$ it does not. The network structure and communication process (including ϵ) are common knowledge, so all can calculate $\epsilon^{\ell(i,j)}$ $\forall i, j \in N$.

First take the case of the connected network as in Proposition 1. Consider deviating against randomly matched opponent j according to (1) in an arbitrary history. Complying yields

$$1 + \sum_{l=1}^{\infty} \delta^l \left[\frac{\#COOP_{i,l}}{n-1} + \frac{\#DEV_{i,l}}{n-1}(\alpha) \right]$$

where $\#COOP_{i,l}$ is the number of cooperators i expects to know about in $t+l$ and $\#DEV_{i,l}$ is the number of deviators i expects to know about in $t+l$. Deviating yields

$$\alpha + \sum_{l=1}^{T} \delta^l \left[\frac{\#COOPK_{i,j,l}}{n-1}(-\beta) + \frac{\#COOPDK_{i,j,l}}{n-1} + \frac{\#DEVK_{i,j,l}}{n-1}(0) + \frac{\#DEVDK_{i,j,l}}{n-1}(\alpha) \right] + \sum_{l=T+1}^{\infty} \delta^l \left[\frac{\#COOP_{i,l}}{n-1} + \frac{\#DEV_{i,l}}{n-1}(\alpha) \right]$$

where $\#COOPK_{i,j,l}$ and $\#COOPDK_{i,j,l}$ is the number of cooperators expected to know and to not know about i's defection against j by $t+l$, and likewise for the number of deviators. These expressions are functions of the network g and the history, but this stand-in notation is simpler. i prefers to comply iff

$$\alpha - 1 \leqslant \sum_{l=1}^{T} \delta^l \left[\frac{\#COOPK_{i,l}}{n-1}(1+\beta) + \frac{\#DEVK_{i,l}}{n-1}\alpha \right].$$

In the thought experiment to test sequential rationality, we consider any history through $t-1$ and a switch to complying with σ^{NWRAT} in t. Hence by $t+T$, the $\#COOP = n$, and so the $\#COOPK_{i,T}$ is strictly a function of the network g. Then we have:

$$\alpha - 1 \leqslant \sum_{l=1}^{T-1} \delta^l \left[\frac{\#COOPK_{i,l}}{n-1}(1+\beta) + \frac{\#DEVK_{i,l}}{n-1}\alpha \right] + \frac{\delta^T(1+\beta)}{n-1} \sum_{j \neq k} \epsilon^{\ell(j,k)}$$

for all future opponents k. The hard case for the condition is the history which minimizes the summand, which occurs when either everyone (and hence everyone who

knows about i's defection) is a cooperator (when $\alpha > \beta + 1$) or is a deviator (when $\alpha < \beta + 1$). Hence, it must be the case that both of the following are satisfied:

$$\alpha - 1 \leqslant \frac{(1+\beta)(\delta - \delta^{T+1})}{(n-1)(1-\delta)} \sum_{j \neq k} \epsilon^{\ell(j,k)} \tag{1}$$

$$\alpha - 1 \leqslant \frac{\alpha(\delta - \delta^{T})}{(n-1)(1-\delta)} \sum_{j \neq k} \epsilon^{\ell(j,k)} + \frac{\delta^T(1+\beta)}{n-1} \sum_{j \neq k} \epsilon^{\ell(j,k)}. \tag{2}$$

Now consider deviating against randomly matched opponent j according to (2) in an arbitrary history. In (2), i has deviated in the past; suppose i most recently deviated d periods ago against k. Complying yields

$$\epsilon^{\ell(k,j)}(-\beta) + (1 - \epsilon^{\ell(k,j)})(1) + \sum_{l=1}^{T-d-1} \delta^l \left[\frac{\#COOPK_{i,j,l}}{n-1}(-\beta) + \frac{\#COOPDK_{i,j,l}}{n-1} + \frac{\#DEVK_{i,j,l}}{n-1}(0) + \frac{\#DEVDK_{i,j,l}}{n-1}(\alpha) \right] + \sum_{l=T-d}^{\infty} \delta^l \left[\frac{\#COOP_{i,l}}{n-1} + \frac{\#DEV_{i,l}}{n-1}(\alpha) \right]$$

while deviating yields

$$\epsilon^{\ell(k,j)}(0) + (1 - \epsilon^{\ell(k,j)})(\alpha) + \sum_{l=1}^{T} \delta^l \left[\frac{\#COOPK_{i,j,l}}{n-1}(-\beta) + \frac{\#COOPDK_{i,j,l}}{n-1} + \frac{\#DEVK_{i,j,l}}{n-1}(0) + \frac{\#DEVDK_{i,j,l}}{n-1}(\alpha) \right] + \sum_{l=T+1}^{\infty} \delta^l \left[\frac{\#COOP_{i,l}}{n-1} + \frac{\#DEV_{i,l}}{n-1}(\alpha) \right].$$

Now i prefers complying to deviating via (2) in any history iff

$$\epsilon^{\ell(k,j)}(\beta) + (1 - \epsilon^{\ell(k,j)})(\alpha - 1) \leqslant \sum_{l=T-d}^{T} \delta^l \left[\frac{\#COOPK_{i,j,l}}{n-1}(-\beta) + \frac{\#COOPDK_{i,j,l}}{n-1} + \frac{\#DEVDK_{i,j,l}}{n-1}(\alpha) \right].$$

The above condition is hardest to satisfy in histories in which d is as small as possible, 1 (in other words, in histories in which i just deviated the period before contemplating this second deviation). In this binding case, the condition becomes:

$$\epsilon^{\ell(k,j)}(\beta) + (1 - \epsilon^{\ell(k,j)})(\alpha - 1) \leqslant \delta^T \left[\frac{\#COOPK_{i,j,T}}{n-1}(1+\beta) + \frac{\#DEVK_{i,j,T}}{n-1}(\alpha) \right].$$

In $t + T$, $\#COOP = n - 1$, $\#DEV = 0$, and the condition reduces to

$$\epsilon^{\ell(k,j)}(\beta) + (1 - \epsilon^{\ell(k,j)})(\alpha - 1) \leqslant \delta^T \left[\frac{\#COOPK_{i,j,T}}{n-1}(1+\beta) \right].$$

When everyone is a cooperator, the number of cooperators who know about i's defection against j is solely a function of the network, and the condition for not deviating via (2) in any history becomes:

$$\epsilon^{\ell(k,j)}(\beta) + (1 - \epsilon^{\ell(k,j)})(\alpha - 1) \leqslant \frac{\delta^T(1+\beta)}{n-1} \sum_{j \neq m} \epsilon^{\ell(j,m)} \tag{3}$$

for all possible future opponents $m \in N$. This condition must hold for all values of $\epsilon^{\ell(k,j)}$. A simpler set of sufficient conditions are:

$$\beta \leqslant \frac{\delta^T(1+\beta)}{n-1} \sum_{j \neq m} \epsilon^{\ell(j,m)} \tag{4}$$

$$\alpha - 1 \leqslant \frac{\delta^T(1+\beta)}{n-1} \sum_{j \neq m} \epsilon^{\ell(j,m)} \tag{5}$$

for all possible future opponents m. These conditions imply the conditions to prevent deviations via (1) above and are slack to the extent that the minimum and maximum values of $\epsilon^{\ell(k,j)}$ deviate from 0 and 1 in a network g.

Deviations according to (3) and (4) are trivially not preferred. Deviating according to either foregoes a chance to earn the gains from punishing *and* incurs punishment.

Deviations according to (5) follow the same logic as (1) and (2) above but earn government payoff γ and additionally forego the expected gains from the rebels lost due to i's marginal impact on their probability of success, yielding, for any history,

$$\gamma \leqslant \frac{\delta^T(1+\beta)}{n-1} \sum_{j \neq i} \epsilon^{\ell(i,j)-1} + b_i(MI_0).$$

The same logic generates the conditions in Proposition 2.

The above conditions for sequential rationality are independent of beliefs. Strategies are a mapping from messages into actions. For any set of messages that any player i has received by time t, $M_{i,t}$, the strategy prescribes a single action but $M_{i,t}$ corresponds to many actual histories of play at t that i cannot distinguish. Any beliefs over histories that i cannot distinguish trivially extend the behavior to sequential equilibrium.

□

A.3 Discussion of case study selection

As noted in the paper, the case studies were selected with the aim of isolating the variable of interest: local ethnic demography, while "holding constant" other, potentially-relevant factors drawn from dominant theories of civil war onset. The factors "held constant," or at least that varied in the direction other than that expected by existing theory, are summarized below.

With respect to the first two factors – type of local traditional leadership and political exclusion – the commonalities among these cases are straightforward: both rebel

	UPA *Teso region of eastern Uganda*	**FOBA** *Bukedi region of eastern Uganda*
Traditional leadership	Decentralized	Decentralized
Political Exclusion	Low	Low
Terrain	Flat, semi-arid savannah	Somewhat hilly, some jungle and nearby forests
Proximity to international borders	No international border, 120 km to western Kenya	Borders western Kenya
Economic well being (Poverty data from 1992 household survey; literacy data from 1991 census)	77.4% living below poverty line; 51.5% literate	57.7% living below poverty line; 53% literate
State strength *year of rebel launch*	Low *1987*	Low *1987*
Ethno-linguistically homogeneous?	*Yes* *1 language in Teso* *Largest ethnic group is 85% of population*	*No* *3 languages in Bukedi* *Largest ethnic group is 37.5% of population*
Did the rebellion become viable?	***Yes***	***No***

Figure 2: *Summary of Paired Comparison, Case Study Rebellions.*

groups launched in areas in which traditional authority structures were decentralized, and as described in the paper, neither were markedly under represented in the national government in the late 1980s. Unlike areas of central and western Uganda that have been arranged into centralized, hierarchical kingdoms since the pre-colonial period, the areas of eastern Uganda studied here have long been characterized by highly localized leadership structures: traditional leaders for a given kinship group would adjudicate disputes among clans, and while these clan leaders would sometimes coordinate, none was not subject to any overall authority.

Regarding terrain and borders, the variation that exists among these cases goes in the direction opposite of that anticipated by existing theories. Uganda sits astride the equator, much of the country is semi-forested and hilly, with most of the geographic

variation being simply the extent of the forest cover and hills. While Uganda is bordered by two mountainous areas on its eastern and western flanks, neither is located close to, or played a significant operational role in, the initial stages of either case study rebellion. Some areas of Uganda are flatter and less thickly forested than others; the UPA – which became viable – launched in the area with the least favorable terrain, since it is the most flat and has the least forest cover.[35] Regarding international borders, FOBA, the group that did not become viable, launched closer to an international border than the UPA, which did become viable.

There are also no major, discernable differences in state capacity or poverty in these areas. The key determinant of economic welfare and state capacity in Uganda in the decade leading up to 1986 – warfare – did not directly affect Teso or Bukedi. The Bush War of the early 1980s, which led to the NRM's ascendance to central power, was fought exclusively in central and western Uganda. Thus, the eastern region studied in this paper escaped the direct effects of war, particularly war-related deaths, destruction of infrastructure and population displacement.

While reliable measures of economic well-being for these areas do not exist for the years immediately prior to these rebellions, measures from the 1991 census provide some clues. As current theories predict, the area in which groups became viable were somewhat poorer than those where groups did not become viable: the percentage of individuals living below the poverty line was 77.4 and 57.7 for the UPA and FOBA. However, because this data was collected about three years after the start of these rebellions, it is likely that events occurring in the initial stages of these rebellions drive at least some of this variation. Literacy rates may be a better proxy for economic well-being since they are stickier, and indeed respective literacy rates for these areas suggest that areas that spawned viable groups were similarly literate, or more literate, than areas that did not: literacy rates for the area where the rebel groups formed respectively are 51.2 and 53 for UPA and FOBA. Thus, while three years after rebellion began the areas where groups became viable were poorer to the areas where rebel groups did not become viable, literacy rates were similar in these areas.

Regarding state capacity, as a part of their war-fighting efforts in central and much of western Uganda, the NRA had developed significant local institutional capacity. In particular, they had developed extensive local government structures that assisted the NRM rebel group in obtaining information about government troops. These institutions were thus already in place and were absorbed into the national government structure when the NRM overtook Kampala in early 1986. But by the time the rebellions began in northern and eastern Uganda in 1987, the NRM government had only recently begun setting up similar local governance institutions throughout northern and eastern Uganda, appointing Special District Administrators to organize those local governments and hold local elections. Thus, throughout eastern Uganda, the central government had very little institutional reach, and thus very low capacity to detect nascent rebels.

In conclusion, to the extent possible, these cases of rebel groups are paired by factors

[35] In fact, one UPA leader remarked about the UPA disadvantage relative to FOBA with respect to terrain, stating that "the forest [in Bukedi where FOBA launched] is ideal for war. During our rebellion, I would look there with envy."

other than ethnic demography that we may expect to influence rebel viability. There appears to be no compelling reason to believe that any of these factors are strongly associated with rebel viability in these cases in the direction anticipated by existing theories.