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Social Structure and Conflict: Evidence from Sub-Saharan Africa[*]

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Abstract:

We test the long-standing hypothesis that ethnic groups that are organized around `segmentary lineages' are more prone to conflict and civil war. Ethnographic accounts suggest that in segmentary lineage societies, which are characterized by strong allegiances to distant relatives, individuals are obligated to come to the defense of fellow lineage members when they become involved in conflicts. As a consequence, small disagreements often escalate to larger-scale conflicts involving many individuals. We test for this link between segmentary lineage organization and conflict across 145 ethnic groups in sub-Saharan Africa. Using a number of estimation strategies, including an RD design at ethnic boundaries, we find that segmentary lineage societies experience more conflicts and ones that are longer in duration and larger in scale. We also find that the previously-documented relationship between adverse rainfall shocks and conflict within Africa is only found within segmentary lineage societies.

Key words: Conflict, Civil War, Social Structure, Segmentary Lineage, Kinship

JEL classification: D74, O55, Z1

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1. Introduction

Civil wars are a common feature of the modern world. In 2013, there were 34 ongoing civil wars, 18 in Asia and the Middle East, 14 in Africa and 2 in the Americas.[1] Some of these wars have been very protracted. An example is the conflict between the Lord's Resistance Army and the Ugandan state, which can be traced back to 1987 or the civil war in Mindanao, the southern island of the Philippines, which has been ongoing since the late 1960s (Allen and Vlassenroot, 2010). These wars cause a great deal of damage and loss of human life. In 2013 alone, an estimated 70,451 people died fighting in civil wars and 10.7 million civilians were newly displaced, resulting in a total stock of 33 million people being displaced due to conflict.[2]

In this paper, we test a long-standing hypothesis from the field of anthropology about the relationship between conflict and the kinship structure of a society, namely whether an ethnic group is organized into segmentary lineages. Although in Western cultures, the central kinship unit is the nuclear family, in most of the world people live within much more complex social structures, connected by extended kin networks. Segmentary lineage is one such social structure. The first defining characteristic of this organizational form is unilineal descent, where people trace their ancestry back either through either the male line (patrilineal) or female line (matrilineal), but not both. Typically, ancestry is traced back to a common, often mythical, founder, after whom the tribe or society is named. Examples are *Samale* and *Orma* who are the common ancestors of the Somali and Oromo (Ahmed, 2013b, p. 20). The second feature is the presence of sub-sets or segments of a full lineage, which function as coherent autonomous groups (Smith, 1956, pp. 39–40). The lineage segments take a 'corporate form,' meaning that they are important for organizing a range of activities and functions that are political, judicial, and administrative in nature (Fortes, 1953).[3]

Figure 1 displays a hypothetical patrilineal segmentary lineage system. In the figure, triangles indicate men and the straight lines indicate descent, with each row of triangles indicating a generation. All individuals in the figure descend from a common ancestor indicated by "I." Also shown in the figure are various segments of the full lineage. The segments are of different sizes:

[1] These figures are based on the authors' calculations using the UCDP/PRIO Armed Conflict Dataset.

[2] These figures are from the UCDP Battle-Related Deaths Dataset and the UNHCR Statistical Yearbook, 2013.

[3] As described by Fortes (1953, p. 26): "the individual has no legal or political status except as a member of a lineage;. . . all legal and political relations in the society take place in the context of the lineage system. . . all the members of a lineage are to outsiders jurally equal and represent the lineage when they exercise legal and political rights and duties in relation to society at large. This is what underlies. . . collective responsibility."

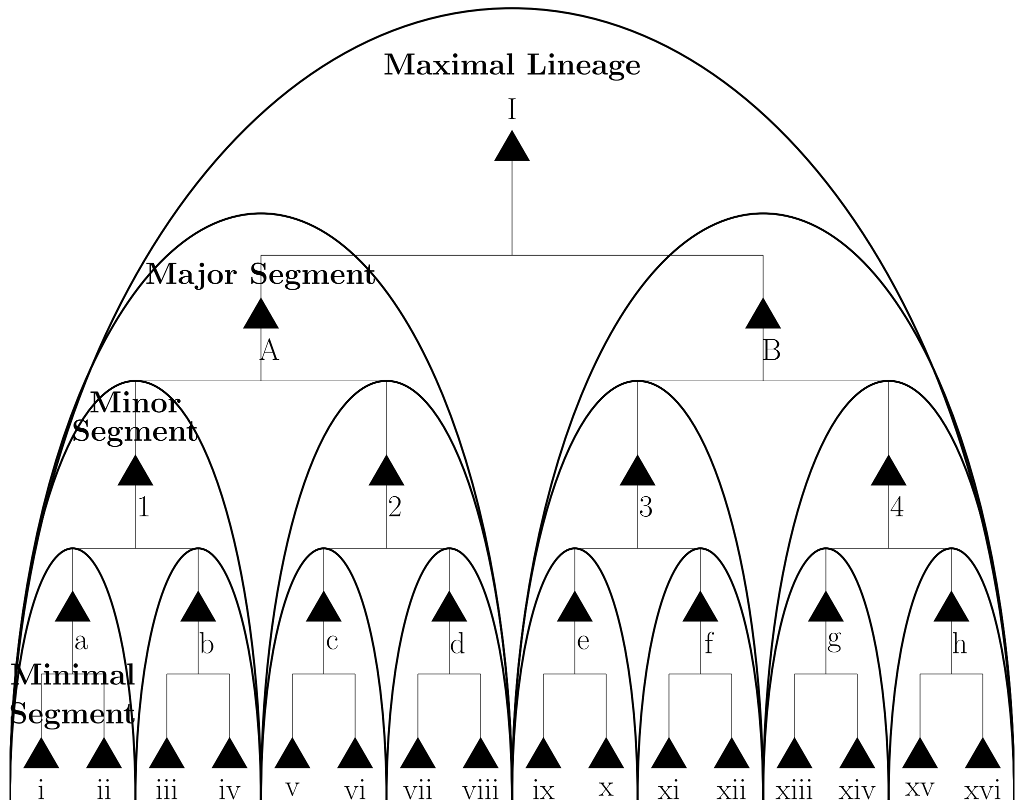


Figure 1: The figure provides a representation of a hypothetical segmentary lineage society.

The smallest is the "Minimal Segment," the next larger is the "Minor Segment," and the largest is the "Major Segment."

Although it is true that, from a biological perspective, decent is universal among human societies, in terms of social significance, descent varies significantly. For example, not all groups trace descent through unilineal lineages. Another common kinship form is cognatic descent where individuals can simultaneously belong to two sets of groups and trace their lineage through either their mother's relatives, father's relatives, or both. Many small-scale societies, for example, hunter-gatherer groups such as the Hadza or San, have no established elaborate kinship system at all. In addition, the importance placed on a society's kinship system, as well as the associated responsibilities and obligations, also vary widely. Unlike in a segmentary lineage society, where lineage and kinship are of the utmost importance, in many societies, local residence functions as a primary source of identity, even though this clearly mixes together individuals who are not genetically related. In other societies, completely different types of social structures, such as age sets and age grades, provide the main way of organizing societies, both administratively and politically.

A number of scholars in the anthropology literature have hypothesized that there is a relationship between the social structure of groups and the prevalence of violence and conflict. More specifically, it is argued that segmentary lineage societies are more prone to become engaged in more conflicts, and in ones that are longer in duration and larger in scale, than societies without a segmentary lineage structure. This is not because segmentary lineage societies harbor particular grievances, but because the social structure is designed to mobilize combatants when a dispute or conflict occurs. To see why this is the case, consider Figure 1. An important aspect of segmentary lineage societies is that lineages and segments, and one's responsibility to them, are of the utmost importance. In the figure, if individual "i" were to have a dispute with individual "ix" within a segmentary lineage system, this would mean that all individuals belonging to "Major Segment A" would be allied with, and come to the defense of, individual "i." Similarly, all individuals in "Major Segment B" would be allied with and come to the defense of individual "ix." Thus, a dispute between two individuals immediately escalates into a dispute between two large communities. Outside of segmentary lineage systems, these allegiances do not exist and the dispute might comprise, at most, a small number of friends or family members of the two involved in the dispute.

More generally, the number of individuals involved in a conflict depends on the genealogical distance of those involved in the dispute. Because of one's membership in a set of nested segments and the strong obligations to one's kinsmen within the segments, in segmentary lineage societies, small-scale disputes can easily escalate into larger-scale, sustained fighting or even full-blown warfare. In the modern context, and particularly in Africa, the region of our study, conflict often takes the form of civil conflict, where the external enemy is the government. However, even in this context, the same characteristics of segmentary lineage societies are still relevant. The structure allows segments to effectively mobilize against the common enemy, which in the setting of civil war is the government.

This characteristic of segmentary lineage systems has been well-studied by anthropologists. For example, Sahlins (1961, pp. 323, 333) argues that "segmentary lineage organization is a successful predatory organization in conflicts with other tribes... [Conflict], even if it has been initiated by a small lineage segment, it pits 'all of us' against 'them'." Along similar lines, Evans-Pritchard (1940a, p. 142) describes the organization of the Nuer, a segmentary lineage group: "Each segment is itself segmented and there is opposition between its parts. The members of any segment unite for war against adjacent segments of the same order and unite with these adjacent segments against larger sections." The logic is also illustrated by a traditional Bedouin proverb that is roughly translated as: "I against my brothers; my brothers and I against my cousins; my cousins, my brothers, and I against the world." (e.g., Barth, 1973, p. 13; Combs-Schilling, 1985, p. 660).

In this study, we take this long-standing hypothesis to the data and test for a relationship between the presence of segmentary lineage organization and conflict today. There are a number of benefits to moving beyond the case study evidence. First, it is unclear whether the cases that have been examined in the anthropology literature are a representative sample of all possible cases. Our empirical strategy has the advantage of being able to estimate an average effect across ethnicities in our sample. Second, it is possible that segmentary lineages, exactly because they escalate the scale of conflict if it starts, prevent wars from occurring. In other words, in theory, segmentary lineage societies may escalate conflicts if they start, but also prevent them from starting in the first place. The case-study literature provides no evidence of this. However, a lack of evidence for this channel is not the same as evidence against such a channel. Our empirical analysis allows us to estimate the separate effects of segmentary lineage organization and conflict onset and on conflict escalation. Third, the ethnographic studies are primarily from before the 1970s and so it is possible that the strength of segmentary lineage organization, and the obligations that go with it, have weakened in recent decades. Although, there are many examples of segmentary lineages between important for recruitment in modern conflicts (e.g., Sterns, 2013), our findings will provide systematic evidence that is relevant to this question.

Information on the presence of segmentary lineage systems is not available from standard ethnographic sources such as the *Ethnographic Atlas* or the *Standard Cross-Cultural Sample*. Therefore, we collected data using previously published ethnographies. The primary source used was the *Ethnographic Survey of Africa*, which is a series of studies, produced from the 1940s until the 1970s and edited by Daryll Forde. Following the definition of Middleton and Tait (1958), we define an ethnic group as having a segmentary lineage organization if: (1) there is a recognized and known unilineal descent system; (2) segments of the lineage take a 'corporate form', meaning that they are sub-units that are important and affect administrative functions and political positions.; and (3) lineages and genealogical relationships influence one's location of residence. We code an ethnicity as not having a segmentary lineage organization if any of these three characteristics are known to not be present.

We restricted our data collection to ethnic groups from Africa. This was done for two reasons. First, the ethnographic data are most readily available from comparable and systematically documented sources for groups within Africa. Second, and probably most important, the geo-coded micro-level conflict data that we use (described below) is only available for Africa. In the end, we are able to definitively categorize 145 African ethnic groups, 74 of which are segmentary lineage societies and 71 of which are not. Although we are unable to construct measures for every ethnic group within Africa, our sample is sizeable, comprising an estimated 212 million people or approximately 38% of the population of sub-Saharan Africa.

We use conflict data from the Armed Conflict Location and Event Data Project (ACLED), a geo-coded data set that catalogs information about each conflict event in Africa from January 1, 1997 to December 31, 2014. The database includes information on the location, date, and other characteristics of "politically violent events."[4] To link the conflict data with the data on the lineage structure of each ethnic group, we use the digitized map of the traditional locations of ethnic groups from Murdock (1959) to calculate the frequency of conflicts that occur within the territory of each ethnic group.[5]

Our empirical analysis comprises two estimation strategies. The first is to estimate the cross-ethnicity relationship between the traditional presence of a segmentary lineage organization and the prevalence of conflicts from 1997–2014. Our estimates show a positive and statistically significant relationship between segmentary lineage and a range of conflict measures, including conflict incidence, duration, and fatalities. In addition, we also examine conflicts of different types – namely, civil conflicts, non-civil conflicts, and localized within-group conflicts. We find that that segmentary lineage experience more of each type of conflict. In addition, to being statistically significant, the estimated effects are also quantitatively meaningful. For example, according to our estimates, segmentary lineage societies experienced approximately 100% more deadly conflict incidents relative to societies without segmentary lineages.

We find that these relationships are robust to controlling for a large number of covariates,

[4]Civil conflicts (i.e., conflicts between the government military and other non-government groups) account for 39.4% of the 117,823 events in their database, while the other 60.6% are non-civil-conflict events that do not involve the government military.

[5]The strategy of using location to link conflicts to ethnic groups follows the methodology of Michalopoulos and Papaioannou (2016). Prior to this, the same methodology was also used to estimate average incomes of ethnic groups (e.g., Michalopoulos and Papaioannou, 2013, 2014, Alesina, Michalopoulos and Papaioannou, 2016).

including: country fixed effects, historical covariates (namely, political centralization and historical development as measured by settlement complexity), and a host of geographic covariates (agricultural suitability, altitude, distance from the equator, amount of land inhabited by the ethnic group, distance from the center of an ethnic group to the nearest country border, and an indicator for the ethnic group being split by a national border). The estimates of interest are very similar whether or not we condition on these covariates.

The conditional correlations potentially suffer from the standard inference issues that plague cross-sectional estimates, namely the presence of omitted factors, particularly those that are unobservable to the researcher. Given this, we implement a second set of estimates that attempt to address the presence of omitted factors that may bias our estimates. We first restrict attention to pairs of ethnic groups that share a border and where one has a segmentary lineage organization and the other does not. In our sample, there are 68 such pairs. We then take 10km-by-10km grid-cells to be the unit of observation and implement a regression discontinuity (RD) identification strategy, where we estimate the effect of segmentary lineage organization on conflict across grid-cells that are restricted to be sufficiently close to the border, while controlling for two-dimensional running variables.

We find that the RD estimates are qualitatively identical to our OLS estimates. The estimated relationships between segmentary lineage organization and conflict are all positive and highly significant. These findings hold for each of our measures of conflict, for a range of different bandwidths, and for a number of different specifications that control for the two-dimensional running variables.

The benefit of the RD estimates over the OLS estimates is that omitted factors, even those that are unobservable, are better accounted for. As long as the omitted factors vary smoothly over space – for example, because physically close units have similar geography, climate, and history – they will be taken into account by the RD estimation strategy. However, the strategy is ineffective if the omitted factors also vary discontinuously at the border. In other words, there may be other differences between the ethnic groups besides the presence of segmentary lineages and the RD estimates may be capturing these differences as well.

To explore the potential importance of this issue, we first check average differences in observable characteristics between societies with and without segmentary lineages. We find that the two groups are balanced on a wide variety of observable covariates. This finding is consistent with arguments suggesting that the presence of segmentary lineage societies is not correlated with a large set of structural factors, but is an idiosyncratic process (Evans-Pritchard and Fortes, 1940, Smith, 1956, Salzman, 1978, Kelly, 1983). Second, we conduct a series of placebo tests where we classify ethnic groups as either treatment or control based on a range of alternative ethnicity-level characteristics. We then use our RD specification to estimate any treatment effects for these alternative characteristics. To make sure that any observed effect is not driven by segmentary lineage organization, for the placebo checks, we focus the comparison on ethnicity pairs with the same segmentary lineage classification. Reassuringly, we find no statistically significant effects of these other characteristics on conflict. Importantly, the point estimates are not only statistically insignificant but also small in magnitude.

One of the conditions that is necessary for the validity of the RD estimates is that we correctly identify the location of ethnic boundaries. We check whether this is satisfied using data from the third round of the Afrobarometer surveys on the location and ethnicity of over 5,500 respondents. The RD estimate, with self-reported ethnicity as the outcome variable, shows a sharp discontinuity at ethnicity borders. This provides confidence in the validity of our RD estimates.

The primary mechanism explaining the estimated relationship between segmentary lineage societies and conflict is the strong in-group allegiances and segmented structure that can cause initially-small disputes to escalate into larger-scale conflicts. In addition, given these effects, segmentary lineage organization could, in theory, actually result in fewer conflicts. It may be that conflicts tend to be larger in scale and duration if they occur, but are less likely to occur. We explore these and related issues by separately estimating the effects of segmentary lineage on the onset of new conflicts and on the duration (i.e., offset) of existing conflicts. Estimating these two mechanisms using a set of hazard models, we find that the presence of a segmentary lineage organization increases the duration of conflicts. This effect is large in magnitude and highly significant. Turning to conflict onset, we find that segmentary lineage also has a positive effect, although it is smaller in magnitude and less precisely estimated. Thus, there is no evidence that segmentary lineage organization, through its escalation effects, prevents conflicts from occurring in the first place.

As an alternative method to examine the escalation effect of segmentary lineages, we estimate the relationship between a segmentary lineage organization and the frequency of conflicts of different sizes, namely conflicts with: no fatalities, 1–10 fatalities, 11–100 fatalities, and more than 100 fatalities. We find that although segmentary lineage organization is associated with a greater probability of conflicts of all types, the estimated relationship is significantly stronger, both in terms of magnitude and statistical significance, the larger the conflict. In addition, these differences are large. For example, we find that while segmentary lineage societies have 59% more conflicts with zero fatalities, they have 183% more conflicts with over 100 fatalities. These findings are consistent with segmentary lineages working, in part, through an escalation mechanism.

The final empirical exercise that we undertake is motivated by the existing evidence of the relationship between adverse rainfall shocks and civil conflict within sub-Saharan Africa (e.g., Miguel, Satyanath and Saiegh, 2004). We test whether the effect of adverse rainfall shocks on conflict is different for segmentary lineage societies. We find greater effects of rainfall shocks on conflicts for segmentary lineage ethnicities. In fact, we find that the average relationship across all ethnicities in our sample is driven solely by segmentary lineage societies. For ethnic groups without segmentary lineage organization, the relationship between adverse rainfall and conflict is not statistically different from zero, and if anything, negative rather than positive.

Our findings contribute to a better understanding of the incidence, intensity, and duration of conflict in developing countries.[6] This literature has proposed various types of explanations, many based on the dichotomy between 'greed' and 'grievance' (Collier and Sambanis, 2005). Greed factors influence whether or not individuals or groups decide to engage in civil war. These include things like the presence of 'lootable wealth,' such as oil or diamonds (Weinstein, 2006, Ross, 2004, 2006), or foreign aid (De Ree and Nillesen, 2009, Nunn and Qian, 2014, Crost, Felter and Johnston, 2014). On the grievance side, conflict could be induced by inequality within society (Cederman, Gleditsch and Buhaug, 2013), the presence of ethnic cleavages (Montalvo and Reynal-Querol, 2005, Esteban, Mayoral and Ray, 2012), arbitrary national boundaries (Michalopoulos and Papaioannou, 2016), the lack of political accountability and democracy (Gleditsch and Ruggeri, 2010) or other types of exploitative institutions (Richards, 1996, Wood, 2003). Also potentially important are factors that influence the opportunity cost of engaging in conflict (Miguel et al., 2004, Debos, 2011, Hoffman, 2011, McGovern, 2011, Dube and Vargas, 2013, Debos, 2016). A final recurrent theme in the literature is that conflict – namely, civil conflict – occurs as a consequence of state weakness, as proxied by real per capita GDP (Fearon and Laitin, 2003) or measured more directly by state history (Depetris-Chauvin, 2014).

[6] See Blattman and Miguel (2010) for an overview of this literature.

Our findings also contribute to a well-established anthropological literature that, through case studies, has hypothesized and documented the effects that segmentary lineage structures have on conflict (e.g., Evans-Pritchard, 1940a,b, Bohannon, 1958, Kelly, 1985, Lewis, 1994, 1989, Salzman, 2007, Zeman, 2009, Stearns, 2013, Ahmed, 2013b, Hoehne, 2015). While the studies recognize that segmentary lineage organization can potentially affect all types of conflict, their focus tends to be on the effects that segmentary lineages have on smaller-scale within-ethnicity conflict, whether it be individuals from the same village against one another or individuals from separate villages against one another. Our estimates test for this directly by examining the effects of segmentary lineage organization on localized within-group conflicts, as well as extending this line of inquiry and asking whether the same mechanisms are also important for civil conflicts.

Our findings also contribute to a deeper understanding of the long-run consequences of the pre-colonial characteristics of African societies. A number of important studies have documented the importance of historical political centralization for economic outcomes today (e.g., Gennaioli and Rainer, 2007, Michalopoulos and Papaioannou, 2013). Although this is clearly an important determinant of subsequent outcomes, our analysis shows that other dimensions – namely, social structure and the nature of kinship – are also important. Our focus on this dimension of social structure connects our findings to previous studies that also examine the importance of various dimensions of social structure within developing countries. For example, La Ferrara (2007), Gneezy, Leonard and List (2009), La Ferrara and Milazzo (2011) and Lowes (2016) study the importance of matrilineal versus patrilineal inheritance, while Bau (2016) studies the importance of matrilocal versus patrilocal residence. Dunning and Harrison (2010) show how the social custom of cross-cutting alliances called "cousinage" influences the appeal of ethnic political appeals in Mali. Greif (1994) examines the institutional divergence between Genoa and other parts of the Mediterranean by positing differences in underlying kinship relations, which did not allow the Genoese to use community enforcement mechanisms in contractual relations and Greif and Tabellini (2010), building on a large historical literature, use a similar argument to explain the historical divergence between Europe and China. More recently, studies have examined the relationship between the strength and scope of kinship networks and democracy (Schulz, 2017), corruption (Akbari, Bahrami-Rad and Kimbrough, 2017), and cooperation and long-run economic development (Enke, 2017).

The difference between attitudes towards and treatment of family members versus non-family members has a basis in biology (Hamilton, 1963, Henrich and Henrich, 2007) and has been applied to study problems of economic development (Banfield, 1958). Kinship, as measured by the strength of family ties, has also been extensively used in the literature on social networks (Ansell and Padgett, 1993, Naidu, Robinson and Young, 2015), and has been shown to be associated with a range of economic, social, and political outcomes (Alesina and Giuliano, 2014). In the political economy literature, family ties have also been explored as sources of political power and dynastic politics (Dal Bo, Dal Bo and Snyder, 2009, Querubín, 2016, Cruz, Labonne and Querubin, 2017). Our findings also add to the existing literature on the importance of family structure (Todd, 1985).

The paper proceeds as follows. In the next section, we review the existing anthropological explanations for why some societies are organized along the basis of segmentary lineages and others are not. We then discuss case study evidence which makes a causal link between segmentary lineage organization and conflict. Section 3 discusses the data and in particular the way in which we coded whether or not a particular society has a segmentary lineage structure based on ethnographic sources. Section 4 presents our OLS estimates, while section 5 presents our RD estimates. Section 6 attempts to gain insights into mechanisms by examining onset, duration, and the differential relationship between adverse rainfall shocks and conflict. Section 7 discusses the relevance of our findings for ethnic groups outside of Africa, while section 8 concludes.

2. Background

A. *Descriptive Evidence of a Relationship between Segmentary Lineage and Conflict*

Numerous studies have documented examples of an apparent link between segmentary lineage organization and the initiation and/or propagation of conflict. Many point out the strong effect that segmentary lineage organization can have on the exacerbation of small conflicts. Once a conflict begins, segmentary lineage structure results in an essentially automatic mobilization of additional combatants, which makes resolving the conflict much less likely.

One of the best-studied segmentary lineage societies is the Somali, whose social structure is dominated by segmentary organization. Anthropologist Ioan Lewis (1961) argues that the segmentary lineage system plays a major role in propagating conflict in Somalia. He writes that "quarrels between individuals which result in loss of life or property or both are often quickly followed by retaliation where there is little thought of negotiation. Within a clan bitter feuds develop and persist, often for many years and sometimes generations, erupting spasmodically as later incidents occur, and being temporarily forgotten only in the context of wider hostilities" (Lewis, 1961, p. 243).

Segmentary lineage has also been associated with more-organized forms of conflict, like political violence. In his book *Blood and Bone*, Ioan Lewis (1994) describes the link between segmentary lineage organization and organized violence in the Somali region during the 1980s. After the Ogaadeen war of 1977–1978, there was an upsurge of "tribalism," which was led by the President Siyad, whose goal was to consolidate the position of his own clan and family. Rather than develop a national identity, his strategy was to recruit as many tribal segments as possible within the segmentary system. In turn, this caused segments opposed to the government to build allegiances among their own segments (Lewis, 1994, pp. 225–226). That is, the "segmentary structure allowed both the government and opposition to mobilize large swaths of the lineage system" (Lewis, 1994, p. 232). This societal polarization along tribal and genealogical lines lays at the foundation of Somalia's subsequent political conflict.

Even today, the relationship between lineage organization and violent conflict continues to be important. A 2015 Rift Valley Institute Report reaffirms its importance in a discussion of an upsurge of conflict during 2006. It describes how the military efforts of the Warsangeli and Dubays fighters is "in line with the segmentary logic of the northern Somali society as a whole: as soon as a common threat emerges from outside, members of a descent group unite at the highest necessary level (sub-clan, clan or clan-family). Conversely, in the absence of such a threat, a group breaks up into smaller units that fend for themselves" (Hoehne, 2015, p. 217).

The Somali example clearly illustrates the obligations that arise due to segmentary lineages and how these can cause individuals to align with large portions of society against common threats and to become involved in conflicts even if they are otherwise far removed from the source of the conflict. This effect has also been documented among several other segmentary lineage groups. The Nuer, an ethnic group from South Sudan that strictly abides by segmentary lineage organization, have been well studied. Evans-Pritchard (1940a) describes this obligation among the Nuer of South Sudan, writing that they "state this structural principle clearly in the expression of their political values. Thus they say that if the Leng tertiary section of the Lou tribe fights the Nyarkwac tertiary section – and, in fact, there has been a long feud between them – the villages which compose each section will combine to fight." (Evans-Pritchard, 1940a, p. 142).

Numerous other segmentary lineage societies also exhibit this same pattern. Lienhardt (1958) describes this same allegiance structure among the Dinka. Bohannon (1958) describes it amongst the Tiv of Nigeria, another segmentary lineage society and provides the specific example of fighting between the Morov of MbaKetsa and MbaHura of Tondov. In this case also, the segmentary structure facilitated recruitment to conflict, which significantly escalated a feud that began between just two tribal segments (Bohannon, 1958, p. 46).

B. ***Other Systems of Kinship***

Those societies without segmentary lineage organization comprise our control group. A common alternative organization form is centered around the village, which is led by a village chief. Radcliffe-Brown (1950, p. 42) describes this form of organization, referring specifically to the Lozi and Bemba of modern Zambia: "The typical corporate group in that region is a village constituted, by the persons who attach themselves to a headman. . . This group is an open, not a closed group; that is, individuals or families may join or leave it, moving from one village to another. It is usual that a number of the inhabitants of a village at any time should be related, either by cognatic ties or through marriage with the headman or with one another, but they do not form a unilineal kin group, which is by its constitution a 'closed' group."

Radcliffe-Brown (1950, p. 43) also describes why unilineal descent (lineage traced through the male line only or the female line only) is important for segmentary lineage organization and why cognatic descent (tracing lineage through both the male or female lines) is not compatible with segmentary lineage organization: "It is the corporate kin group. . . that controls the use of land, whether for hunting, for pastoral life, or for cultivation; that exacts vengeance for the killing of a member, or demands and receives an indemnity. . . A continuing social structure requires the aggregation of individuals into distinct separated groups, each with its own solidarity, every person belonging to one group of any set. . . In kinship systems cognatic kinship cannot provide this; it is only made possible by the use of the principle of unilineal descent."[7] Analyses of cognatic kinship groups illustrate that they are very different in structure from segmentary lineage groups. Most important for thinking about the mechanisms linking social structure and conflict is the fact that segmentary lineage societies are closed in a way cognatic societies are not and

[7]As we discuss further below, one of the primary characteristics of segmentary lineage organizations, which is relevant for creating an ethnicity-level measure is whether a society has unilineal descent.

that all of the functions that a corporate group might undertake – social, political, judicial, or administrative – are fused together in a segmentary lineage group. These elements seem to create a far greater social solidarity in segmentary lineage societies and much greater ability to engage in collective action. This is not so in societies with cognatic kinship, where there is typically a clear differentiation between kinship relations and political relations (Fortes, 1953, p. 26; Gluckman, 1951, p. 31).

Writing about the Lozi of Zambia, Max Gluckman (1950) makes a similar point: "No corporate unilineal group of kinsmen exists among the Lozi. Every child. . . has a right to make its home in a village of either of its mother's parents and to inherit there. It also has these rights with the kin of its father. . . There are no broadly based unilineal groups associating in common rights of residence, ownership, inheritance, production etc." (Gluckman, 1950, pp. 171, 173). Thus, it is clear that the social organization of ethnic groups, like the Bemba or Lozi, who base groups on villages, is very different from segmentary lineage organization, in which kinship ties are predetermined, clearly defined, and form distinct non-overlapping groups (e.g., segments). While the Bemba and Lozi had centralized states, their form of village/chief organization can also be found among ethnic groups that were stateless, such as the nearby Tonga (Colson, 1951). This system is also common among groups in other parts of Africa, with the most well-studied groups being the Wabena of Tanzania and the Ankole and Toro of Uganda (Gluckman, 1950, p. 178).

In addition to cognatic kinship societies, there are a number of other forms of non-segmentary lineage organization. For example, there are societies, like the Masai in Kenya and Tanzania, whose politics and administration are organized by age – i.e., around age-sets – and by lineage or descent. Age-based organization also create obligations although to those within one's own age set. One could also imagine that age could also provide a useful axis for mobilization and collective action and there is some evidence that it certain instances it can, either historically (Gluckman, 1940, Eldredge, 2014) or in the modern period (Kurimoto and Simonse, 1998). However, what is distinct about segmentary lineage societies is the number of individuals that can be mobilized through lineage relative to age sets. While an age grade typically consists of tens of people lineage segments consist of hundreds or even thousands of people. Another example is very small scale societies that never develop either unilineal or cognatic kinship in any institutionalized form. Examples include such groups as the Hadza or the San people.

3. Data

A. *Conflict Data (ACLED)*

Our conflict data are from the *Armed Conflict Location and Event Data Project* (ACLED) database, which provides details of all known conflict events within Africa from January 1, 1997 to December 31, 2014. The information available includes the location (latitude and longitude) of the conflict incident, the type of incident (riots and protests, battles, violence against civilians, etc), the actors involved (government forces, rebel militia, civilians, protestors, etc), the motivation of the actors involve (e.g., aimed at taking over land, riots, protests, etc), and the number of fatalities during the event. ACLED only includes conflict incidents in the data set if the province in which the incident took place is known. Conflicts in which only the province, and not a smaller administrative unit, is known are coded as having low geographic precision and are often, but not always, assigned the location of the province capital. These conflicts make up 4.75% of the full ACLED data.[8]

Given the potentially different effects that segmentary lineage structures have on civil conflicts relative to other forms of conflict, such as within-ethnicity conflicts, our analysis examines the following measures of conflict: (1) an aggregate measure that includes all conflict incidents; (2) incidents that are part of a civil war; (3) incidents that are part of a conflict that is not a civil war; (4) incidents that are between individuals from the same ethnic group or village. We provide a precise definition of each below.

1. **All Conflicts.** Includes all conflict incidents listed in the ACLED database (with the exclusion of conflicts that result in no fatalities).

2. **Civil Conflict.** Includes conflict incidents that involve the government military or rebels (who are seeking to replace the central government) as one of the actors.[9]

3. **Non-Civil Conflict.** Includes all conflict incidents that are not coded as being part of a civil conflict.[10]

[8] All baseline results excluding conflicts with low geographic precision are reported in Tables A5 and A8.

[9] In the ACLED database, this includes all incidents for which the interaction variable is any integer from 10–28.

[10] In the ACLED database, this includes all incidents for which the interaction variable is any integer from 30–67.

4. **Within-Group Conflict.** Includes conflict incidents for which both actors in the conflict are geographically local and/or ethnically local groups.[11]

For each of the four types of conflict, we construct three measures of the frequency and prevalence of each type: the number of deadly conflict incidents, number of conflict deaths, and number of months from 1997–2014 with a deadly conflict incident.[12] In total, we have twelve different measures of conflict.[13]

Following the methodology of previous studies (e.g., Michalopoulos and Papaioannou, 2016), we use location to connect conflict incidents to ethnic groups. This is done by combining the location of the conflict event with a digitized version of the map of ethnic boundaries taken from Murdock (1959) to construct measures of the frequency and intensity of conflicts occurring within the territory of each ethnic group.[14] The use of location to infer those who are involved in the conflicts is motivated by the fact that, in general, conflicts tend to occur close to the homelands of participants. This is most clearly true for disputes and conflicts that do not involve the government military, which tend to be very localized. For conflicts that involve the government military – i.e., conflicts that we refer to as civil conflicts – conflicts also generally occur within the ethnic homelands of the combatants. (See for example the recent findings of Michalopoulos and Papaioannou (2016).) Therefore, for these forms of conflicts as well, within which ethnic group's territory the fighting occurs is informative.

A shortcoming of our strategy is that conflicts that involve members of an ethnic group but occur outside of the group' boundaries will not be correctly identified in our estimates. Although it would also be informative to connect ethnic groups to conflict by using information on the participants involved, unfortunately this strategy is not feasible. It requires detailed information on the ethnicity of the parties involved in each conflict, which is not available. Often, we only have a very general description of the participants, such as "locals", "protestors", "civilians", etc.

[11]This includes values of the interaction variable from 40–47, 50–57 and 60–67. We exclude conflicts in which one of the participants is listed as "other," defined as "outside/external force (e.g., UN)."

[12]By 'deadly' conflicts we mean a conflict that results in at least one battle death.

[13]All are positively correlated and the correlation coefficients range from 0.489–0.837. The lowest correlation is between civil conflicts and within-group conflicts and the highest correlation is between all conflicts and civil conflicts.

[14]The digitized map is taken from Nunn (2008) and is the same map as used in Michalopoulos and Papaioannou (2013, 2014, 2016).

B. ***Identifying Segmentary Lineage Societies***

The most commonly used source for ethnographic information is the *Ethnographic Atlas*, which contains information on the traditional practices and characteristics of 1,265 ethnic groups. Although this source does include a number of characteristics of kinship practices, it does not contain information on whether a society is organized according to segmentary lineages.[15] Therefore, to identify the presence or absence of a segmentary lineage system, we relied on the *Ethnographic Survey of Africa*, which is a multi-volume work that compiles ethnographic information from a large number of African ethnic groups. The *Survey*, edited by Daryll Forde, was published over the course of several decades, beginning during the late-1940s, by the International African Institute in London. It is divided into individual volumes, first by region and then by ethnic group, and each entry contains detailed information about the political, social, cultural, and economic practices of each ethnic group, as well as a description of the ecological environment inhabited by the group. If a particular group was not included in the *Ethnographic Survey of Africa*, or when the information available was insufficient to determine whether or not it was a segmentary lineage society, we then consulted additional sources, including the references used in the *Ethnographic Atlas* to try to determine if the group had a segmentary lineage structure.[16] Full details of the data construction are provided in the paper's online appendix.

For a group to be coded as a segmentary lineage society, we required that it satisfy the following three criteria, which are taken from Middleton and Tait's (1958) definition of a segmentary lineage society.

1. The society must be based on unilineal descent and there must have been direct and explicit evidence that people identify with their lineages and are aware of their genealogical connections to members of other sub-groups.

2. The segments of the lineages must take on a 'corporate form', which means that branching lineage segments must determine administrative functions and political allegiances and that

[15]The *Ethnographic Atlas* has information on the presence of clans and whether living arrangements are organized around them (variables v15/v16) and whether there are lineages that are unilineal (matrilineal or patrilineal) (v17/v19). However, whether or not a society had a segmentary lineage structure is not a simple composition of these. Although these measures are correlated with our constructed segmentary lineage variable, the two variables only explain about 11% of the total variation in segmentary lineage.

[16]In total, for 111 of the 145 ethnic groups coded, information was from the *Ethnographic Survey of Africa.* For the remaining groups, information was taken from a number of other sources, which are documented in the paper's appendix.

a centralized political authority entirely divorced from the lineage structure does not exist.[17]

3. Lineage and genealogical relationships affect where people live, with those who are more closely related living geographically closer to one another. Thus, we require evidence that there is a geographic organization of residence that is based on the lineage system.[18]

For an ethnic group to be coded as a segmentary lineage society, we required direct evidence that each of the three criteria is satisfied. Likewise, for an ethnic group to be coded as a non-segmentary lineage society, we required direct evidence that any of the three criteria is not satisfied. That is, lack of evidence for a criterion was not sufficient for a variable to be coded as not being a segmentary lineage system. In the end, we are able to code our segmentary lineage society indicator variable for 145 ethnic groups within Africa (using the ethnicity classification of Murdock (1959)). For the other ethnic groups, the existing evidence was not sufficient to determine with confidence whether an ethnic group is based on segmentary lineage organization or not. Although we do not have data for all ethnic groups in sub-Saharan Africa, the 145 ethnic groups account for 38% of the population of sub-Saharan Africa.[19]

As a check on the validity of our coding, after the variable was constructed, we consulted the existing secondary literature for cases where scholars had previously characterized or described specific ethnic groups as having a segmentary lineage organization or not. Reassuringly, in all cases (42 in total), our classification matched the majority consensus. These cases are summarized in the paper's appendix.[20]

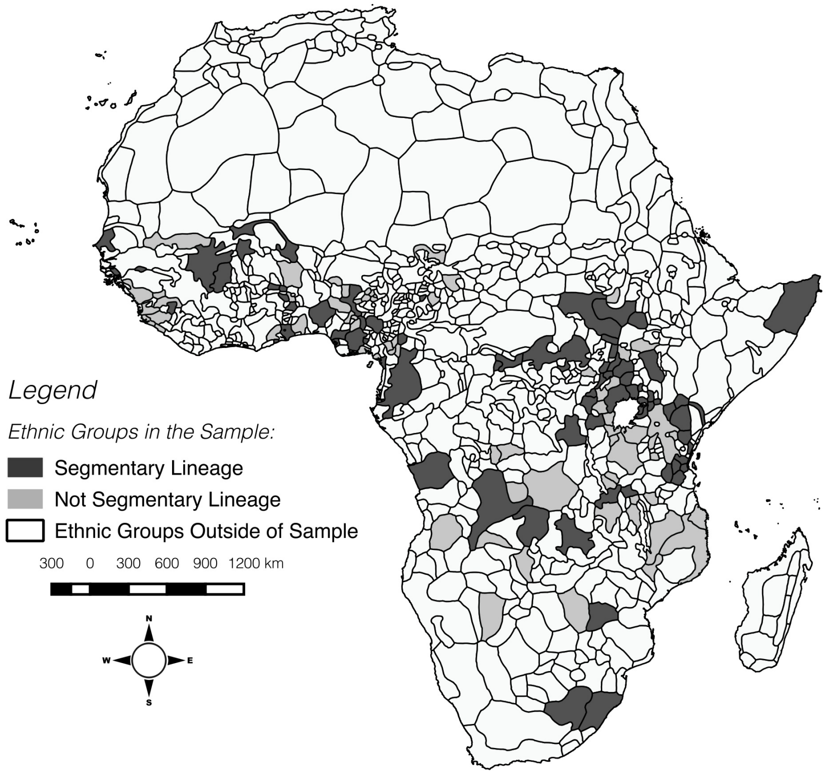
The 145 ethnic groups are shown in Figures 2a and 2b. Segmentary lineage societies are depicted in dark grey and non-segmentary lineage societies in light grety. The map shows that our sample includes ethnic groups from many parts of Africa. In Figure 2b, we add the locations of conflict incidents in the ACLED dataset that occur within the boundaries of the ethnic groups in our sample.

[17]On the importance of this aspect of segmentary lineage organization, see Evans-Pritchard and Fortes (1940, p. 13).

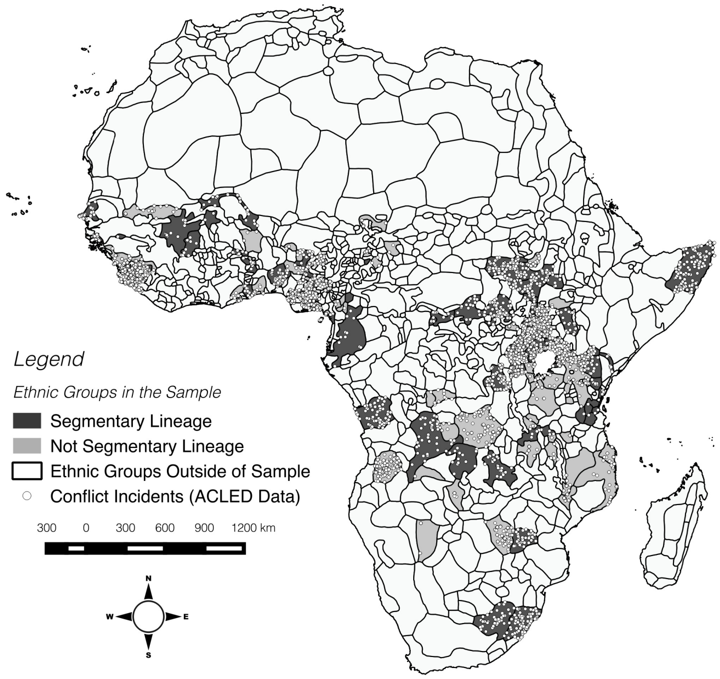
[18]On the importance of this aspect of segmentary lineage organization, see Radcliffe-Brown (1950, p. 42), Fortes (1953, p. 36), or Sahlins (1961, p. 328).

[19]The figures are calculated using NASA *EarthData* estimates of population density in 2000 and Murdock's ethnic boundary shapefile.

[20]This is not to say that there is always unanimity within the literature about the classification of every society. For example, Sahlins (1961) argues that the Dinka are not a segmentary lineage society, while Butt (1952) and Middleton and Tait (1958) argue that they are. The difference arises because Sahlins appears to have been using a narrower definition of segmentary lineage than is standard.



(a) Segmentary lineage classification



(b) Segmentary lineage classification and conflict incidents

Figure 2: Maps showing the boundaries of ethnic groups, the presence and absence of segmentary lineage organization, and, in Figure 2b, the location of conflict incidents that occur within the boundaries of the ethnic groups in our sample.

To better understand the extent to which our sample of 145 ethnic groups is representative of the full population of societies within sub-Saharan Africa, we compare the characteristics of the ethnic groups within our sample to the ethnic groups outside of our sample. This can be done for any of the variables that are available from the *Ethnographic Atlas* or for geographic characteristics. Within the *Ethnographic Atlas*, there are 420 ethnic groups from sub-Saharan Africa. Of these, 145 are in our sample and 275 are not. In Table 1, we report averages of both groups for a number of characteristics, as well as their differences in means and statistical significance. We find that for 16 of the 19 variables examined, there is no statistically significant difference between the two groups (at the 5% level or stronger). The three measures for which the samples appear different are: jurisdictional hierarchy, the natural log of total population, and longitude. Thus, larger groups that have a more centralized political system are more likely to be in our sample. This is explained by the fact that larger ethnic groups were more likely to be studied and documented by anthropologists and therefore are more likely to appear in our sample. This difference should be kept in mind when interpreting our results. The explanation for the difference in longitude is less clear. Our sample is slightly more likely to include ethnic groups from the eastern portion of Africa. It is possible that ethnic groups in the region were studied in greater detail than ethnic groups in other regions. It is also possible that it is simply due to the large number of variables that we examine. With almost 20 variables being examined, it is expected that even with balance one of the twenty will be significantly different from zero at a 5% significance level.

C. *Descriptive Statistics*

Within the sample of 145 ethnic groups, 74 have a segmentary lineage organization, while 71 do not. Average characteristics of the two groups, as well as the differences between them, are summarized in Table 2. Column 1 reports the mean and standard deviation of characteristics for segmentary lineage societies, column 2 reports the same for non-segmentary lineage societies and column 3 reports the difference in means between the two groups, as well as the standard error of the difference.

Panel A of the table reports statistics for the twelve conflict measures, constructed from the ACLED database: the natural log of the number of deadly conflict incidents for all conflicts, civil conflicts, non-civil conflicts, and within-group conflicts; the natural log of conflict deaths for all conflicts, civil conflicts, non-civil conflicts, and within-group conflicts; and the natural log of the

Table 1: Differences in characteristics between the ethnic groups within and outside of our sample.

	(1)	(2)	(3)	(4)
	Ethnic groups within the sample (N = 145)	Ethnic groups not within Sample (N = 275)	Difference (within minus outside)	t-statistic of difference
Jurisdictional Hierarchy, 1-5	2.27	1.95	0.32***	3.36
	[0.08]	[0.05]	[0.10]	
ln Population	13.48	12.49	0.98***	7.65
	[0.10]	[0.05]	[0.13]	
Settlement Complexity, 1-8	5.94	6.16	-0.22	-1.46
	[0.13]	[0.08]	[0.15]	
Patrilineal (indicator)	0.70	0.65	0.05	1.02
	[0.38]	[0.29]	[0.05]	
Matrilineal (indicator)	0.14	0.18	-0.04	-1.15
	[0.03]	[0.02]	[0.04]	
Patrilocal (indicator)	0.78	0.74	0.05	1.07
	[0.03]	[0.03]	[0.04]	
Matrilocal (indicator)	0.04	0.01	0.03*	1.72
	[0.02]	[0.01]	[0.02]	
Slavery Historically (indicator)	0.52	0.43	0.09*	1.71
	[0.04]	[0.03]	[0.05]	
Dependence on Gathering, 0-9	0.40	0.35	0.05	0.63
	[0.07]	[0.05]	[0.09]	
Dependence on Hunting, 0-9	0.88	0.96	-0.09	-1.02
	[0.06]	[0.05]	[0.09]	
Dependence on Fishing, 0-9	0.86	0.97	-0.11	-0.88
	[0.08]	[0.08]	[0.11]	
Dependence on Husbandry, 0-9	2.02	1.82	0.20	1.45
	[0.12]	[0.08]	[0.14]	
Dependence on Agriculture, 0-9	5.83	5.90	-0.07	-0.42
	[0.12]	[0.10]	[0.16]	
Intensity of Agriculture, 1-6	3.46	3.42	0.04	0.36
	[0.08]	[0.06]	[0.1]	
Female Participation in Agriculture, 1-5	3.41	3.38	0.03	0.28
	[0.08]	[0.09]	[0.12]	
Election of local headman (indicator)	0.09	0.06	0.03	0.82
	[0.03]	[0.02]	[0.03]	
Presence of Active God (indicator)	0.23	0.16	0.07	1.17
	[0.04]	[0.04]	[0.06]	
Latitude	1.57	1.80	-0.21	-0.21
	[0.77]	[0.61]	[1.00]	
Longitude	19.68	16.01	3.67**	2.34
	[1.33]	[0.90]	[1.57]	

Notes: The table reports balance statistics for our sample. Population estimates are based on grid cell level data from NASA's *EarthData* and are calculated for ethnic groups in the Murdock map. Variables coded from the Ethnographic Atlas are constructed using Ethnographic Atlas variables: v33 (jursditional hierarchy), v30 (settlement complexity), v43 (matrilineal, patrilineal), v12 (matrilocal, patrilocal), v1 (gathering), v2 (hunting), v3 (fishing), v4 (husbandry), v5 (agriculture), v28 (intensity of agriculture), v54 (female participation in agriculture), v72 (election of headman=1 if v72=6), and v34 (presence of active god=1 if v34>2). *, **, and *** indicate significance at the 10%, 5%, and 1% levels.

Table 2: Descriptive statistics of segmentary lineage and non-segmentary lineage societies.

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Variable (Conflict)	Segmentary Lineage (n=74)	Not Segmentary Lineage (n=71)	Difference	Variable (Non-Conflict)	Segmentary Lineage (n=74)	Not Segmentary Lineage (n=71)	Difference
		Panel A. Conflict Measures				**Panel B. Geographic Characteristics**	
				Land Area	36,901.45	27,946.43	8,955.02
ln (1+Deadly Conflict Incidents):					[48,907.15]	[36,282.44]	[7,175.14]
All conflicts	3.32	1.76	1.55***	Distance to National Border	110.53	145.76	35.23**
	[1.76]	[1.47]	[0.27]		[96.16]	[113.30]	[17.43]
Civil conflicts	2.55	1.57	0.97***	Split Ethnic Group (10%)	0.35	0.28	0.07
	[1.84]	[1.73]	[0.30]		[0.48]	[0.45]	[0.08]
Non-civil conflicts	2.53	1.5	1.03***	Absolute Latitude	6.87	8.56	1.69
	[1.51]	[1.48]	[0.25]		[5.74]	[4.83]	[0.88]
Within-group conflicts	1.78	0.73	1.06***	Agricultural Suitability Index	0.56	0.57	0.01
	[1.38]	[0.96]	[0.20]		[1.43]	[1.31]	[0.03]
				Mean Altitude	0.38	0.35	0.03
ln (1+Conflict Deaths):					[0.36]	[0.33]	[0.06]
All conflicts	5.03	2.94	2.08***	Mean Temperature	24.07	24.27	0.20
	[2.56]	[2.57]	[0.42]		[3.08]	[2.58]	[0.47]
Civil conflicts	3.99	2.19	1.80***	Malaria Ecology Index	14.65	13.43	1.21
	[2.85]	2.48	[0.44]		[9.83]	[8.88]	[0.78]
Non-conflicts	3.98	2.07	1.91***			**Panel C. Historical Characteristics**	
	[2.21]	[2.12]	[0.36]	Levels of Jurisdictional Hierarchy	2.04	2.38	0.34**
Within-group conflicts	3.05	1.31	1.74***		[0.96]	[1.11]	[0.17]
	[2.29]	[1.82]	[0.34]	Settlement Pattern	5.93	5.70	0.23
					[1.54]	[1.91]	[0.29]
ln (1+Months of Deadly Conflict):				Dependence on husbandry	2.03	2.00	0.03
All conflicts	2.77	1.52	1.25***		[1.45]	[1.36]	[0.23]
	[1.38]	[1.23]	[0.22]	Dependence on agriculture	5.70	5.97	0.27
Civil conflicts	2.14	1.1	1.04***		[1.42]	[1.49]	[0.24]
	[1.47]	[1.09]	[0.22]	Major City in 1800	0.04	0.04	0.00
Non-conflicts	2.22	1.11	1.12***		[0.20]	[0.23]	[0.03]
	[1.28]	[1.08]	[0.20]	Slave exports (norm. land area)	0.40	0.29	0.11
Within-group conflicts	1.58	0.66	0.92***		[0.88]	[0.59]	[0.13]
	[1.17]	[0.84]	[0.17]	Log Pop. Density 1960	2.82	2.48	0.34
					[1.18]	[1.31]	[0.21]

Notes: The baseline conflict outcome variables are listed in column 1; all are parameterized as ln(1+x). Column 2 reports the mean of each conflict variable among the segmentary lineage societies in our sample. Column 3 reports the same for non-segmentary lineage societies. Standard deviations are reported in brackets. Column 4 reports the difference in the mean value of each conflict variable between the two groups, along with the standard error in brackets. Column 5 lists a set of geographic characteristics (Panel B) and historical characteristics (Panel C). Column 6 and 7 report the mean and standard deviation for segmentary lineage and non-segmentary lineage societies, while column 8 reports the mean difference between the two groups and its standard error in brackets. *, **, and *** indicate significance at the 10%, %, and 1% levels.

number of months during the sample period with at least one deadly conflict incident for all conflicts, civil conflicts, non-civil conflicts, and within-group conflicts. We observe that for all twelve conflict measures, conflict is significantly higher within segmentary lineage societies.

Panel B reports descriptive statistics for eight geographic measures: the land area of the ethnic group, distance from the ethnic group's centroid to the nearest national border, an indicator variable that equals one if an ethnic group is split by a national border, distance from the equator, average altitude, average temperature, and average malaria ecology index.[21] In general, the differences are not statistically different from zero. The one exception is distance to a national border, which is significant at the 5 percent level. Segmentary lineage ethnic groups appear to be closer to national borders.

Panel C reports statistics for eight historical measures: the number of levels of jurisdictional hierarchy beyond the local community, the complexity of settlement (measured on a 1–8 scale), the proportion of subsistence that is from animal husbandry (on a 0–9 scale), the proportion of subsistence that is from agriculture (on a 0–9 scale), an indicator for the presence of a major city in the ethnic group's territory in 1800, the log number of slaves taken during the Atlantic and

[21] The source and details of each variable, as well as all those used in the paper, are reported in the paper's appendix.

Indian Ocean slave trades (normalized by land area), and the natural log of population density in 1960.

In all cases but one, the difference between the two groups is not statistically different from zero. Particularly noteworthy is the similarity between the two groups in terms of reliance on animal husbandry. This alleviates concerns that segmentary lineage organization might be correlated with the practice of animal husbandry, which has been hypothesized to be associated with a 'culture of honor', which can lead to the escalation of violence and conflict (Nisbett and Cohen, 1996, Grosjean, 2014).

The one measure that is statistically different between the two groups is the number of levels of jurisdictional hierarchy beyond the local community. This is a particularly important characteristic, especially given the existing evidence that this is associated with better development outcomes today (Gennaioli and Rainer, 2007, Michalopoulos and Papaioannou, 2013). It is plausible that groups with a history of statelessness might experience more conflicts today. However, it is also worth noting that although segmentary lineage societies tend to be less centralized on average, the difference of 0.34 between the two groups is small. This reflects the fact that many segmentary lineage societies had experienced processes of political centralization. Indeed, Southall (1956) pioneered the term 'segmentary state' to refer to the co-existence of these different structures. Thus, lineage organization was compatible both with large centralized states and with societies that were stateless. To illustrate this, in Figure 3 we categorize our societies into four groups depending on: (1) whether or not they have a segmentary lineage structure, and (2) whether or not they are politically centralized (defined as having two or more levels of political authority beyond the local community). To define centralized and stateless societies, we use information on the levels of political authority beyond the local community from variable *v33* from the *Ethnographic Atlas*. Stateless societies are defined as having 0 or 1 levels, while centralized societies are defined as having 2–4 levels. As shown, there are examples of ethnic groups in all four groups, and they are distributed fairly equally between the different cells. This is consistence with the small difference found in Table 2.

Given the difference in state centralization observed between the societies with segmentary lineages and those without and the importance of state centralization for long-run economic development (and potentially conflict), in all specifications, we control for historical state centralization.

	Centralized *Levels of Jurisdictional Hierarchy (v33) = 2-4*	Not Centralized / Stateless *Levels of Jurisdictional Hierarchy (v33) = 0-1*
Segmentary Lineage	**20** (e.g. Duala, Ndembu)	**53** (e.g. Nuer, Tiv)
Not Segmentary Lineage	**32** (e.g. Kuba, Haya)	**36** (e.g. Kung, Masai)

Figure 3: Matrix showing the number (and examples) of segmentary lineage and non-segmentary lineage societies that are considered as having a centralized state or being stateless.

4. OLS Estimates

We now turn to OLS estimates of the relationship between segmentary lineage organization and conflict today. For this, we use the following estimating equation:

$$y_i = \alpha_{c(i)} + \beta I_i^{SL} + \mathbf{X}_i'\mathbf{\Gamma} + \varepsilon_i, \tag{1}$$

where i denotes ethnic groups and c countries. y_i denotes one of our twelve measures of conflict experienced by ethnic group i. I_i^{SL} is an indicator variable that equals one if ethnic group i has a segmentary lineage organization and zero if it does not. $\alpha_{c(i)}$ denotes country fixed effects. $\mathbf{X}_i'$ is a vector of ethnicity-level historical and geographic covariates. The geographic controls are: the natural log of the land area occupied by the ethnic group, the natural log of the minimum distance between the ethnic group centroid and a national border, an indicator variable that equals one if the ethnic group is cut by a national border, average altitude, the absolute value of latitude, longitude, and average agricultural suitability. The historical controls are: pre-industrial political centralization (levels of political authority beyond the local community) and pre-industrial economic development measured by the complexity of settlement patterns, which is measured on a 1–8 integer scale.[22] The coefficient of interest is β. A positive coefficient indicates that segmentary lineage societies experience more conflict.

Estimates of equation (1) are reported in Table 3. Each panel reports estimates for one of the four conflict types: all conflicts, civil conflicts, non-civil conflicts, and within-group conflicts. Each triplet of columns reports estimates for one of our three measures of conflict intensity: the natural log of the total number of dearly conflict incidents (columns 1–3), the natural log of the number

[22]The finer details of the construction and measurement of the covariates is provided in the paper's appendix.

of conflict deaths (column 4–6), or the natural log of the number of months of deadly conflict (columns 7–9). For each outcome variable, we report three specifications, each with a different set of covariates. The first specification (in columns 1, 4, and 7) is the most parsimonious and only includes country fixed effects. The second specification (in columns 2, 5, and 8) also controls for the geographic covariates. The final specification (in columns 3, 6, and 9) also includes the historical covariates.

Across all 36 specifications, we estimate a positive and significant relationship between the presence of segmentary lineage organization and conflict. In addition to being statistically significant, the estimates are also quantitatively meaningful. For example, according to the estimates for the number of deadly conflict incidents (columns 1–3 of panel A), a segmentary lineage society experiences 80–110% more incidents than a society that does not have a segmentary lineage organization. The magnitudes of the effects are fairly similar across the different conflict types.

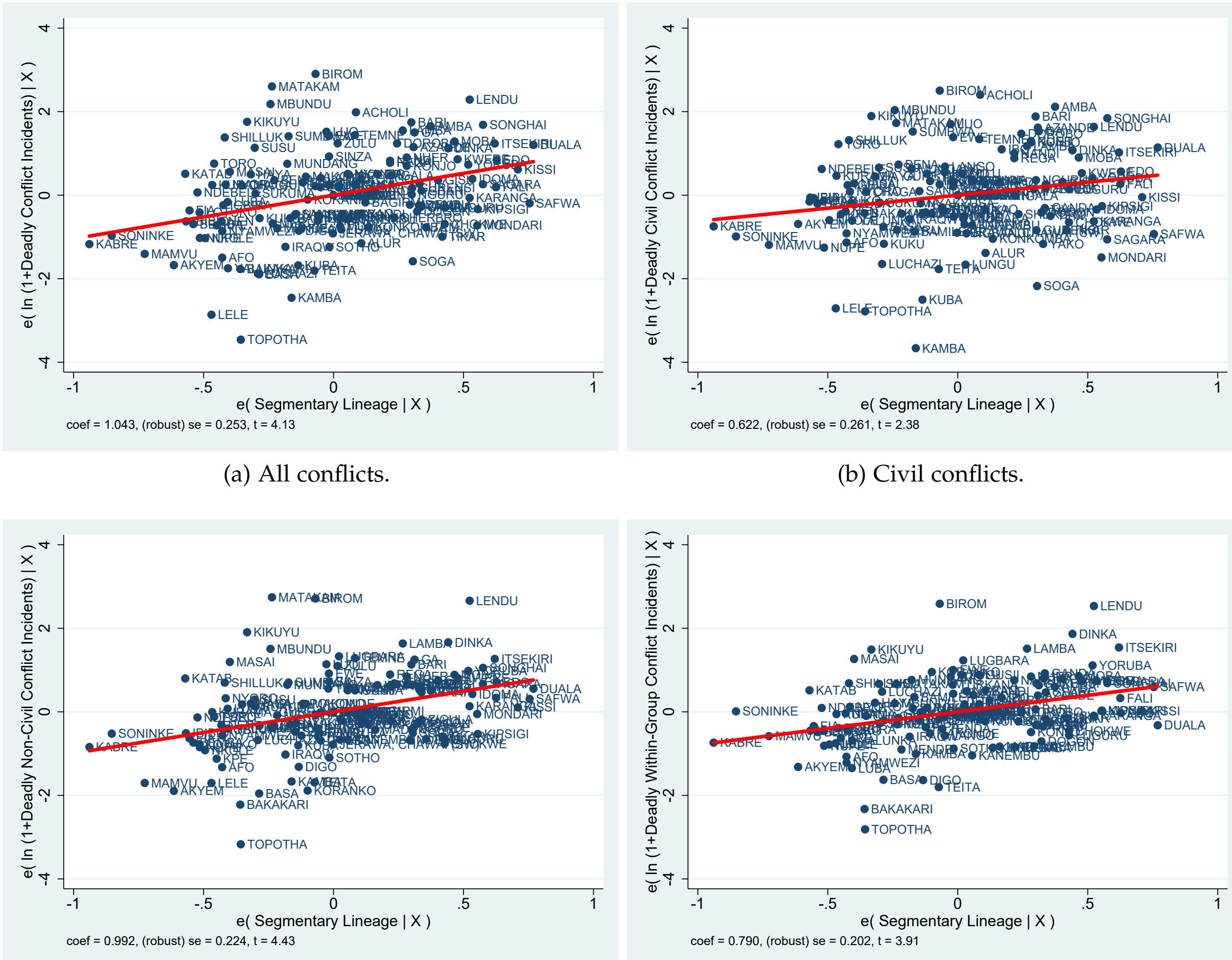
In Figures 4a–4d, we report partial correlation plots for each type of conflict, measured by number of incidents, and from the specification that includes country fixed effects, the geographic controls, and the historical controls (column 3). For each conflict type, the relationship appears general and to not be driven by a small number of influential observations. Interestingly, the fit appears tightest for localized within-group conflicts.

In the figures, we label each observation with the name of the ethnicity. This allows one to identify the location of ethnic groups that have been widely studied in the anthropology literature. One example of such a group is the Lele, who are from the Kasai province of the Democratic Republic of the Congo. They are a society that is not based on segmentary lineage, but instead on age sets (Douglas, 1963). Further, this has been an area of the country with little large-scale conflict. The Lele appear in the bottom left of the figures. Also noteworthy are the Bemba and Toro, two societies identified by anthropologists as not having segmentary lineage structures and experiencing relatively little conflict. The Bemba are behind the left side of the trend line, and the Toro are just above the left side of the trend line, seen most clearly in Figure 4a and 4b. By contrast, in the upper right of the figure are such societies as the Kissi, in Sierra Leone, a segmentary lineage society whose territory experienced a great deal of conflict during the Sierra Leone civil war (Middleton and Tait, 1958, Massing, 1980). We also see the Songhai, a segmentary lineage group from Mali and Niger (Rouch, 1954), as well as the Douala, a segmentary lineage group from Cameroon (Ardener, 1956, Terretta, 2013).

Table 3: Segmentary lineage societies and conflict: OLS estimates.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Dep. Var. is ln(1+Deadly Conflict Incidents)			Dep. Var. is ln(1+Conflict Deaths)			Dep. Var. is ln (1+Months of Deadly Conflict)		
				Panel A: All Conflicts					
Segmentary Lineage	1.139***	1.114***	1.043***	1.615***	1.644***	1.358***	0.892***	0.855***	0.811***
	(0.296)	(0.222)	(0.253)	(0.469)	(0.383)	(0.430)	(0.241)	(0.178)	(0.202)
Jurisdictional Hierarchy			-0.087			-0.337*			-0.035
			(0.127)			(0.192)			(0.100)
Mean of Dep. Var.	2.56	2.56	2.56	4.01	4.01	4.01	2.16	2.16	2.16
R-squared	0.530	0.704	0.704	0.555	0.690	0.700	0.528	0.717	0.718
				Panel B: Civil Conflicts					
Segmentary Lineage	0.844***	0.813***	0.622**	1.263**	1.307***	0.936**	0.688***	0.668***	0.522**
	(0.297)	(0.246)	(0.261)	(0.494)	(0.431)	(0.449)	(0.252)	(0.207)	(0.220)
Jurisdictional Hierarchy			-0.186			-0.393**			-0.143
			(0.127)			(0.185)			(0.097)
Mean of Dep. Var.	2.07	2.07	2.07	3.11	3.11	3.11	1.63	1.63	1.63
R-squared	0.564	0.694	0.705	0.522	0.639	0.666	0.476	0.639	0.651
				Panel C: Non-Civil Conflicts					
Segmentary Lineage	0.915***	0.896***	0.992***	1.520***	1.562***	1.594***	0.768***	0.741***	0.803***
	(0.244)	(0.194)	(0.224)	(0.409)	(0.316)	(0.374)	(0.215)	(0.167)	(0.192)
Jurisdictional Hierarchy			0.109			0.016			0.079
			(0.122)			(0.188)			(0.105)
Mean of Dep. Var.	2.02	2.02	2.02	3.05	3.05	3.05	1.67	1.67	1.67
R-squared	0.577	0.710	0.713	0.511	0.669	0.675	0.524	0.702	0.704
				Panel D: Within-Group Conflicts					
Segmentary Lineage	0.785***	0.783***	0.790***	1.420***	1.378***	1.310***	0.667***	0.654***	0.664***
	(0.189)	(0.185)	(0.202)	(0.347)	(0.336)	(0.380)	(0.162)	(0.160)	(0.175)
Jurisdictional Hierarchy			-0.047			-0.147			-0.042
			(0.116)			(0.216)			(0.099)
Mean of Dep. Var.	1.27	1.27	1.27	2.20	2.20	2.20	1.13	1.13	1.13
R-squared	0.581	0.667	0.682	0.571	0.636	0.654	0.580	0.680	0.690
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Geographic controls	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Historical controls	No	No	Yes	No	No	Yes	No	No	Yes
Observations	145	145	141	145	145	141	145	145	141

Notes: The unit of observation is the ethnic group and the right hand side variable of interest is an indicator variable that equals one if an ethnic group is a segmentary lineage society. Along with the segmentary lineage variable, in columns 1, 4 and 7, we include country fixed effects. In columns 2, 5 and 8, we add a set of 'geographic controls,' which include the log of the land area occupied by the ethnic group, the log of the minimum distance between the ethnic group centroid and a national border, an indicator variable that equals one if the ethnic group is split by a national border, mean altitude, absolute latitude, longitude, and an agricultural suitability index. In Columns 3, 6 and 9, we add a set of 'historical controls,' which include historical political centralization (jurisdictional hierarchy beyond the local community) and historical settlement pattern complexity. The coefficient on the political centralization variable is displayed since it is of independent interest. In Panel A, the outcome variables are constructed using all conflicts in the ACLED data; in Panel B they are constructed using civil conflicts; in Panel C, they are constructed using non-civil conflicts; and in Panel D, they are constructed using within group conflicts. All outcome variables are parameterized as ln(1+x). Robust standard errors are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels.



(a) All conflicts.

(b) Civil conflicts.

(c) Non-civil conflicts.

(d) Intra-group conflict.

Figure 4: The figure reports partial correlation plots where the dependent variable is the natural log of the number of conflict incidences (of the reported conflict type). All specifications include country fixed effects, geographic covariates, and historical covariates.

A. *Assessing Selection on Unobservables*

While the RD analysis that we undertake below is our primary strategy for estimating the causal relationship between segmentary lineage organization and conflict, in this section we undertake a number of additional exercises to assess the validity of the OLS estimates.

We start by first assessing the sensitivity of the OLS estimates to controlling for observable characteristics. We first employ the strategy adapted by Nunn and Wantchekon (2011) from Altonji, Elder and Taber (2005) that allows us to determine how much stronger selection on unobservables would have to be compared to selection on observables in order to fully explain away our results. To perform this test, we calculate the ratio $\hat{\beta_F}/(\hat{\beta_R} - \hat{\beta_F})$, where $\hat{\beta_F}$ is our coefficient of interest from a regression that includes a full set of controls while $\hat{\beta_R}$ is our coefficient of interest from a regression that includes a restricted set of controls. The results are reported in columns 1–3 of Appendix Table A2. Each panel reports a ratio where the fully-controlled regression includes the geographic and historical controls, while the restricted regression including country fixed effects only. This yields twelve ratios that range from -160.24 to 193.71. In some cases, the coefficient in the fully-controlled model is larger than that on the uncontrolled model giving a negative ratio. In general, these ratios suggest that the influence of unobservable characteristics would have to be far greater than the influence of observable characteristics to fully account for our findings.

We also use the method from Oster (2017) to calculate a lower bound for our coefficient of interest. Oster shows that if one assumes that observables and unobservables have the same explanatory power in the outcome variable, then the following is a consistent estimator: $\beta^* = \hat{\beta_F} - (\hat{\beta_R} - \hat{\beta_F}) \times \frac{R^2_{max} - R^2_F}{R^2_F - R^2_R}$, where $\hat{\beta_F}$ and $\hat{\beta_R}$ are as defined above, R^2_F is the R-squared from the fully-controlled regression, and R^2_R is the R-squared from the restricted regression. R^2_{max} is the R-squared from a regression that includes all observable and unobservable controls. Although in theory, the maximum possible value of R^2_{max} is one, as Gonzalez and Miguel (2015) have shown, in the real world, where there is significant measurement error, the value of R^2_{max} should be much lower than one. However, in order to produce the most conservative estimates, we set $R^2_{max} = 1$. The lower bound estimates are reported in columns 4–6 of Appendix Table A2. All lower bound estimates from this exercise remain positive and, taken at face value, still imply a sizeable estimated effect of segmentary lineage organization on conflict.

An alternative strategy to OLS is to use matching to compare each segmentary lineage society to the non-segmentary lineage society that is most similar, based on a range of observable characteristics.[23] We report such matching estimates in Appendix Table A3. Column 1 reports estimates where ethnicity pairs are matched on latitude and longitude only. Column 2 reports estimates from matching based on the baseline set of geographic and historical controls from equation (1). Column 3 reports estimates from matching the geographic and historical controls, but where we also require that members of a matched pair have the same number of levels of jurisdictional hierarchy beyond the local community. This is motivated by the importance of accounting for political centralization as thoroughly as possible. As reported, for each conflict outcome, the estimates continue to be positive and highly significant.

[23] We use nearest neighbor matching based on Mahalanobis distance.

B. *Robustness Checks*

We now turn to an examination of the robustness and sensitivity of the OLS estimates. Given that all of our conflict measures are count variables, we check that our estimates are robust to using a Poisson or negative binomial estimator. Table A4 reports estimates for the most stringent specification that includes country fixed effects, geographic controls, and the historical controls. Our findings remain robust. In every specification, the estimated relationship between the segmentary lineage and conflict is positive, sizeable, and in all specifications but one, statistically significant.

We next check the robustness of our estimates to alternative measures of conflict. One characteristic of the ACLED conflict data is that they include a wide range of different activities as incidents, sometimes activities of conflict actors that are part of larger conflicts but are not themselves explicitly violent. These include (*i*) instances when a headquarters or base is established, (*ii*) non-violent activity by a conflict actor, and (*iii*) a non-violent transfer of territory. We construct versions of our outcome variables that exclude conflict events that are in the ACLED database but are "non-violent." While our baseline conflict measures already exclude conflicts without fatalities, excluding conflicts classified as non-violent on the basis of the actors' intentions is another strategy to check that our conflict measures capture variation in violent conflict. The estimates using this alternative measure are reported in panel A of Appendix Table A5. We find that our estimates remain robust to using this alternative measure of conflict intensity.

We also check the robustness of our estimates to the use of data from an alternative commonly-used source of conflict data, the *Uppsala Conflict Data Program - Georeferenced Event Dataset* (UCDP GED). There are a number of differences between this data source and the ACLED source that we use. First, this source begins in 1991, six years earlier than the ACLED data. Second, unlike the ACLED data, this source has a minimum mortality threshold (25 fatalities in a calendar year) that has to be met for the conflict to appear in the dataset. Thus, checking the robustness of our findings to this alternative data source also checks the robustness of our estimates to using a slightly different time period and a higher death threshold. Panel B of Appendix Table A5 reports the estimates using the UCDP GED conflict data. The estimates remain very similar to our baseline estimates.

Another potential concern is that our results may be driven by a small number of particularly influential outlying observations. One is particularly concerned that observations with very intensive fighting may have particularly strong leverage in the regressions. An example would be the ethnic groups that experienced the conflicts that were initiated by the Lord's Resistance Army in Uganda. These conflicts primarily occurred within the territory of segmentary lineage societies like the Acholi. Although the partial correlation plots reported in Figures 4a–4d seem to show that the estimates are fairly general and are not driven by a small number of influential observations, we undertake a systematic check here. Specifically, we re-estimate our baseline specification after dropping influential observations that we identify using Cook's Distance. As an alternative strategy, we re-estimate equation (1), after removing observations with extreme values of conflict, defined as those within the top five percent. The estimates, which are reported in panels A and B of Appendix Table A6, show that both strategies yield estimates that are similar to the baseline estimates.

The final robustness check that we perform includes additional covariates in our estimating equation. In our baseline specifications, we were careful not to include variables that are potentially endogenous to segmentary lineage organization. However, with the standard concerns associated with endogenous covariates in mind, we now check the sensitivity of our findings to controlling for a number of potentially endogenous factors. The first that we consider is a society's history of conflict which, as Besley and Reynal-Querol (2014) document, is positively correlated with the prevalence of conflict today. Estimates controlling for the prevalence of pre-colonial conflicts, using data from Besley and Reynal-Querol (2014), are reported in Appendix Table A7. Our results remain highly significant and the magnitude of the point estimates are very similar to the baseline estimates.[24]

We next check the sensitivity of our estimates to controlling for ethnicity-level measures of economic prosperity and the presence of Islam today, both of which are potentially important determinants of conflict. We include two measure of economic prosperity: the natural log of night light intensity normalized by population,[25] and the natural log of population density.[26] To measure the presence of Islam, we use data from the *World Religion Database*, which records religious affiliation for ethnicities in Africa, and construct an indicator variable that equals one if Islam is the dominant religion of the ethnic group today.

[24]The estimates in the table are directly comparable to the estimates reported in columns 3, 6, and 9 of Table 3.

[25]The use of nightlights as a proxy for economic development follows, among others, Henderson, Storeygard and Weil (2012), Michalopoulos and Papaioannou (2013), and Michalopoulos and Papaioannou (2014).

[26]Both variables are measured in 2000.

Estimates of equation (1) with these additional covariates are reported in Appendix Table A8. We find that even after accounting for these potentially endogenous factors, the estimated relationship between segmentary lineage and conflict remains positive, although the magnitude of the estimated effects decline slightly. Interestingly, the most notable decline is for civil conflicts, while the decline is modest for non-civil conflicts and within-group conflicts.[27]

5. Accounting for Unobservables: Spatial RD Estimates

Despite the robustness of our OLS estimates and the fact that our findings are similar when we account for a range of observable characteristics, there remains the concern that there are unobservables that may be biasing our estimates. For example, if ethnic groups have a persistent unobservable propensity to engage in conflict and if this affected whether ethnic groups adopted a segmentary lineage form of social organization in the past, then this unobservable trait could bias our estimates of interest. In this case, we would observe a relationship between segmentary lineage systems and conflict today even if no causal relationship exists. These unobservable traits could originate from a range of different sources, including the physical environment or historical experiences. Similarly, there may be unobservable contemporary factors, like the extent to which the rule of law is able to reach more remote locations from the capital city or the quality of transportation and communication infrastructure. These, and similar factors, might have direct effects on conflict.

Given this possibility, we also implement an alternative estimation strategy. Since unobservable factors are, by definition, unobservable, the strategy we undertake is to examine and compare locations that are geographically close, but where one location is inhabited by a segmentary lineage society and the other by a society without segmentary lineages. For this analysis, a 10km-by-10km grid-cell is the unit of observation and the sample consists of grid-cells within pairs of contiguous ethnic groups where one ethnicity has segmentary lineages and the other does not. Figure 5 illustrates this setup, showing grid-cells and pairs of contiguous ethnic groups,

[27] The estimated relationships between either population density, night lights, or Islam and conflict are opposite in sign from what one might have expected. Night lights and population density are both positively correlated with conflict and Islam is negatively correlated. One explanation for the population-density relationship is that one needs people to fight and thus conflicts often occur where there are people. In addition, it may be that places with more populations or higher incomes (proxied by night lights) are more likely to be strategic locations that are the focus of civil conflicts. Lastly, higher population density may indicate greater population pressures which has been shown to correlate with conflict (e.g., Andre and Platteau, 1998, Acemoglu, Fergusson and Johnson, 2017).

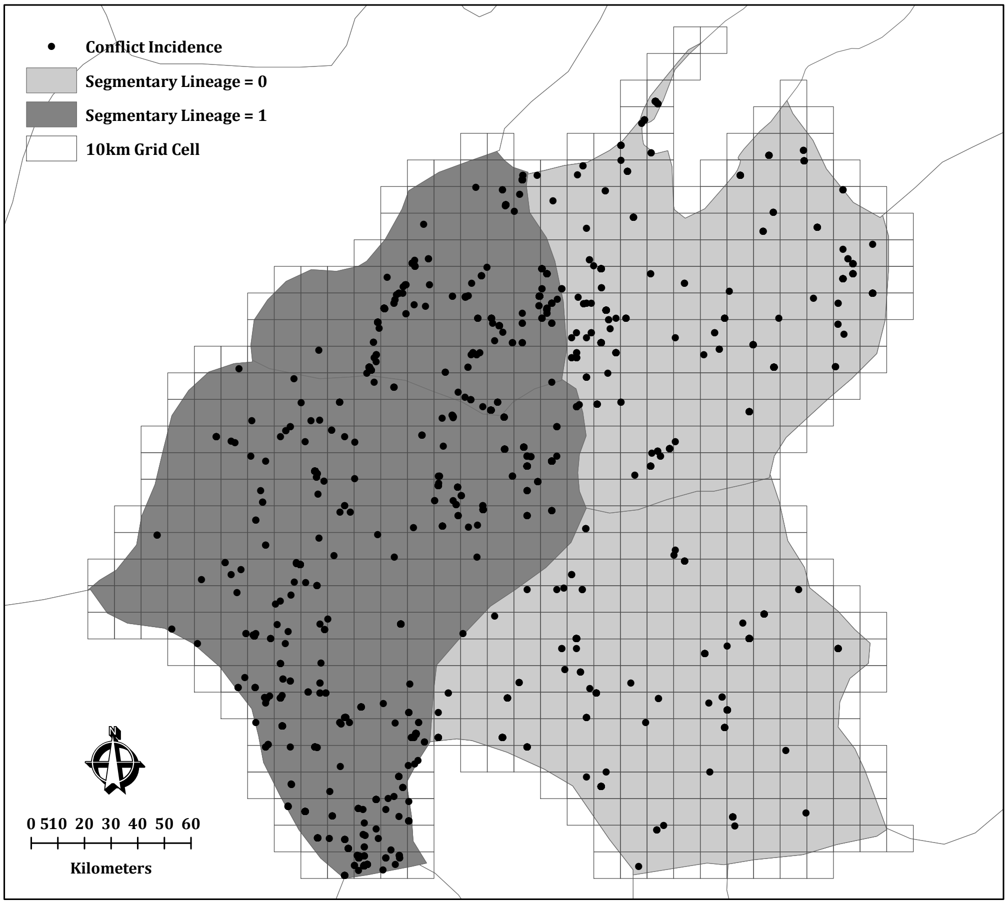


Figure 5: An illustration of the RD setting: an example of ethnicity pairs, deadly conflict incidents, and 10km grid-cells. The two segmentary lineage ethnic groups shown are Ambo (top) and Konjo (bottom), and the two non-segmentary lineage groups shown are Toro (top) and Nkole (bottom) (all in Western Uganda).

one of which has segmentary lineages and the other does not. The figure also shows the locations of deadly conflict incidents.

Our strategy is to use a regression discontinuity (RD) estimation method that restricts the sample to grid-cells that are sufficiently close to the ethnic boundaries and estimates the causal effect of segmentary lineage organization on conflict using the estimated difference in conflict at the ethnic boundary. The benefit of this strategy is that it accounts for unobservable factors that vary smoothly across space. Therefore, as long as the determinants of unobservable traits – like geography, history, idiosyncratic shocks, state presence etc. – vary smoothly, the unobservable traits will be accounted for by the RD strategy.

Our RD estimating equation takes the following form:

$$y_{ip} = \omega_p + \gamma I^{SL}_{e(i)} + f(location_{ip}) + \mathbf{Z}_i'\mathbf{\Gamma} + \varepsilon_{ip} \tag{2}$$

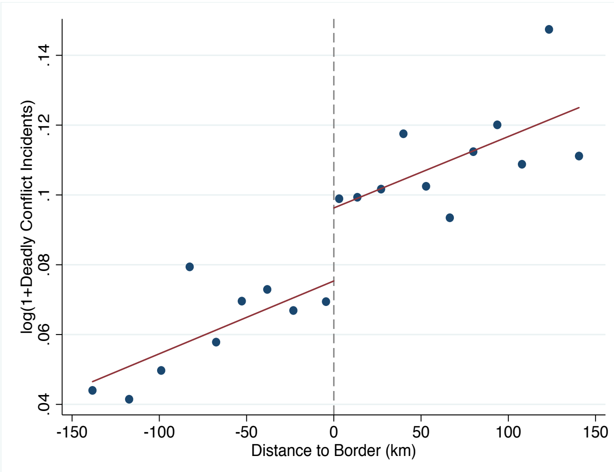
where i indexes a 10-kilometer grid-cell, e ethnicities (80 in total), and p ethnicity pairs where one ethnic group has segmentary lineages and the other does not (68 in total). y_{ip} is a measure of the extent of conflict in grid-cell i which is within ethnicity pair p. $I^{SL}_{e(i)}$ is an indicator variable that equals one if cell i belongs to the ancestral homeland of an ethnic group e that traditionally had a segmentary lineage organization. $f(location_{ip})$ denotes a polynomial that controls for a smooth function of the geographic location of grid cells. In our baseline specification, we use a location's Euclidian distance from the border as the running variable, and, following Gelman and Imbens (2014), use a local linear specification, estimated separately on both sides of the border. We also report estimates using several other functional forms. ω_p denotes fixed effects for each ethnicity-pair. The vector $\mathbf{Z}'_i$ denotes a vector of covariates that includes country fixed effects, as well as the following set of grid-cell level geographical controls: elevation, agricultural suitability, and an indicator if the grid-cell is intersected by a national border.[28] The sample includes all grid cells of all pairs of ethnic groups that share a border and where one has segmentary lineages and the other does not.[29] The sample is further restricted to grid-cells that are within a certain distance of the border of the two ethnic groups, either 60, 80, or 100 kilometers.

Before turning to our estimates we first examine the raw data for the RD sample. Figures 6a–6d show a bin scatterplots (with 20 bins) of the unconditional relationship between each of the four types of conflict and the distance from the ethnicity boundary. Even in the raw data, a discontinuity at the border is apparent. We observe a discontinuous increase in conflict on the segmentary lineage side of the border. We next turn to our more formal RD estimates.

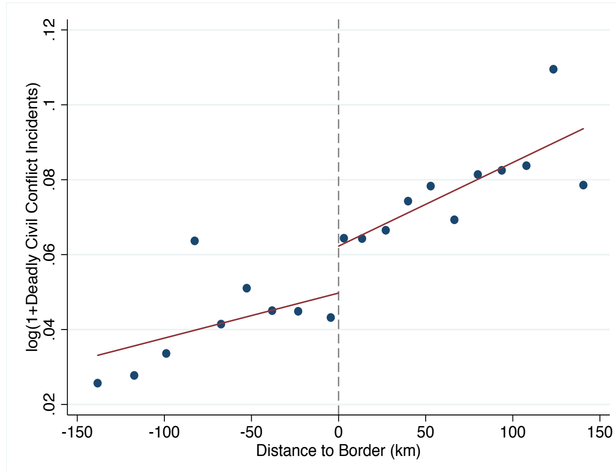
Estimates of equation (2), for each of our three conflict measures (incidents, deaths, and months), are reported in Table 4. For each outcome, we report three specifications, each in a different column. In the first, we only include ethnicity pair fixed effects; in the second, we add country fixed effects; and in the third, we add the set of geographic controls. Each panel of the table reports estimates for a different type of conflict, either all conflicts, civil conflict, non-civil conflicts, and within-group conflicts. All estimates use a restricted sample of grid cells within 60km of the ethnicity-pair border. We find that in every specification, and irrespective of the measure of conflict, the estimated effect of segmentary lineage systems on conflict is positive and statistically significant. We also find that for each outcome, the magnitude of the estimated effect

[28]Details, including sources of these measures, are provided in the online appendix.

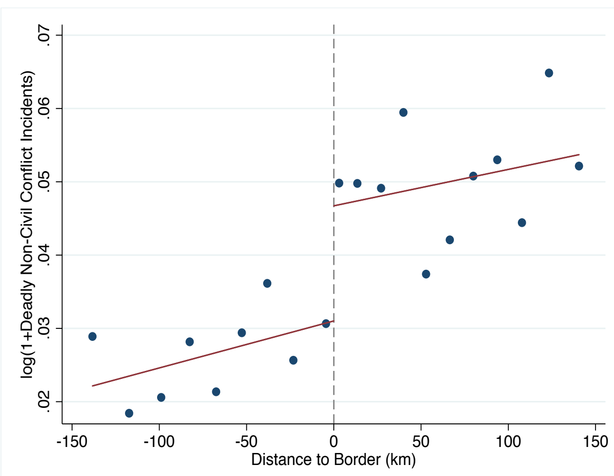
[29]If an ethnic group is adjacent to more than one ethnic group of different treatment status, then the ethnic group can be a part of multiple pairs.



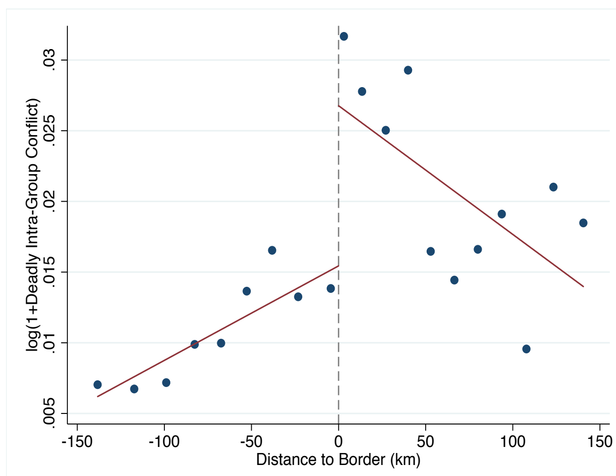
(a) All conflicts.



(b) Civil conflicts.



(c) Non-civil conflicts.



(d) Within-group conflict.

Figure 6: This figure presents a binscatter plot (with 20 bins) of the unconditional relationship between conflict incidence and distance from the border. The y-axis reports the natural log of one plus the number of deadly conflict incidents for each of the the four different types of conflict. The x-axis reports distance (in kilometers) from the borders between segmentary lineage and non-segmentary lineage societies. The border is at kilometer 0, and positive values indicate kilometers in the territories of segmentary lineage societies.

Table 4: Baseline RD estimates.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Sample: Observations <60 km from Ethnic Group Boundary Linear Running Variable in Euclidean Distance to the Border								
Dependent Variable:	ln(1+Deadly Conflict Incidents)			ln(1+Conflict Deaths)			ln(1+Months of Deadly Conflict)		
	Panel A: All Conflicts								
Segmentary Lineage	0.0420***	0.0373**	0.0378**	0.0862***	0.0791***	0.0805***	0.0323**	0.0283**	0.0287**
	(0.0158)	(0.0153)	(0.0152)	(0.0283)	(0.0283)	(0.0278)	(0.0128)	(0.0126)	(0.0124)
R-squared	0.095	0.122	0.122	0.084	0.088	0.088	0.094	0.116	0.116
	Panel B: Civil Conflicts								
Segmentary Lineage	0.0301**	0.0263**	0.0263**	0.0563**	0.0503**	0.0505**	0.0237**	0.0201**	0.0200**
	(0.0134)	(0.0125)	(0.0124)	(0.0238)	(0.0238)	(0.0235)	(0.0102)	(0.00981)	(0.00979)
R-squared	0.103	0.139	0.139	0.088	0.092	0.092	0.101	0.132	0.132
	Panel C: Non-Civil Conflicts								
Segmentary Lineage	0.0253***	0.0237***	0.0241***	0.0600***	0.0570***	0.0579***	0.0223***	0.0211**	0.0214***
	(0.0088)	(0.0087)	(0.0086)	(0.0175)	(0.0168)	(0.0166)	(0.0082)	(0.0081)	(0.0080)
R-squared	0.047	0.050	0.050	0.044	0.047	0.048	0.050	0.052	0.052
	Panel D: Within-Group Conflicts								
Segmentary Lineage	0.0133**	0.0130**	0.0130**	0.0302**	0.0286**	0.0288**	0.0103*	0.0100*	0.0100*
	(0.0058)	(0.0059)	(0.0058)	(0.0129)	(0.0126)	(0.0124)	(0.0052)	(0.0053)	(0.0052)
R-squared	0.035	0.036	0.036	0.034	0.035	0.036	0.036	0.037	0.038
Ethnic Groups	80	80	80	80	80	80	80	80	80
Observations	10,739	10,739	10,739	10,739	10,739	10,739	10,739	10,739	10,739
Ethnic Group Pair FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Geographic Controls	No	No	Yes	No	No	Yes	No	No	Yes

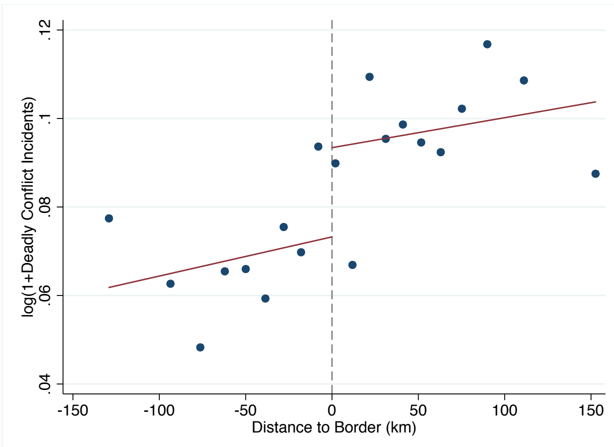
Notes: In columns 1-3, the oucome variable is the number of conflicts that resulted in at least one death; in columns 4-6, the outcome variable is the number of conflict deaths; and in columns 7-9, the outcome variable is the number of months during the sample period with at least one conflict, all parameterized as ln(1+x). The unit of observation is a 10km grid cell. All regressions include a linear polynomial in latitude and longitude, interacted with ethnic group cluster indicator variable, and ethnic group pair fixed effects (68 pairs total). In Panel A, the outcome variables are constructed using all conflicts in the ACLED data; in Panel B, they are constructed using civil conflicts; in Panel C, they are constructed using non-civil conflicts; and in Panel D, they are constructed using within-group conflicts. All outcome variables are parameterized as ln(1+x). Geographic controls include elevation, agricultural suitability, and an indicator variable that equals one if a grid cell intersects with a national border. Robust standard errors clustered at the ethnicity level are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels.

is similar in the different specifications.

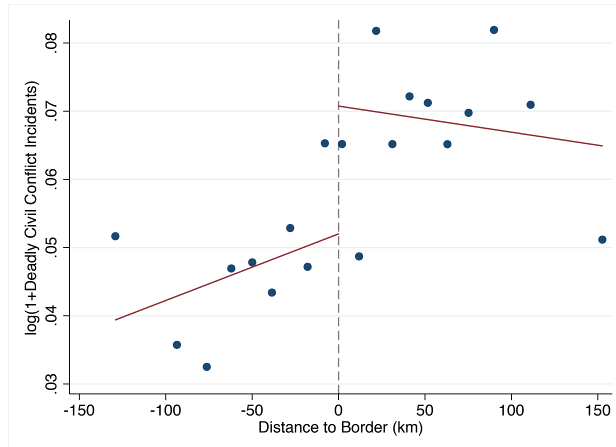
Figures 7a–7d visually displays the RD estimates from column 2 of Table 4. The figure shows bin scatter partial plots for the specification with ethnicity-pair fixed effects and country fixed effects.

A. *Validating the Assignment of Segmentary Lineage Status*

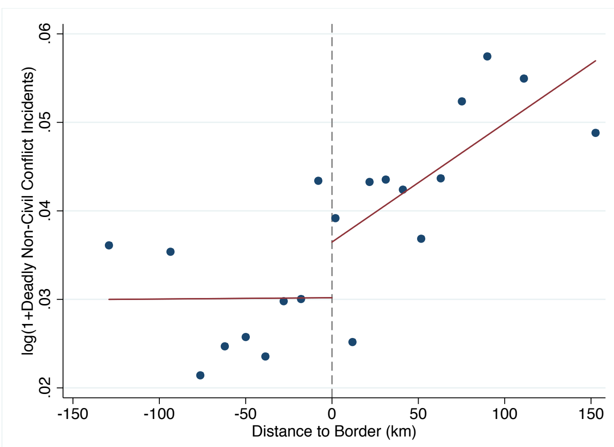
The boundaries used for our RD estimates are from Murdock (1959), a source that has been used previously in a number of studies that use a similar RD approach (see e.g., Michalopoulos and Papaioannou, 2013, 2014, 2016). However, an important assumption when using the ethnic boundaries is that they accurately reflect true discontinuities (i.e., boundaries) of ethnic affiliation today.



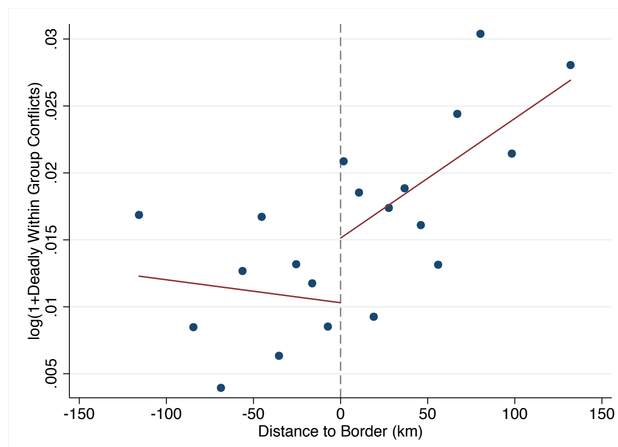
(a) All conflicts.



(b) Civil conflicts.



(c) Non-civil conflicts.



(d) Within-group conflict.

Figure 7: This figure presents the baseline RD results graphically as binned scatter partial correlation plots (20 bins) from the specification that conditions on ethnicity-pair fixed effects and country fixed effects. The y-axis reports the natural log of one plus the number of deadly conflict incidents for each of the the four different types of conflict. The x-axis reports distance (in kilometers) from the borders between segmentary lineage and non-segmentary lineage societies. The border is at kilometer 0, and positive values indicate kilometers in the territories of segmentary lineage societies.

This is particularly important since, in reality, one may not observe clear borders between ethnic groups, and instead only a gradual change of the mix of ethnicities over space. Therefore, we now check the validity of our use Murdock's ethnic boundaries by examining how self-reported ethnic affiliation varies at ethnicity boundaries. For this, we use round 3 of the *Afrobarometer* survey, which records the self-reported ethnicity of respondents, as well as their location, which has been geo-referenced by Nunn and Wantchekon (2011). Combining this information with the ethnicity map from Murdock (1959), we are able to examine whether we observe a discontinuity in ethnic identity at the Murdock boundaries among our sample of ethnicity pairs. This is shown in Figure 8, which reports the bivariate relationship between distance from the border and ethnic affiliation. The y-axis displays the fraction of the population in a bin that reports that they are a member of a segmentary lineage society and the x-axis is distance in kilometers from the border, with a positive distance indicating a location within the territory of the segmentary lineage society and a negative distance indicating a location outside of the segmentary lineage territory. We find that there is a discontinuous change in the fraction of the population that report that they are members of a segmentary lineage society at the borders.[30]

The estimates from Figure 8 have important implications for assessing the relative magnitudes of the estimate OLS and RD effects. According to the estimated RD coefficients, segmentary lineage organization is associated with an increase in conflict of 0.082 to 0.104 standard deviations.[31] These estimates are smaller than those from the cross-ethnicity OLS regressions (reported in Table 3). According to the OLS estimates, segmentary lineage organization is associated with an increase in conflict of 0.333 to 0.622 standard deviations. Thus, the magnitude of the OLS estimates are significantly larger than the RD estimates. Although one explanation for this is a potential bias from unobservables present in the OLS estimates, the difference might also be explained by the fact that close to the border within a segmentary lineage society, a smaller fraction of the population is likely to belong to the segmentary lineage society. As shown in Figure 8, close to the border approximately 50% of the population does not belong to the segmentary lineage group. This, suggests that the magnitude of the RD estimates could be biased downwards by this amount as well. In addition, if conflict in non-segmentary lineage ethnic groups is affected

[30]In Appendix Figure A3, we report RD plots for pairs of prominent ethnic groups that have been widely studied in the anthropology literature: Ganda and Soga, and Sotho and Zulu. In both cases, we observe a discontinuous and sharp change in self-reported ethnicity at Murdock's ethnic group boundaries.

[31]See Appendix Tables A1 and A9 for summary statistics.

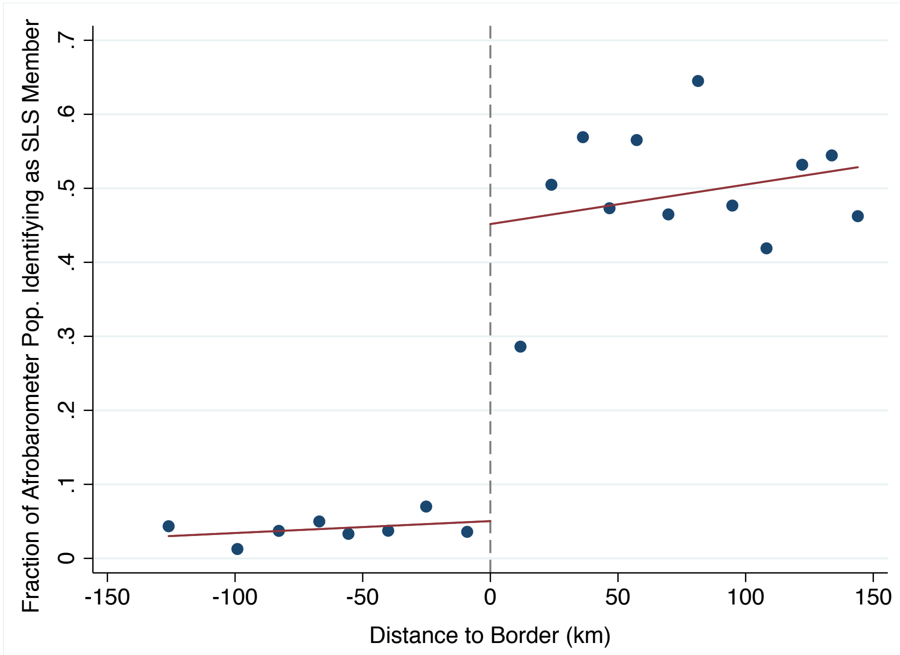


Figure 8: This graph presents the relationship between self-reported ethnicity and geographic location based on survey data from Round 3 of the *Afrobarometer* Survey. Data are aggregated for all borders between segmentary lineage and non-segmentary lineage societies in our sample. The x-axis reports geographic distance. Positive values imply kilometers into the territory of the segmentary lineage society and negative values are kilometers into the non-segmentary lineage society. The y-axis measures the fraction of the population at each distance that identifies as being a member of the segmentary lineage group.

by nearby segmentary lineage groups, then this spillover to the control group will cause the estimated effects at the border to be muted.

B. *Robustness and Sensitivity Checks*

We now check the sensitivity of our estimates to a range of robustness checks, which include: alternative specifications for the running variable, different restrictions on the window of observations that are included in the sample, and estimation using Poisson or negative binomial models. The estimates are reported in Table 5, where each column reports estimates using a different restriction on the range of observations included in the sample (60km, 80km, or 100km), and each panel reports different running variables and estimators.[32] In panel A, for reference, we report the baseline estimates from Table 4. In panels B and C, we use the baseline running variable, but use a negative binomial and Poisson estimator. In panels D to I, we report

[32]The estimates are for total conflicts. The estimates for civil conflicts, non-civil conflicts, and within-group conflicts are similarly robust.

estimates using more flexible specifications for the running variable. Specifically, we use latitude and longitude (and their interaction) instead of Euclidean distance as running variables. This allows us to control more directly for features that vary over two-dimensional space rather than collapsing a two-dimensional location into a one-dimensional distance measure (see Dell (2010) for a similar strategy). In panel D, we include the baseline running variable interacted with 14 cluster indicator variables, where a cluster is defined as a set of contiguous ethnic groups. Thus, in this specification, the coefficient on the running variable is allowed to differ for different ethnic groups in the same region. In panel E, rather than using the distance from the border as the running variable, we use latitude and longitude and interact both with the 14 cluster indicator variables. In panel F, we include quadratic polynomials in the latitude and longitude (i.e. latitude, longitude, squared, longitude squared, and latitude times longitude), with each component of the polynomial interacted with the 14 cluster indicators. Panels G–I are equivalent to panels D–F, except instead of interacting distance or latitude and longitude with 14 cluster indicator variables, we interact them with 68 pair indicator variables. Although these are demanding specifications (the running variable in Panel I, for example, consists of 340 variables) by allowing the running variable to vary for each ethnicity pair we are about to control for specific conflict patterns around each border segment. Overall, the estimates using any of these alternative specifications are similar to the baseline RD estimates. The estimated coefficients all remain positive and similar in magnitude, and in nearly every specification they remain statistically significant.

The final robustness check that we perform concerns the precision of the location data for conflicts. This is particularly important for the RD estimates since they are derived from differences in conflict intensity between areas that are geographically close. As a result, misreported conflict locations and imprecise geocoding of the conflict data could potentially bias the results. To confront this issue, we re-estimate equation (2), reporting the same specifications as in Table 4, except that we exclude conflict incidents that, according to the ACLED documentation, are georeferenced with lower precision.[33] While conflict incidents are only included in the ACLED data if a minimum level of information about geographic location is known, it is nevertheless important that our results are robust when we restrict to conflict incidents that are georeferenced with a high level of certainty. The estimates, which are reported in Appendix Table A10, show

[33]We exclude conflicts that are given a score of 3 in ACLED's geo-precision measure. These conflicts make up 4.75% of the all observations in the ACLED dataset.

that our estimates are nearly identical when these observations are omitted.

C. ***Checking Smoothness of Observables at Ethnic Boundaries***

One assumption of the RD approach is that unobservables vary smoothly across the borders. Although this is impossible to test directly, we glean evidence about the validity of this assumption by estimating whether there appears to be a discontinuity at the border for the following observable variables: elevation, slope, average temperature, the presence of a body of water, suitability for the cultivation of cereals,[34] the percentage of land that is currently under cultivation, the presence of petroleum, the presence of diamonds, the number of mission stations during the early colonial period, an indicator for the presence of a colonial railway, and an indicator for the presence of a pre-colonial explorer route.[35] We check for discontinuities by estimating equation (2) with each variable as the dependent variable. Table 6 reports estimates using the specification from column 2 of Table 4. For each of the eleven variables, the coefficient on the segmentary lineage indicator is always small in magnitude and it is never statistically different from zero. Appendix Figure A3 reports the RD plots, which show no sign of the type of discontinuities that we find for segmentary lineage organization. Therefore, the estimates reduce the concern that other factors may also vary discontinuously at the borders that are used in our RD analysis.

D. ***Placebo RD Estimates: Do Other Traits Affect Conflict?***

Although we find no evidence of discontinuities in geographic or historical factors, there remains the concern that other ethnic characteristics, besides segmentary lineage organization, may also vary discontinuously at the boundaries. To threaten the validity of our RD estimates, any other ethnic differences must have an independent effect on contemporary conflict. If this were the case, and if segmentary lineage organization were correlated with the other characteristics, then the effects we estimate might really be due to these.

To check for this possibility, we conduct a series of 'placebo' estimates where we undertake the same procedure as for our baseline RD estimates except that ethnicity pairs are created, and treatment and control defined, using ethnicity characteristics other than segmentary lineage. We then re-estimate equation (2) to obtain estimates of the impact of the characteristic on conflict. To

[34]Cereals include: wheat, wetland rice, dryland rice, maize, barley, rye, pearl millet, foxtail millet, sorghum, oat, and buckwheat.

[35]See the paper's online appendix for the details of each measure.

Table 5: Additional RD estimates.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Dependent Variable:	Deadly Conflict Incidents			Conflict Deaths			Months of Deadly Conflict		
Distance to Border:	<100km	<80km	<60km	<100km	<80km	<60km	<100km	<80km	<60km
Panel A: OLS Estimates, Linear Running Variable in Euclidean Distance									
Segmentary Lineage	0.0359*	0.0342*	0.0373**	0.0676*	0.0753**	0.0791***	0.0281*	0.0274*	0.0283**
	(0.0187)	(0.0176)	(0.0153)	(0.0392)	(0.0346)	(0.0283)	(0.0164)	(0.0149)	(0.0126)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.125	0.114	0.122	0.086	0.080	0.088	0.113	0.106	0.116
Panel B: Negative Binomial Estimates, Linear Running Variable in Euclidean Distance									
Segmentary Lineage	0.599**	0.734***	0.656**	1.014**	1.516***	1.153**	0.695**	0.616**	0.733**
	(0.289)	(0.280)	(0.281)	(0.452)	(0.494)	(0.484)	(0.300)	(0.302)	(0.305)
Country FE	No	No	No	No	No	No	No	No	No
Panel C: Poisson Estimates, Linear Running Variable in Euclidean Distance									
Segmentary Lineage	0.799**	0.667*	0.791**	0.271	0.265	0.599	0.550**	0.583**	0.507**
	(0.338)	(0.351)	(0.385)	(0.637)	(0.718)	(0.815)	(0.252)	(0.257)	(0.254)
Country FE	No	No	No	No	No	No	No	No	No
Panel D: OLS Estimates, Linear Running Variable in Euclidean Distance that Varies at the Contiguous Group Level									
Segmentary Lineage	0.0410**	0.0380**	0.0392**	0.0746**	0.0797**	0.0812***	0.0328**	0.0309**	0.0301**
	(0.0181)	(0.0174)	(0.0157)	(0.0367)	(0.0336)	(0.0284)	(0.0157)	(0.0147)	(0.0129)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.130	0.119	0.127	0.094	0.088	0.095	0.119	0.112	0.122
Panel E: OLS Estimates, Linear Running Variable in Lat & Lon that Varies at the Contiguous Group Level									
Segmentary Lineage	0.0704***	0.0719***	0.0622***	0.146***	0.146***	0.131***	0.0625***	0.0633***	0.0552***
	(0.0142)	(0.0136)	(0.0131)	(0.0281)	(0.0259)	(0.0237)	(0.0129)	(0.0124)	(0.0120)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.132	0.121	0.130	0.093	0.088	0.094	0.119	0.113	0.124
Panel F: OLS Estimates, Quadratic Running Variable in Lat & Lon that Varies at the Contiguous Group Level									
Segmentary Lineage	0.0618***	0.0606***	0.0577***	0.129***	0.129***	0.120***	0.0534***	0.0532***	0.0505***
	(0.0171)	(0.0151)	(0.0141)	(0.0319)	(0.0278)	(0.0252)	(0.0155)	(0.0137)	(0.0127)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.143	0.134	0.143	0.108	0.103	0.108	0.131	0.126	0.137
Panel G: OLS Estimates, Linear Running Variable in Euclidean Distance that Varies at the Pair Level									
Segmentary Lineage	0.0465***	0.0391***	0.0373***	0.0880***	0.0812***	0.0771***	0.0387***	0.0324***	0.0285**
	(0.0144)	(0.0134)	(0.0139)	(0.0255)	(0.0237)	(0.0243)	(0.0127)	(0.0117)	(0.0116)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.160	0.152	0.159	0.129	0.123	0.123	0.151	0.146	0.158
Panel H: OLS Estimates, Linear Running Variable in Lat & Lon that Varies at the Pair Level									
Segmentary Lineage	0.0426**	0.0354**	0.0305*	0.0920***	0.0867***	0.0778**	0.0362**	0.0304**	0.0252*
	(0.0179)	(0.0174)	(0.0171)	(0.0347)	(0.0324)	(0.0303)	(0.0156)	(0.0148)	(0.0143)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.163	0.154	0.161	0.135	0.128	0.127	0.154	0.149	0.160
Panel I: OLS Estimates, Quadratic Running Variable in Lat & Lon that Varies at the Pair Level									
Segmentary Lineage	0.0392***	0.0321**	0.0269	0.0761***	0.0688***	0.0572**	0.0334***	0.0272**	0.0211
	(0.0145)	(0.0138)	(0.0165)	(0.0268)	(0.0253)	(0.0278)	(0.0126)	(0.0119)	(0.0142)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.189	0.183	0.190	0.168	0.163	0.160	0.183	0.180	0.190
Ethnic Group Pair FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ethnic Groups	80	80	80	80	80	80	80	80	80
Observations	17,330	14,111	10,739	17,330	14,111	10,739	17,330	14,111	10,739

Notes: In columns 1-3, the oucome variable is the number of conflicts that resulted in at least one death; in columns 4-6, the dependent variable is the number of conflict deaths; and in columns 7-9 the dependent variable is the number of months during the sample period with at least one conflict. The outcome is parameterized as ln(1+x) when an OLS model is used and as the raw number when a negative binomial or Poisson model is used. The model used for each regression is noted in the panel heading. The unit of observation is a 10-by-10 kilometer grid cell. The RD polynomial varies across specifications and is reported in the header of each column. In columns 1 and 4, the sample only includes observations located within 100km of the relevant ethnic group boundary. The threshold is reduced to 80 in columns 2 and 5, and 60km in columns 3 and 6. All specifications include 68 border segment fixed effects, where a border segment is the portion of an ethnic group's boundary that divides two ethnic groups that have different lineage organization (segmentary lineage versus not). Country fixed effects are also included in all OLS models. Robust standard errors, clustered at the ethnic group level, are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels.

Table 6: RD estimates examining observable characteristics.

Dependent Variable:	(1) ln Mean Elevation	(2) Mean Slope	(3) Mean Temp.	(4) Water Indicator	(5) Cereal Suitability	(6) % Land Cultivated	(7) Petroleum Indicator	(8) Diamond Indicator	(9) Mission Stations	(10) Railway Indicator	(11) Explorer Route
Segmentary Lineage	-0.00410	-0.00154	0.0589	-0.00150	0.0337	0.606	-0.00404	-0.0379	0.00808	-0.00154	-0.000867
	(0.0327)	(0.216)	(0.0995)	(0.0163)	(0.0649)	(1.067)	(0.0120)	(0.0297)	(0.00522)	(0.0109)	(0.0138)
Beta Coefficient	*-0.002*	*0.000*	*0.011*	*-0.004*	*0.015*	*0.017*	*-0.012*	*-0.048*	*0.026*	*-0.006*	*-0.002*
Ethnic Group Pair FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	10,739	10,739	10,739	10,638	10,739	10,739	10,739	10,739	10,739	10,739	10,739
R-squared	0.855	0.167	0.844	0.133	0.396	0.542	0.619	0.892	0.040	0.089	0.113

Notes: The unit of observation is a 10km-by-10km grid cell. All regressions use the same specification as in Table 5: a linear running variable in distance to the border and both ethnic-group-pair and country fixed effects are included on the right hand side. All regressions restrict the sample to observations within 60 kilometers of the relevant border. Data on crop suitabiity and land use are from the FAO GAEZ database. Data on missionary and colonial railway presence are from Nunn (2010) and Nunn (2011), respectively. Data on the location of petroleum fields and diamonds are from PRIO. Temperature is calculated as the mean daily temperature over the period 2000-2010. Robust standard errors, clustered at the ethnicity level, are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% level.

ensure that the estimates do not reflect the effect of segmentary lineages on conflict, the sample only includes ethnicity pairs for which both ethnicities of the pair have the same classification of segmentary lineage organization.

The RD estimates are reported in Table 7. All specifications reported are the same as in column 2 of Table 4. In columns 1–3, the outcome variable is the natural log of deadly conflict incidents (for all conflicts), in columns 4–6, it is the natural log of conflict deaths, and in columns 7–9, it is the natural log of the number of conflict months. For each outcome, we report RD estimates where grid-cells are restricted to be within 100km, 80km, and 60km of the border. Each panel reports estimates examining a different ethnic characteristic (or set of ethnic characteristics). In panel A, we compare adjacent ethnic pairs with the same segmentary organization coding, but with different levels of jurisdictional hierarchy beyond the local community. We define the 'treated' ethnicity to be the ethnicity of the pair with more levels of jurisdictional hierarchy. We find no estimated effect of this characteristic on conflict. Panel B reports the same estimates but using historical settlement complexity as the characteristic of interest. In the panel C, we use the first principal component from a factor analysis that uses indicator variables for each category of the jurisdictional hierarchy and the settlement pattern variables.[36] In panel D, we use the first principal component from a factor analysis that, in addition to the variables from panel C, also includes the historical variables from Table 2: presence of a major city in 1800, slave exports, population density in 1960, historical dependence on agriculture, historical dependence on animal

[36]Thus, there are four jurisdictional hierarchy indicator variables and eight settlement pattern indicator variables.

Table 7: Placebo RD estimates, using other ethnicity-level characteristics.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Dependent Variable:	ln(1+Deadly Conflict Incidents)			ln(1+Conflict Deaths)			ln(1+Months of Deadly Conflict)		
Distance to Border:	<100km	<80km	<60km	<100km	<80km	<60km	<100km	<80km	<60km
					Panel A: Jurisdictional Hierarchy				
> Jurisdictional Hierarchy	-0.0216	-0.0225	-0.0293	-0.0053	-0.0127	-0.0162	-0.0112	-0.0132	-0.0119
	(0.0244)	(0.0257)	(0.0255)	(0.0397)	(0.0350)	(0.0308)	(0.0186)	(0.0172)	(0.0141)
Ethnic Groups	74	74	74	74	74	74	74	74	74
Observations	14,264	11,865	9,174	14,264	11,865	9,174	14,264	11,865	9,174
R-squared	0.211	0.214	0.221	0.124	0.140	0.175	0.124	0.138	0.171
					Panel B: Historical Settlement Complexity				
> Historical Settlement Complexity	-0.0122	-0.0113	-0.0291	-0.0371	-0.0379	-0.0711	-0.0113	-0.0118	-0.0232
	(0.0211)	(0.0225)	(0.0229)	(0.0368)	(0.0382)	(0.0434)	(0.0174)	(0.0182)	(0.0189)
Ethnic Groups	79	79	79	79	79	79	79	79	79
Observations	16,248	13,487	10,441	16,248	13,487	10,441	16,248	13,487	10,441
R-squared	0.202	0.198	0.191	0.118	0.119	0.125	0.118	0.121	0.127
					Panel C: First Principal Component (Jurisdictional Hierarchy & Settlement Complexity)				
> Principal Component	-0.0060	-0.0099	-0.0132	-0.0244	-0.0206	-0.0226	-0.0122	-0.0109	-0.0121
	(0.0137)	(0.0126)	(0.0125)	(0.0191)	(0.0181)	(0.0180)	(0.0096)	(0.0095)	(0.0097)
Ethnic Groups	98	98	98	98	98	98	98	98	98
Observations	23,500	19,645	15,250	23,500	19,645	15,250	23,500	19,645	15,250
R-squared	0.200	0.201	0.200	0.113	0.123	0.145	0.115	0.122	0.142
					Panel D: First Principal Component (Broader Set of Historical Variables)				
> Principal Component (Broader Var. Set)	0.0061	0.0054	-0.0039	0.0268	0.0211	0.0065	0.0092	0.0070	0.0028
	(0.0155)	(0.0167)	(0.0160)	(0.0289)	(0.0260)	(0.0216)	(0.0126)	(0.0121)	(0.0095)
Ethnic Groups	98	98	98	98	98	98	98	98	98
Observations	23,500	19,645	15,250	23,500	19,645	15,250	23,500	19,645	15,250
R-squared	0.200	0.202	0.200	0.113	0.123	0.144	0.115	0.122	0.141
Ethnic Group Pair FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: The unit of observation is a 10km-by-10km grid cell. All regressions include a linear running variable in distance to the border and both ethnic-group-pair and country fixed effects. In Panel A, the independent variable of interest is an indicator variables that equals one if an ethnic group has a greater number of levels of jurisdictional hierarchy than its pair; in Panel B it is an indicator variable that equals one if an ethnic group has greater historical settlement complexity; in Panel C, it is an indicator variable that equals one if an ethnic group has a greater first principal component after conducting principal component analysis using jurisdictional hierarchy and historical settlement complexity measures; in Panel D, it is an indicator variable that equals one if an ethnic group has a greater first principal component after conducting principal component analysis using jurisdictional hierarchy, settlement complexity, historical dependence on agriculture and animal husbandry, log of slave exports normalized by land area, log of population density in 1960, an indicator variable that equals one if a major city was present in 1800, and an indicator that equals one if an ethnic group is split by a national border. The outcome varaibles are (exactly as in Tables 5 and 6): ln(1+deadly conflict incidents) (columns 1-3), ln(1+conflict deaths) (columns 4-6), and ln(1+number of months with at least one conflict) (columns 7-9). Observations are restricted to be within 100km (columns 1, 4, and 7), 80km (columns 2, 5, and 8) and 60km (columns 3, 6, and 9) of the relevant border. Standard errors, clustered at the ethnicity level, are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% level.

husbandry, and an indicator that equals one if an ethnic group's homeland is split by a country border.[37]

We find that in each of the 36 specifications reported, the 'placebo' estimates of the effects of the alternative ethnic characteristics on conflict are all small in magnitude and statistically insignificant. Although we see clear evidence of a relationship between segmentary lineage organization and conflict today, we do not see any evidence that other factors, like historical political centralization or economic development, affect conflict.

[37]The factor loadings for both principal components are reported in Table A11.

6. Mechanisms

A. *Onset and Duration*

To this point, our OLS and RD estimates suggest that segmentary lineage organization is associated with more conflict. This could be either because segmentary lineages cause existing conflicts to escalate and last longer (i.e., longer duration) or because they result in more new conflicts (i.e., more onset) or a combination of the two. In theory, the effect of segmentary lineage organization on these two channels could be very different. For example, if segmentary lineage organization causes conflicts to escalate, as case-study evidence suggests, one could imagine that this is foreseen and prevents conflicts from starting in the first place.[38] That is, the effects of segmentary lineage organization on conflict duration and conflict onset could differ substantially.

To investigate these and related issues, we separately estimate the effects of segmentary lineage organization on conflict duration and conflict onset. We do this using discrete-time logistic hazard models.[39] The estimating equation for conflict duration is:

$$\log\left[\frac{h_{i,t}^{offset}}{1-h_{i,t}^{offset}}\right] = \psi(t) + \gamma I_{e(i)}^{SL} + \mathbf{X}'_{e(i)}\mathbf{\Omega} + \epsilon_{i,t}, \tag{3}$$

where e indexes ethnic groups, i episodes of conflict, and t years into the episode of conflict.[40] The sample includes all episodes of conflict – i.e., years and ethnic groups that are 'at risk' of a conflict ending. $h_{i,t}^{offset}$ is the discrete-time hazard rate: $h_{i,t}^{offset} = \text{prob}(T_i = t | T_i \leq t; \mathbf{X})$, where T_i denotes the time at which the episode of fighting ends (i.e., conflict offset). We assume that $h_{i,t}^{offset}$ follows a logistic distribution and estimate $\psi(t)$ using a third-order polynomial in duration.

The estimating equation for conflict onset is:

$$\log\left[\frac{h_{i,t}^{onset}}{1-h_{i,t}^{onset}}\right] = \theta(t) + \beta I_{e(i)}^{SL} + \mathbf{X}'_{e(i)}\mathbf{\Gamma} + \varepsilon_{i,t}, \tag{4}$$

where e continues to index ethnic groups, i episodes of peace, and t years into the episode of peace. The sample includes all observations that are 'at risk' of conflict onset. $h_{i,t}^{onset}$ is the discrete-time hazard rate: $h_{i,t}^{onset} = \text{prob}(T_i = t | T_i \leq t; \mathbf{X})$, where here T_i denotes the time at which

[38]Nisbett and Cohen (1996) make such an argument when discussing the culture of honor in the U.S. South. These dynamics are able to explain the simultaneous presence of a culture of honor and aggression, as well as the Southern Gentleman in the U.S. South. Along similar lines, (Ahmed, 2013b, pp. 21–24) argues that segmentary lineage organization is associated with a form of 'tribal hospitality'.

[39]See Jenkins (1995) for the finer details of estimation.

[40]The granularity of the ACLED data allows one to measure time in months. However, doing so results in a number of 'false' onsets and offsets that are coded anytime there is a pause in fighting of a month or greater, which is common. Thus, we measure time in years rather than something finer.

the episode of peace ends (i.e., conflict onset). Here too, we assume that $h_{i,t}^{onset}$ follows a logistic distribution and we estimate $\theta(t)$ using a third-order polynomial in duration.

Estimates of equations (3) and (4) are reported in Table 8. Column 1–3 report estimates of equation (3), while columns 4–6 report estimates of equation (4). The specification reported in columns 1 and 4 includes the third-order duration polynomials only – i.e., $\psi(t)$ and $\theta(t)$, respectively. In columns 2 and 5, we add country fixed effects, while in columns 3 and 6, we add our set of geographical and historical controls. Each panel reports estimates for a different form of conflict.

We find strong evidence that segmentary lineage organization is associated with escalation of conflict. Specifically, we find a robust negative relationship between segmentary lineage organization and conflict offset. Once conflicts start, in a segmentary lineage societies, they are less likely to end and more likely to last longer.

We also find some evidence that segmentary lineage organization is associated with the start of new conflicts. We estimate a positive relationship between segmentary lineage organization and conflict onset. Thus, there is no evidence that segmentary lineage organization reduces the probability of conflict onset. In comparing the onset versus duration/escalation mechanisms, we find that the estimated effects on onset tend to be smaller and less precisely estimated than those for conflict offset. For example, in the specifications reported in panel A of columns 3 and 6, the marginal effect (estimated at the mean) of segmentary lineage organization on conflict offset is about 1.71 times larger in magnitude than its effect on conflict onset (0.082 versus 0.048).[41] In addition, two of the three estimates for conflict onset in panel A are not statistically different from zero.

Overall, the estimates are consistent with the emphasis on an escalation channel that is observed in the ethnographic literature. Because segmentary lineage societies mobilize a large number of combatants, they have particularly large effects on the duration and scale of conflicts. Once a conflict starts, it is much more likely to escalate and turn into a prolonged conflict.

[41] It is unlikely that this is explained by differences in the relative frequency of onset versus offset. For all conflicts, they are similar.

Table 8: Effects of segmentary lineage on conflict onset and duration.

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent Variable:		Conflict Offset			Conflict Onset	
			Panel A: All Conflicts			
Segmentary Lineage	-0.753***	-0.850***	-0.805***	0.472***	0.266	0.313
	(0.166)	(0.233)	(0.239)	(0.181)	(0.224)	(0.278)
Marginal Effect at Mean	-0.071	-0.093	-0.082	0.079	0.043	0.048
Mean of Dep. Var.	0.18	0.18	0.18	0.23	0.23	0.23
Ethnic groups	137	129	125	120	117	113
Observations	1,303	1,183	1,164	1,162	1,143	1,094
			Panel B: Civil Conflicts			
Segmentary Lineage	-0.741***	-0.996***	-0.988***	0.712***	0.449*	0.477*
	(0.193)	(0.245)	(0.276)	(0.180)	(0.231)	(0.258)
Marginal Effect at Mean	-0.142	-0.186	-0.180	0.096	0.057	0.058
Mean of Dep. Var.	0.28	0.28	0.28	0.20	0.20	0.20
Ethnic groups	124	119	115	138	134	130
Observations	977	951	937	1,488	1,464	1,410
			Panel C: Non-Civil Conflicts			
Segmentary Lineage	-0.775***	-0.807***	-0.696***	0.703***	0.513**	0.551**
	(0.187)	(0.236)	(0.248)	(0.176)	(0.206)	(0.241)
Marginal Effect at Mean	-0.121	-0.143	-0.117	0.105	0.073	0.075
Mean of Dep. Var.	0.23	0.23	0.23	0.21	0.21	0.21
Ethnic groups	129	120	116	135	130	126
Observations	1,023	904	893	1,442	1,403	1,346
			Panel D: Within-Group Conflicts			
Segmentary Lineage	-0.553***	-0.621***	-0.633**	0.761***	0.492**	0.414*
	(0.183)	(0.238)	(0.266)	(0.174)	(0.205)	(0.251)
Marginal Effect at Mean	-0.107	-0.122	-0.122	0.094	0.055	0.045
Mean of Dep. Var.	0.30	0.30	0.30	0.17	0.17	0.17
Ethnic groups	120	115	112	141	135	131
Observations	763	734	725	1,702	1,659	1,600
Third-degree polynomial of duration	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	No	Yes	Yes	No	Yes	Yes
Geographic & Historical controls	No	No	Yes	No	No	Yes

Notes: Columns 1-3 report estimates of a discrete time hazard model for the incidence of conflict offset. In this context, survival is continued conflict. Columns 4-6 report estimates of a discrete time hazard model for incidence of conflict onset. In this setting, survival is continued peace. Geographic and historical controls include log of the land area occupied by the ethnic group, the log of the minimum distance between the ethnic group centroid and a national border, an indicator variable that equals one if the ethnic group is split by a national border, mean altitude, absolute latitude, an agricultural suitability index, historical political centralization, and historical settlement pattern complexity. In Panel A, the dependent variables are constructed using all conflicts in the ACLED data; in Panel B, they are constructed using civil conflicts; in Panel C, they are constructed using non-civil conflicts; and in Panel D, they are constructed using within group conflicts. The marginal effect evaluated at the mean is reported for all specifications, along with the coefficient from the logistic model. Robust standard errors, clustered at the ethnicity level, are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels.

B. *The Scale of Conflict*

As another way of gaining a better understanding of the mechanisms underlying our estimates, we examine the effects of segmentary lineage organization on conflicts of different sizes. Specifically, we use a negative binomial model to estimate equation (1) with the number of conflict incidents of each of the following sizes as dependent variables: incidents with 0 deaths, 1-10 deaths, 11-100 deaths, or 100+ deaths. The estimates are reported in Table 9.[42] We find a positive relationship between segmentary lineage and the incidence of conflict incidents of all sizes. However, the magnitude of the coefficient increases monotonically with the scale of the conflict as measured by the number of fatalities. As shown, in panels A to D, this is true irrespective of whether we examine all conflicts, civil conflict, non-civil conflict, or within-group conflicts. This finding is consistent with segmentary lineage organization mobilizing large numbers of combatants, which causes small disputes to escalate into larger-scale conflicts.

C. *The Differential Relationship between Adverse Environmental Shocks and Conflict*

The final exercise that we undertake to better understand the channels behind our findings examines how environmental shocks, which have been shown to cause conflict, interact with the presence of segmentary lineage systems. It is possible that segmentary lineage groups have a more difficulty dealing with adverse environmental shocks and mitigating the extent to which they lead to escalated armed conflict. Motivated by this, we test whether adverse rainfall shocks lead to more conflict in segmentary lineage societies compared to non-segmentary lineage societies. Using a monthly panel of ethnic groups, we first examine the relationship between adverse rainfall shocks and conflict. This is motivated by prior evidence of a relationship between rainfall and conflict within sub-Saharan Africa (e.g., Miguel et al., 2004, Rogall, 2014). We then allow the relationship to differ depending on whether the ethnic group has a segmentary lineage organization or not. Given that rainfall shocks provide a catalyst for conflict, these estimates test the extent to which segmentary lineages amplify the effects of these shocks, allowing them to more frequently result in full-scale conflict.

The rainfall data are from the Tropical Rainfall Measuring Mission (TRMM) satellite.[43] The

[42]In all specifications, we control for country fixed effects, geographical controls, and historical controls.

[43]The use of satellite data is especially important in our context since ground sensors are scarce. Wherever possible, TRMM data are also validated using data from "ground-based radar, rain gauges and disdrometers": `https://pmm.nasa.gov/TRMM/ground-validation`.

data, which are collected using five separate instruments (precipitation radar, lightening sensors, infrared scanners, microwave imaging, and measurement of radiant energy at the top of the atmosphere, within the atmosphere, and at the Earth's surface)[44] represent a significant improvement over earlier sources of precipitation data, including previously-available satellite data.[45] The TRMM data are available at a 0.25-by-0.25-degree spatial resolution and at three-hour intervals. Using the raw data, we calculate the average daily precipitation (in thousands of millimeters per day) experienced by each ethnic group in each month of our sample period.

The relationship of interest is estimated using the following equation:

$$y_{i,t} = \sum_{j=1}^{6} \gamma^j y_{i,t-j} + \beta_1 Neg\,Shock_{i,t} + \beta_2 Neg\,Shock_{i,t} \times I_i^{SL} + \mu_i T_t + \alpha_i + \alpha_t + \varepsilon_{i,t} \quad (5)$$

where i continues to index ethnic groups and t months from January 1998 to December 2014.[46] $y_{i,t}$ denotes one of our measures of conflict intensity in the territory of ethnic group i during month t. $Neg\,Shock_{i,t}$ is a normalized measure of adverse rainfall shocks experienced by ethnic group i in month t. This is calculated as the average monthly rainfall of ethnic group i over the sample period minus the rainfall experienced by ethnic group i in month t; thus, a higher number means less rainfall. I_i^{SL} is our segmentary lineage indicator variable. Equation (5) also includes ethnicity fixed effects α_i, time-period fixed effects α_t, ethnicity-specific linear time trends $\mu_i T_t$, and six lags of the dependent variable, $\sum_{j=1}^{6} \gamma^j y_{i,t-j}$. Given the high frequency of our panel (which is monthly), it is important to account for lagged conflict. We include all lags of the dependent variable that are statistically significant, which is six. The coefficient of interest is β_2. A positive coefficient suggests that within segmentary lineage societies, adverse rainfall shocks lead to more conflicts than in non-segmentary lineage societies.

Estimates of equation (5) are reported in Table 10. In columns 1–3, the dependent variable is the log number of deadly conflict incidents and in columns 4–6, it is the log number of deaths. Each panel reports estimates for each type of conflict: all, civil, non-civil and within-group. Columns 1 and 4 report estimates of a version of equation (5) without the interaction term. Consistent with previous estimates (e.g., Miguel et al., 2004), we find that adverse rainfall shocks tend to be

[44] See `https://pmm.nasa.gov/trmm/tmi` for a discussion of the Microwave Imager (TMI) and why it represents an improvement over alternative sources of data, including other existing sources that rely on microwave imagery.

[45] According to NASA, "Before TRMM's launch measurements of the global distribution of rainfall at the Earth's surface had uncertainties of the order of 50%." See, for example: `https://trmm.gsfc.nasa.gov/overview_dir/why-univ.html`, for a general discussion of TRMM data quality improvement.

[46] The satellite was launched on November 27, 1997.

associated with greater conflict, although the precision of the estimates varies. Allowing for a differential relationship for groups that have segmentary lineages, we find that the positive relationship is much stronger for segmentary lineage groups (columns 2 and 5). For non-segmentary lineage groups, we estimate relationships that are not statistically different from zero, and that actually tend to be negative, rather than positive. The differential effect for segmentary lineages is largest and most precisely estimated for all conflicts and for civil conflicts, which is interesting since the previous literature examining the relationship between rainfall and conflicts has focused on civil wars (Miguel et al., 2004). The estimates also show effects for within-group conflicts, although these tend to be smaller in magnitude.[47]

The magnitudes of the effects for segmentary lineage groups are sizeable. According to the estimates from columns 2 and 5 of panel A, for segmentary lineage societies, a one-standard-deviation increase in the adverse rainfall shock variable, which is 4.015 mm, leads to a 0.85% ($(-0.0972 + 2.211) \times 0.004015 = 0.0085$) increase in the number of deadly conflict incidents and a 1.57% ($(-0.866 + 4.768) \times 0.004015 = 0.0157$) increase in the number of conflict deaths.

In equation (5), because we have included ethnicity fixed effects, we are unable to estimate the direct effect of segmentary lineage when there is average rainfall. This is because the uninteracted segmentary lineage indicator variable is absorbed by the equation's ethnicity fixed effects. Therefore, we also estimate a version of equation (5) that does not include the ethnicity fixed effects (or their interactions with a time trend), but instead includes the segmentary lineage indicator variable, as well as our baseline set of ethnicity-level geographic and historical covariates. From the estimates, which are reported in columns 3 and 6 segmentary lineage societies are associated with more conflict even when rainfall is at its historical average ($Neg\,Shock_{i,t} = 0$). The estimated effect, which is given by the coefficient for the (uninteracted) segmentary lineage indicator variable, is positive, sizeable, and statistically significant. This is consistent with other factors, besides adverse rainfall, being a catalyst for conflict, which is then exacerbated by segmentary lineage organization.

We also check the robustness of these findings to the use of alternative specifications that have been used in previous studies that examine the effects of weather shocks on conflict. These

[47]Given the presence of lagged dependent variables in our regression equation, there is concerned about the presence of a Nickel bias. If we instead use an Arellano-Bond estimator, we obtain very similar results to what we report here. The coefficient on the interaction term in column 2 of Panel A, for example, is 2.602 and significant at the 5% level. Also, as we report in Appendix Table A12, we obtain similar estimates using specifications that do not include lags of the dependent variable.

estimates are reported in Appendix Table A12. Specifically, we report estimates of a version of equation (5) without lagged dependent variables, but with: ethnicity fixed effects and ethnicity-specific linear time trends (panel A);[48] ethnicity fixed effects and time fixed effects (panel B); ethnicity fixed effects, time fixed effects, and ethnicity-specific time trends (panel C).

7. Discussion of Implications and External Validity

We feel that our findings provide insight into a previously unexplored determinant of conflict. Although our findings hold for all forms of conflict, they are potentially the most informative for civil conflicts, helping us to better understand why some armed non-state actors have been better able to recruit soldiers than others. As an example of a non-state organization that has been successful in this dimension consider Boko Haram in Northern Nigeria. It is very difficult to explain their success using standard determinants. Certainly, the Nigerian state lacks capacity, but it does so everywhere, not just in the North. Indubitably, there is greed in Nigeria and perhaps the incentive to mobilize is due to the prospect of grabbing oil rents. But the oil is in the South, not in the North. Certainly, the North also has legitimate grievances, but one can imagine that such grievances are widespread in Nigeria. Why then has the rebellion in the North attracted so many followers?

Our findings suggest that one missing element in such a puzzle may be the social structure of the societies involved. Boko Haram has recruited primarily from the Kanuri people who historically constituted a segmentary lineage society. That there is a connection between segmentary lineage societies and Boko Haram has been argued by Akbar Ahmed (2013b) who argues that they actively recruit where segmentary lineage structures are most prominent:

> "Over the previous three years, the group popularly known as Boko Haram had struck fear into Nigerians with its ferocious attacks on both government and civilian targets. . . The group was dominated by the historically segmentary lineage Kanuri people, who previously had their own independent kingdom until British colonialism. . . [Later], the group began to recruit other ethnic groups, such as the Fulani, another segmentary lineage people in northern Nigeria. The first suicide bomber in

[48] This is similar to the specification from Burke, Miguel, Satyanath, Dykema and Lobell (2009).

Nigerian history, who Boko Haram announced was Fulani, blew himself up in the national police headquarters in Abuja in June 2011" (Ahmed, 2013b, p. 129).

Though we have conducted our analysis within Africa because of the rich geocoded subnational conflict data, the findings we present are likely applicable beyond the continent. For example, Osama bin Laden and many individuals recruited to Al Qaeda were and are Yemeni; moreover, "Yemeni tribes in Asir are organized around a segmentary lineage system, with elders and councils, a spirit of egalitarianism, and a code of honor guiding society that emphasizes courage, loyalty, hospitality, and revenge" (Ahmed, 2013b, p. 110). The same logic of lineage-based obligation and revenge among segmentary groups in Somalia and Sudan applies to the Yemeni. According to Paul Dresch, "If a man from a village in Khamis Abu Dhaybah or Kharif kills someone from Arhab... a debt exists between the two tribes... a man's immediate kin are involved (those who Islamic law recognizes as always al-dam), but men much further from the particular antagonist may also be drawn in. If a man from section A of our tribe kills someone from another tribe, that other tribe might perhaps kill someone in a quite different section of ours, section B" (Dresch, 1989, pp. 84–85). As we documented within Africa, here too lineage-based obligation and responsibility to participate in conflict appear to facilitate the escalation and persistence of conflicts that otherwise would be small and short-lived. Thus, it is likely that our findings for Africa also apply more broadly.

A better understanding of segmentary lineage systems also has the potential to shed important light and new understanding on key international security issues. It is possible that segmentary lineage organization is not only associated with within-country conflicts but also with inter-state warfare, international violence, and terrorism. Ahmed (2013b) points out a broad correlation between areas of high-intensity Islamist violence and areas where society is structured based on segmentary lineage organization. In a 2013 speech, Ahmed claimed the following:

> "Here is a correlation for you. Ask yourselves: where are [US] drones most used? They are really segmentary lineage systems: the Pashtuns in Afghanistan and Pakistan tribal areas, mainly in Waziristan; among the Somali segmentary lineage system; the Yemenis' segmentary lineage system; the Kurds in eastern Turkey, segmentary lineage system; the Tuareg in West Africa, segmentary lineage system. An immediate correlation. So there is some connection that we can identify... Take a look at these mutant militant groups that are emerging: the TTP (Tehrik-i-Taliban Pakistan), for

example. Where is it coming out of? It's coming out of a specific tribe, a specific clan. Al Shabaab: tribal. Tribal: Boko Haram in West Africa. Again, because we tend to jump on Islam as the explanation for what's going on, we are missing this whole tribal basis of the discussion. All of these are coming out of straight segmentary lineage system backgrounds." (Ahmed, 2013a)

Philip Salzman extends this reasoning and argues that Islam, at its inception, was structured as an amalgamation of segmentary lineage societies and was designed to unite these tribes against outsiders. He argues that the unification of these segmentary societies "was only possible by extending the basic tribal principle of balanced opposition. This Muhammad did by opposing the Muslim to the infidel, and the dar al-Islam, the land of Islam and peace, to the dar al-harb, the land of the infidels and conflict. Balanced opposition was raised to a higher structural level and the newly Muslim tribes were unified in the face of the infidel enemy" (Salzman, 2007, pp. 137–138). In this conceptualization, the entire Islamic world comprises the largest tribal segment that is compelled to unite against any non-Muslim – infidels, the West, or the dar al-harb. For Salzman, an understanding of segmentary organization becomes crucial to understanding all Islam-fueled violence.

This logic is moreover not confined to the writing of academic anthropologists. Philip Zeman, a strategist with the U.S. Marine Corps, has argued that there is a strong relationship between segmentary organization and "terror." He writes not only that "members of Islamist extremist groups commonly come from societies with strong tribal [segmentary] traditions" but also that there are explicit links between tribal organization and violent extremism (Zeman, 2009, p. 682). For Zeman, there is a national security "need for in-depth understanding of tribal systems and influences" (Zeman, 2009, p. 682).

Although our analysis has focused specifically on the African context, our findings have the potential to explain conflict elsewhere. They raise the possibility that segmentary lineage organization may be a crucial driver of global conflict.

8. Conclusion

We have tested a long-standing hypothesis from the anthropology literature about the relationship between segmentary lineage organization and conflict. A rich ethnographic literature suggests that segmentary lineage organization results in large numbers of men being mobilized for warfare anytime there is a dispute or conflict. This is true when the initial feud is between individuals within the same segment, but especially when it is between individuals from different segments or lineages. To investigate these ideas, we collected information from existing ethnographic sources on the social structure of 145 ethnic groups from sub-Saharan Africa.

Our first strategy was to examine the cross-ethnicity relationship between the historical presence of a segmentary lineage system and measures of conflict today. Our second empirical strategy was to restrict our analysis to pairs of contiguous ethnic groups where one ethnic group was traditionally organized based on segmentary lineages and the other was not. Examining variation across 10km-by-10km grid-cells, we estimated the effect of segmentary lineage organization on conflict using a regression discontinuity (RD) approach. This strategy allowed us to better control for any omitted factors that change smoothly over space, such as geographic factors, ecological characteristics, or historical shocks. Using either strategy, we found a strong positive relationship between segmentary lineage organization and conflict today.

Motivated by the existing case-study and historical literatures, which suggest that the primary consequence of segmentary lineages is to cause the escalation of conflicts that otherwise would have been relatively small, we turned to an examination of mechanisms. Estimating hazard models, we found robust evidence that segmentary lineage organization prolongs conflicts once they start. The estimated effects on conflict onset, although positive, were smaller in magnitude and less robust. We also examined the effects of segmentary lineage organization on the prevalence of conflicts of different sizes. We found that although segmentary lineage organization is positively associated with conflicts of all sizes, the relationship was much larger in magnitude and more precisely estimated for larger-scale conflicts.

The final exercise that we undertook was to examine the differential ability of segmentary lineage and non-segmentary lineage societies to cope with adverse rainfall shocks. Examining a monthly panel at the ethnicity-level, we first documented a positive relationship between adverse rainfall shocks and conflict across the 145 ethnic groups in our sample. We then allowed the effect to differ for segmentary lineage and non-segmentary lineage societies and found that the average effect was being driven solely by segmentary lineage societies. Among non-segmentary lineage societies, there was no relationship between adverse rainfall shocks and conflict. This suggests that segmentary lineage societies are less successful at containing conflicts that results from adverse rainfall shocks.

Although our analysis has focused specifically on the African context, our results are applicable outside of Africa, where segmentary lineage organization is also common. Outside of Africa, and especially in the Middle East, there are many examples of prolonged conflicts involving groups that are traditionally organized in segmentary lineages. Thus, our findings suggest that segmentary lineage organization may be an important determinant of global conflict.

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Table 9: Negative binomial estimates of the effect of Segmentary Lineage Systems on conflict of different sizes.

	(1)	(2)	(3)	(4)
Dependent Variable:	Number of Conflict Incidents with:			
	0 Deaths	1-10 Deaths	11-100 Deaths	100+ Deaths
	Panel A: All Conflicts			
Segmentary Lineage	0.586**	0.906***	1.174***	1.832***
	(0.278)	(0.292)	(0.328)	(0.507)
Mean of Outcome	134.43	41.59	12.74	2.62
	Panel B: Civil Conflicts			
Segmentary Lineage	0.711***	0.734**	0.900**	1.131**
	(0.273)	(0.323)	(0.406)	(0.557)
Mean of Outcome	61.82	25.35	7.55	1.7
	Panel C: Non-Civil Conflicts			
Segmentary Lineage	0.466	0.822***	1.681***	2.847***
	(0.314)	(0.254)	(0.355)	(0.835)
Mean of Outcome	46.52	17.42	3.59	0.35
	Panel D: Within-Group Conflicts			
Segmentary Lineage	0.605*	0.943***	1.896***	3.959
	(0.328)	(0.265)	(0.447)	(2.647)
Mean of Outcome	29.28	7.11	1.93	0.24
Country FE	Yes	Yes	Yes	Yes
Geographic Controls	Yes	Yes	Yes	Yes
Historical Controls	Yes	Yes	Yes	Yes
Observations	141	141	141	141

Notes: The unit of observation is the ethnic group and the right hand side variable of interest is an indicator variable that equals one if an ethnic group is a segmentary lineage society. Along with the segmentary lineage variable, all regressions include country fixed effects, a set of 'geographic controls,' (log of the land area occupied by the ethnic group, the log of the minimum distance between the ethnic group centroid and a national border, an indicator variable that equals one if the ethnic group is split by a national border, mean altitude, absolute latitude, longitude, and an agricultural suitability index) and a set of 'historical controls' (historical political centralization (jurisdictional hierarchy beyond the local community) and historical settlement pattern complexity). All specifications use a negative binomial regression model. In Panel A, the outcome variables are constructed using all conflicts in the ACLED data; in Panel B, they are constructed using civil conflicts; in Panel C, they are constructed using non-civil conflicts; and in Panel D, they are constructed using within group conflicts. Robust standard errors are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels.

Table 10: OLS estimates of the differential effect of adverse rainfall shocks on conflict.

	(1)	(2)	(3)	(4)	(5)	(6)
	ln (1+Deadly Conflict Incidents)			ln (1+Conflict Deaths)		
			Panel A: All Conflicts			
Negative Rainfall Shock (1000 mm/day)	0.873**	-0.0972	-0.207	1.226	-0.866	-1.042
	(0.382)	(0.367)	(0.385)	(0.761)	(0.734)	(0.775)
Neg. Rainfall Shock x Segmentary Lineage		**2.211*** **	**2.432*** **		**4.768*** **	**5.098*** **
		(0.742)	**(0.777)**		**(1.608)**	**(1.685)**
Segmentary Lineage			0.0185***			0.0481***
			(0.0059)			(0.0153)
Mean of Dependent Variable	0.108	0.108	0.108	0.222	0.222	0.222
SD of Dependent Variable	0.369	0.369	0.369	0.807	0.807	0.807
R-squared	0.453	0.453	0.436	0.379	0.379	0.360
			Panel B: Civil Conflicts			
Negative Rainfall Shock (1000 mm/day)	0.993***	0.285	0.139	1.617***	0.145	-0.127
	(0.292)	(0.276)	(0.276)	(0.594)	(0.587)	(0.604)
Neg. Rainfall Shock x Segmentary Lineage		**1.613** **	**1.478** **		**3.354** **	**2.867** **
		(0.624)	**(0.624)**		**(1.338)**	**(1.382)**
Segmentary Lineage			0.0114***			0.0296**
			(0.0042)			(0.0115)
Mean of Dependent Variable	0.065	0.065	0.065	0.141	0.141	0.141
SD of Dependent Variable	0.292	0.292	0.292	0.669	0.669	0.669
R-squared	0.416	0.416	0.426	0.361	0.361	0.364
			Panel C: Non-Civil Conflicts			
Negative Rainfall Shock (1000 mm/day)	0.0940	-0.280	-0.276	0.0326	-0.981	-0.987
	(0.312)	(0.348)	(0.327)	(0.640)	(0.712)	(0.735)
Neg. Rainfall Shock x Segmentary Lineage		**0.853**	**1.106***		**2.309**	**2.640***
		(0.621)	**(0.660)**		**(1.422)**	**(1.554)**
Segmentary Lineage			0.0148***			0.0426***
			(0.0045)			(0.0122)
Mean of Dependent Variable	0.073	0.073	0.073	0.152	0.152	0.152
SD of Dependent Variable	0.288	0.288	0.288	0.649	0.649	0.649
R-squared	0.377	0.377	0.372	0.289	0.289	0.274
			Panel D: Within-Group Conflicts			
Negative Rainfall Shock (1000 mm/day)	0.0262	-0.176	-0.151	0.108	-0.581	-0.586
	(0.136)	(0.175)	(0.172)	(0.350)	(0.415)	(0.418)
Neg. Rainfall Shock x Segmentary Lineage		**0.460***	**0.702** **		**1.571** **	**2.026** **
		(0.274)	**(0.307)**		**(0.710)**	**(0.813)**
Segmentary Lineage			0.0065**			0.0223***
			(0.0027)			(0.0073)
Mean of Dependent Variable	0.024	0.024	0.024	0.052	0.052	0.052
SD of Dependent Variable	0.156	0.156	0.156	0.375	0.375	0.375
R-squared	0.231	0.231	0.225	0.165	0.165	0.150
Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Ethnic Group FE	Yes	Yes	No	Yes	Yes	No
Ethnicity-Specific Linear Time Trends	Yes	Yes	No	Yes	Yes	No
6 Lags of Dependent Variable	Yes	Yes	Yes	Yes	Yes	Yes
Geographic & Historical Controls	No	No	Yes	No	No	Yes
Observations	28,722	28,722	28,722	28,722	28,722	28,722

Notes: All columns present results from a 216 month panel (1998-2014) of all ethnic groups in the sample for which all ethnicity-level controls are available. The ethnicity-level negative rainfall shock variable is included in every column. This is cacluated as realized monthly rainfall subtracted from the ethnic group average over the sample period. The mean value of the rainfall shock is (mechanically) 0.000 and the standard deviation is 4.015. In columns 2-3 and 5-6 an interaction between the negative rainfall shock and the segmentary lineage indicator is also included. Columns 1-2 and 4-5 include ethnic group fixed effects, time fixed effects, group-specific linear time trends, and six lags of the dependent variable. In columns 3 and 6, ethnic group fixed effects and group-specific trends are dropped and geographic and historical ethnicity-level controls are included, along with the segmentary lineage indicator. In columns 1-3, the dependent variable is deadly conflict incidents and in columns 4-6, it is conflict deaths, both parameterized as ln(1+x). In Panel A, the dependent variables are constructed using all conflicts in the ACLED data; in Panel B, they are constructed using civil conflicts; in Panel C, they are constructed using non-civil conflicts; and in Panel D, they are constructed using within group conflicts. Standard errors clustered at the ethnic group level are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels.

Web Appendix for

Social Structure and Conflict: Evidence from Sub-Saharan Africa

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A1. Overview

The following section of the Appendix, Section A2, provides a description of the data used in the paper, including relevant source material and an explanation of the construction of each variable. Section A3 reports results from two alternative strategies that we use to investigate causal relationships: (*i*) An application of the techniques developed by Altonji, Elder and Taber (2005) and Oster (2014), which propose ways to assess the required strength of unobservable characteristics to fully explain away our baseline results, and (*ii*) nearest neighbor matching.

Section A4 reports estimates from a range of robustness and sensitivity checks: (*i*) re-estimation using Poisson or negative binomial models, (*ii*) the use of alternative conflict coding and data sources, (*iii*) the exclusion of potential outliers from the sample, and (*iv*) controlling for potentially endogenous historical and contemporary covariates.

Section A5 presents additional checks about the validity of the RD approach. First, we present graphical results that accompany the balance tests reported in Table 6 of in the main text. Second, we report the estimates that show that ethnic affiliation varies discontinuously at the boundaries on the Murdock map. Last, we report the factor loadings for the principal components constructed for the placebo RD analyses, which are reported in Table 7 of the text.

The final section of the Appendix, Section A6, presents additional results investigating the interaction between adverse climate shocks and segmentary lineage organization. We present results analogous to Table 12 but with different conflict sub-types as the outcome variable. We also report estimates of an alternative specification without ethnic group fixed effects but with ethnicity-level controls, in order to estimate the effect of segmentary lineage organization in the absence of a negative rainfall shock.

A2. Data, their Sources, and their Construction

A. *Conflict*

Our primary source of conflict data is the Armed Conflict Location and Event Data Project (ACLED): https://www.acleddata.com. ACLED includes information on the location (latitude and longitude), date, and other characteristics of all known conflict events in Africa since 1997, including the number of conflict deaths resulting from each conflict event and information about conflict type. We use the "Interaction" variable to group conflicts by type; in particular, we define a conflict as a:

- **Civil Conflict** if the Interaction variable takes a value between 10-28. These are all conflict events that involve the government military or rebels (who are seeking to replace the central government) as one of the actors.
- **Non-Civil Conflict** if the Interaction variable takes a value between 30-67. These are all conflict events that are not civil conflicts.
- **Within-Group** or **Localized Conflict** if the Interaction variable takes a value between 40-47, 50-57, or 60-67. These are all conflict events for which both actors in the conflict are geographically local and/or ethnically local groups.

The ACLED data also contain information about the type of conflict event (riots and protests, battles, violence against civilians, etc – this information is used in Table A4), the actors involved (government forces, rebel militia, civilians, protestors, etc), and the motivation of the actors involve (e.g., aimed at taking over land, riots, protests, etc). ACLED data are coded from a variety of sources, including "reports from developing countries and local media, humanitarian agencies, and research publications" (http://www.acleddata.com/about-acled/).

As an alternative source of conflict data, we use the Uppsala Conflict Data Program (UCDP): http://ucdp.uu.se/#/exploratory. The UCDP data are used exclusively in Table A4. These data record the location, date, and other characteristics of conflict events beginning in 1989 and only include conflict events with at least 1 associated fatality.

Conflicts were matched to ethnic groups using the Murdock Map of African ethnic groups from Murdock (1959). They were matched to grid cells using the location of the conflict incidents. Summary statistics of the various conflict measures at the ethnicity-level and grid-cell-level are reported in Tables A1 and A9 respectively.

B. *Segmentary Lineage Organization*

All sources that were used to code the segmentary lineage variable are included at the end of the Appendix. All ethnic groups in the sample are listed by classification, along with the source(s) used to determine whether the ethnic group was a segmentary lineage society or not. If one of the sources is from the *Ethnographic Survey of Africa*, it is listed first.

Segmentary lineage societies:

ACHOLI

1. Butt, Audrey (1952), *The Nilotes of the Anglo-Egyptian Sudan and Uganda*, pp. 81-82.
2. Parkin, David (1969) *Neighbors and Nationals in an African City Ward*, p. 200.

ALUR

1. Butt, Audrey (1952), *The Nilotes of the Anglo-Egyptian Sudan and Uganda*, pp. 174-175.
2. Southall, Aidan W. (2004), *Alur Society: A Study in Processes and Types of Domination*, p. 62.
3. Middleton, John & David Tait (2004), *Tribes Without Rulers*, p. 15.

AMBA

1. Taylor, Brian K. (1963), *The Western Lacustrine Bantu*, pp. 74, 76-77.
2. Runciman, W. G. (1989), *A Treatise on Social Theory (Volume II)*, p. 321.

ANUAK

1. Butt, Audrey (1952), *The Nilotes of the Anglo-Egyptian Sudan and Uganda*, pp. 68-70.
2. Eisenstadt, S. N. (1959), " Primitive Political Systems: A Preliminary Comparative Analysis," *American Anthropologist*, p. 209.

BALANTE

1. Morier-Genou, Eric (2012), *Sure Road? Nationalisms in Angola, Guinea-Bissau & Mozambique*, p. 62.
2. Sigrist, Christian (2004), "Segmentary Societies: The Evolution and Actual Relevance of an Interdisciplinary Conception," *Difference and Integration*, p. 15.

BAMBARA

1. Paques, Viviana (1954), *Les Bambara*, pp. 50-51.

BANZA

1. Burssens, Herman (1956), *Les peuplades de l'entre Congo-Ubangi (Ngbandi, Ngbaka, Mbanja, Ngombe et Gens d'Eau)*, p. 117.

BARI

1. Huntingford, George W. B. (1953), *The Northern Nilo-Hamites*, pp. 35-36.
2. Barclay, Harold (1982), "Sudan (North): On the Frontier of Islam" in *Religion and Societies: Asia and the Middle East* ed. Carlo Caldarola, p. 148.

CHOKWE

1. McCulloch, Merran (1978), *The Southern Lunda and Related Peoples*, pp. 40-41.
2. Miller, Joseph C. (1977), "Imbangala Lineage Slavery" in *Slavery In Africa: Historical and Anthropological Perspectives* eds. Suzanne Miers and Igor Koptoff, p. 207.

DIGO

1. Waaijenberg, Henk (1994) *Mijikenda Agriculture in Coast Province of Kenya?: Peasants in between Tradition, Ecology and Policy*, p. 35, 38.
2. UNESCO World Heritage Convention (2008), "The Sacred Mijikenda Kaya Forests," p. 59.

DINKA

1. Butt, Audrey (1952), *The Nilotes of the Anglo-Egyptian Sudan and Uganda*, pp. 120-121.
2. Middleton, John & David Tait (2004), *Tribes Without Rulers*, p. 14.

DOGON

1. Palau Martí, Montserrat (1957), *Les Dogon*, p. 37.
2. Tait, David (1950), "An Analytical Commentary on the Social Structure of the Dogon," *Africa* 20(3), p. 197.

DOROBO

1. Huntingford, George W. B. (1969), *The Southern Nilo-Hamites*, pp. 72-73.
2. Eisenstadt, Shmuel Noah (2009), *From Generation to Generation*, p. 119.

DUALA

1. Ardener, Edwin (1956), *Coastal Bantu of the Cameroons*, pp. 51, 57.

2. Teresa, Meredith (2013), *Nation of Outlaws, State of Violence*, p. 270.
EDO
1. Bradbury, R. E. (1957), *The Benin Kingdom and the Edo-Speaking Peoples of the South-Western Nigeria*, pp. 88-89.
EWE
1. Manoukian, Madeline (1952), *The Ewe-speaking people of Togoland and the Gold Coast*, pp. 22-24.
FALI
1. Palau Martí, Montserrat (1957), *Les Dogon*, p. 37.
FANG
1. Alexandre, Pierre & Jaques Binet (1960), "Le groupe dit Pahouin (Fang, Boulou, Beti)," *Revue de l'histoire des religions* 160(1), pp. 48-9.
2. Terretta, Meredith (2013), *Nation of Outlaws, State of Violence: Nationalism, Grassfields Tradition, and State Building in Cameroon*, p. 270.
GA
1. Manoukian, Madeline (1964), *Akan and Ga-Adangme Peoples of the Gold Coast*, p. 73.
2. Middleton, John & David Tait (2004), *Tribes Without Rulers*, p. 17.
GANDA
1. Fallers, Marcaret Chave (1968), *The Eastern Lacustrine Bantu (Ganda, Soga)*, p. 52.
2. F.B. Welbourn, "A Sacral Kingship in Buganda? An Essay in the Meaning of Religion," *Department of Religious Studies, University of Bristol*, p. 2.
GBARI
1. Gunn, Harold D. & F. p. Conant (1960), *Peoples of the Middle Niger Region: Northern Nigeria*, pp. 94-96.
GISU
1. La Fontaine, J.S. (1959), *The Gisu of Uganda*, pp. 24-26, 29-31.
2. La Fontaine, J.S., "Witchcraft in Bugisu" in *Witchcraft and Sorcery in East Africa* eds. John Middleton and E.H. Winter, p. 188.
GURENSI (TALENSI)
1. Manoukian, Madeline (1951), *Tribes of the Northern Territories of the Gold Coast*, pp. 26-27.
2. Smith, M.G., "On Segmentary Lineage Systems," in *The Journal of the Royal Anthropological Institute of Great Britain and Ireland* 86(2), p. 40.
3. Middleton, John & David Tait (2004), *Tribes Without Rulers*, p. 12.
GUSII
1. Cohen, Yehudi (1971), *Man in Adaptation: The Institutional Framework*, pp. 294-295.
2. Smith, M.G., "On Segmentary Lineage Systems," in *The Journal of the Royal Anthropological Institute of Great Britain and Ireland* 86(2), p. 40.
IBO
1. Forde, Darryll & G.I. Jones (1967), *The Ibo and Ibibio Speaking Peoples of South Eastern Nigeria*, pp. 15-16.
2. Southall, Aidan (1975), "From Segmentary Lineage to Ethnic Association–Luo, Luhuya, Ibo and Others" in *Colonialism and Change; Ikenna Nzimiro, Studies in Ibo Political Systems* ed. Maxwell Owusu, pp. 100-101.
3. Middleton, John & David Tait (2004), *Tribes Without Rulers*, p. 17.
IDOMA
1. Armstrong, Robert G. (1955), "The Idoma-Speaking Peoples" in *Peoples of the Niger-Benue Confluence* ed. Darryll Forde, pp. 94-5.
2. Dudley, B.J. (1968), *Parties and Politics in Northern Nigeria*, pp. 60-61.
ITSEKIRI
1. Lloyd p.C. (1957), "The Itsekiri" in *The Benin Kingdom and the Edo-Speaking Peoples of the*

South-Western Nigeria ed. R.E. Bradbury, pp. 182, 186.
KAMBA
1. Middleton, John & Greet Kershaw (1972), *The Central Tribes of the North-Eastern Bantu*, pp. 71-74.
2. Edgerton, Robert B. (1970), "Violence in East African Tribal Societies," in *Collective Violence* eds. James F. Short Jr. & Marvin E. Wolfgang, pp. 168-169.
KARANGA
1. Hughes, A.J. B. & J. van Velsen (1954), *The Shona and Ndebele of Southern Rhodesia*, p. 19.
KIKUYU
1. Middleton, John & Greet Kershaw (1972), *The Central Tribes of the North-Eastern Bantu*, pp. 23-24, 27-29, 38.
KIPSIGI
1. Huntingford, George W. B. (1969), *The Southern Nilo-Hamites*, pp. 43-45.
KISSI
1. Middleton, John & David Tait (2004), *Tribes Without Rulers*, p. 17.
KONGO
1. Soret, Marcel (1959), *Les Kongo*, pp. 72-73.
KONJO
1. Taylor Brian K. (1969), *The Western Lacustrine Bantu*, p. 92.
KONKOMBA
1. Froelich, J. C. et al. (1965), *Les population du Nord-Togo*, p. 142.
2. Middleton, John & David Tait (2004), *Tribes Without Rulers*, p. 13.
KEWRE
1. Beidelman, T. O. (1967), *Matrilineal Peoples of Eastern Tanzania*, p. 23.
LAMBA
1. Froelich, J. C. et al. (1965), *Les population du Nord-Togo*, p. 89.
2. Mitchell, James Clyde, and John Arundel Barnes (1950). *The Lamba Village: Report of a Social Survey*, throughout.
LANGO
1. Butt, Audrey (1952), *The Nilotes of the Anglo-Egyptian Sudan and Uganda* pp. 98-99.
LENDU
1. Kaberry, Phyllis (1957), "Primative States", *The British Journal of Sociology* 8(3), p. 230.
LUGBARA
1. Middleton, John & David Tait (2004), *Tribes Without Rulers*, p. 12.
LUGURU
1. Beidelman, T. O. (1967), *Matrilineal Peoples of Eastern Tanzania*, p. 28.
2. Pets, Peter (1996), "The Pidgnization of Luguru Politics: Administrative Ethnography and the Paradoxes of Indirect Rule," *American Ethnologist*, p. 744.
LUNGU
1. Willis, Roy G. (1966), *The Fipa and Related Peoples*, pp. 49-50.
LUO
1. Butt, Audrey (1952), *The Nilotes of the Anglo-Egyptian Sudan and Uganda* pp. 110-111.
2. Shipton, Parker (1984), *Lineage and Locality as Antithetical Principles in East African Systems of Land Tenure*, p. 123.
MADI
1. Middleton, John & David Tait (2004), *Tribes Without Rulers*, p. 15.
MERU
1. Moore, Sally Falk & Paul Puritt (1977), *The Chagga and Meru of Tanzania*, pp. 110-111
2. Munson, Robert B. (2013), *The Nature of Christianity in Northern Tanzania* p. 17.
MIJERTEIN (SOMALI)

1. Lewis, I.M. (1999), *A Pastoral Democracy: A Study of Pastoralism and Politics Among the Northern Somali of the Horn of Africa*, pp. 127, 161.
2. Lewis, I.M. (1994), *Blood and Bone: The Call of Kinship in Somali Society*, p. 19.
MINIANKA
1. Holas, Bohumil (2006), *Les Sénufo: (y compris les Minianka)*, pp. 65, 78.
MOBA
1. Froelich, J. C. et al. (1965), *Les population du Nord-Togo*, p. 142.
MONDARI
1. Huntingford, George W. B. (1953), *The Northern Nilo-Hamites*, pp. 58, 63-64.
NANDI
1. Huntingford, George W. B. (1953), *The Northern Nilo-Hamites*, pp. 24-26.
NDEMBU
1. McCulloch, Merran (1978), *The Southern Lunda and Related Peoples*, pp. 18-21.
2. Gough, Kathleen (1961), "Descent Group Variation Among Mobile Cultivators" in *Matrilineal Kinship* eds. David Murray Schneider & Kathleen Gough, p. 537.
NGBANDI
1. Burssens, Herman (1956), *Les peuplades de l'entre Congo-Ubangi (Ngbandi, Ngbaka, Mbanja, Ngombe et Gens d'Eau)*, p. 117.
NGURU
1. Beidelman, T. O. (1967), *Matrilineal Peoples of Eastern Tanzania*, p. 59.
NUER
1. Butt, Audrey (1952), *The Nilotes of the Anglo-Egyptian Sudan and Uganda*, pp. 138-139.
2. Middleton, John & David Tait (2004), *Tribes Without Rulers*, p. 12.
POKOMO
1. Prins, A. H. J. (1952), *The Coastal Tribes of the North-Eastern Bantu*, pp. 16-22.
REGA
1. Biebuyck, Daniel p. (1973), *Lega Culture: Art, Initiation and Moral Philosophy Among a Central African People*, pp. 44-46.
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C. *Geographic variables (ethnicity level)*

- **Land Area.** The land area occupied by each ethnic group calculated in square kilometers from the Murdock Map (Murdock, 1959).
- **Distance to National Border.** Distance calculated in kilometers from the centroid of each ethnic group in the Murdock Map (Murdock, 1959) to the nearest national border.
- **Latitude & Longitude.** Calculated at the centroid of each ethnic group in the Murdock Map (Murdock, 1959).
- **Split Ethnic Group Indicator.** An indicator that equals 1 when at least 10% of an ethnic group's land area partitioned into different countries. This variable is motivated by Michalopoulos and Papaioannou (2016).
- **Elevation.** Calculated as the mean elevation in kilometers in each ethnic group as defined by the boundaries on the Murdock Map (Murdock, 1959). Data are from GTOPO30, a "global digital elevation model (DEM) with a horizontal grid spacing of 30 arc seconds," which can be accessed at: https://lta.cr.usgs.gov/GTOPO30.
- **Temperature.** Calculated as the mean temperature in degrees Celsius within an ethnic group's boundaries as defined by Murdock (1959). The data used for this measure are from

Alsan (2015), and originally from the University of East Anglia Climatic Research Unit: http://www.cru.uea.ac.uk/data.

- **Malaria Ecology Index.** The malaria ecology index is computed from a model incorporating both the "human biting tendency" of the mosquito and the mortality rate; data used to compute the index are collected from field studies and incorporate the most prevalent mosquito type in a given area. These data are from Alsan (2015), and originally from Kiszewski, A.Mellinger, Spielman, Malaney, Sachs and Sachs (2004).

- **Agricultural Suitability Index.** This suitability index is calculated by the Food and Agriculture Organization (FAO) for rain-fed crops. We computed the average suitability for each ethnic group using the shapefile associated with Plate 46 that can be accessed at: http://webarchive.iiasa.ac.at/Research/LUC/GAEZ/index.htm.

- **Precipitation.** The rainfall data are from the Tropical Rainfall Measuring Mission (TRMM) satellite. Wherever possible, TRMM data are also validated using data from "ground-based radar, rain gauges and disdrometers" (https://pmm.nasa.gov/TRMM/ground-validation). The TRMM precipitation data are available at a 0.25-by-0.25-degree resolution at three-hour intervals. We first calculate the average daily precipitation (mm) in each month and grid-cell. We then calculate the average daily precipitation for each month and ethnic group by taking the average over all grid-cells that fall within the land occupied by each ethnicity, where ethnic group land area is defined by Murdock (1959). The data can be accessed at https://pmm.nasa.gov/data-access/downloads/trmm. The relevant download is the "3B42 RT: 3-Hour Realtime TRMM Multi-satellite Precipitation Analysis."

D. ***Historical and contemporary characteristics (ethnicity level)***

- **Levels of Jurisdictional Hierarchy Beyond the Local Community.** Variable v33 from Murdock's Ethnographic Atlas. This variable takes integer values from 0-4.

- **Settlement Complexity.** Variable v30 from Murdock's Ethnographic Atlas. This variable takes integer values from 1-8 increasing in pre-colonial settlement complexity.

- **Historical Dependence on Gathering, Hunting, Fishing, Animal Husbandry, and Agriculture.** Variables v1-v5 respectively in Murdock's Ethnographic Atlas. The variables take integer values from 0-9 increasing in percent dependence on the food source. For example, the integer 0 indicates 0-5% dependence while 9 indicates 86-100% dependence.

- **Intensity of Agriculture.** Variable v28 from Murdock's Ethnographic Atlas. The variable takes integer values from 1-6 increasing in agricultural intensity.

- **Female Participation in Agriculture.** Coded from variable v54 in Murdock's Ethnographic Atlas. We construct from v54 a variable that takes integer values from 1-5 increasing in female participation in agriculture. The raw v54 variable takes integer values ranging from 1-9. We exclude groups where v45>6. No ethnic groups in the Ethnographic Atlas are coded as 7 or 8, and groups are coded as 9 if agriculture is an "absent or unimportant activity." We also combine groups coded as 3 or 4 into a single category, since both suggest equal participation of men and women in agriculture.

- **Election of Local Headman.** Coded from variable v72 in Murdock's Ethnographic Atlas. We construct an indicator variable that equals 1 if v72=6 (that is, if succession to the office of local headman determined by "election or other formal consensus, nonhereditary").

- **Presence of Active God.** Coded from variable v34 in Murdock's Ethnographic Atlas. We construct an indicator that equals 1 if v34=3 or 4 (i.e. if there is a high god that is either "active in human affairs but not supportive of human morality" or "supportive of human morality.")

- **Historical Slave Exports.** We use ethnic group-level measures of Atlantic and Indian Ocean slave exports from Nunn and Wantchekon (2011): https://scholar.harvard.edu/nunn/pages/data-0. Following Nunn (2008), we normalize slave exports by land area using ethnic group land area in the map from (Murdock, 1959).

- **Patrilineality and Matrilineality.** Coded from variable v43 in Murdock's Ethnographic Atlas as indicator variables that equals 1 when v43 = 1 or 3 respectively.

- **Patrilocality and Matrilocality.** Coded from variable v12 in Murdock's Ethnographic Atlas as indicator variables that equals 1 when v12=8 or 5 respectively.

- **Major City in 1800.** An indicator that equals 1 if a major city fell within the Murdock boundary of the ethnic group in 1800. Geospatial data on city location – defined as locations with over 20,000 inhabitants – are from Chandler (1987) (as used in Nunn and Wantchekon (2011), Alsan (2015), Michalopoulos and Papaioannou (2016)).

- **Pre-Colonial Conflict.** An indicator that equals 1 for ethnic groups that experienced a pre-colonial conflict (1400-1700). Conflicts were linked to ethnic groups using the location of each conflict and the map from (Murdock, 1959). Conflict data are from Besley and Reynal-Querol (2014).

- **Population Density.** Ethnic group population density, parameterized as log (0.01 + population per square kilometer), was computed for both 1960 and 2000. The data, from the UN Environment Programme / Global Resource Information Database (UNEP/GRID), can be accessed at: https://na.unep.net/siouxfalls/datasets/datalist.php.

- **Muslim Majority.** We construct an indicator that equals 1 if the majority of an ethnic group's population is Muslim. This was coded individually for each ethnic group using the World Religion Database: http://www.worldreligiondatabase.org/wrd_default.asp.

- **Light Density.** Following Michalopoulos and Papaioannou (2013), we compute light density as the average luminosity across pixels that fall within an ethnic group's boundaries in Murdock (1959). For the empirical analysis, we take the log of ethnicity-level light density normalized by population. We use data from the U.S. National Oceanic and Atmospheric Administration/National Geophysical Data Center Earth Observation Group, which can be accessed at: https://ngdc.noaa.gov/eog/.

E. ***Grid-cell level characteristics***

- **Self-Reported Ethnicity.** Self reported ethnicity, used in Figure 7, is from a geo-referenced version of Round 3 of the Afrobarometer Survey used in Nunn and Wantchekon (2011). Individuals in the Afrobarometer survey were matched to grid cells based on their location (latitude and longitude). To construct Figure 7, for each grid cell in a segmentary lineage society (based on the Murdock Map and our coding) in our sample, we computed the fraction of individuals from the Afrobarometer survey whose self-reported ethnicity matched the segmentary lineage society. For each grid cell in a non-segmentary lineage society, we computed the fraction of individuals from the Afrobarometer survey whose self reported ethnicity matched the adjacent segmentary lineage society. This variable is on the y-axis in Figure 7.

- **Latitude and Longitude.** Latitude and longitude are computed at the centroid of each grid cell.

- **Agricultural Suitability Index.** This suitability index is calculated by the Food and Agriculture Organization (FAO) for rain-fed crops. We computed the average suitability for each grid cell using the shapefile associated with Plate 46 that can be accessed at: http://webarchive.iiasa.ac.at/Research/LUC/GAEZ/index.htm.

- **Split Grid Cell.** An indicator that equals 1 if a grid cell is intersected by an international border. This variable is motivated by Michalopoulos and Papaioannou (2016).

- **Elevation and Slope.** Data for both elevation (m) and slope (degrees) are from GTOPO30, a "global digital elevation model (DEM) with a horizontal grid spacing of 30 arc seconds," which can be accessed at: https://lta.cr.usgs.gov/GTOPO30. To compute slope, we take the absolute value of each cell in the GTOPO30 data and compute the average over all cells within each grid cell. This an uphill slope measure equivalent to, for example, the measure used in Nunn and Puga (2012).

- **Temperature.** Average grid-cell level temperature in degrees Celsius was calculated for the period 2000–2010 from the University of East Anglia Climatic Research Unit, http://www.cru.uea.ac.uk/data.

- **Water Coverage.** We constructed an indicator that equals 1 if a grid cell is intersected by a body of water. Data on the distribution of land water is from the Inland Water Area Features dataset published by Global Mapping International (GMI). GMI shut down in June 2017.

- **Sorghum Suitability and Cereal Suitability.** Agro-ecological suitability for both sorghum and a composite measure for cereal is from the FAO GAEZ. The cereal composite measure incorporates the suitability of wheat, wetland rice, dryland rice, maize, barley, rye, pearl millet, foxtail millet, sorghum, oat, and buckwheat. We computed average suitability for each grid cell for both measures. The data can be accessed at: http://gaez.fao.org/Main.html#.

- **Land Cultivation.** Data on the distribution of cultivated land, including both irrigated and rain-fed crops, are from the FAO GAEZ. For each grid cell, we compute the fraction of land under cultivation based on FAO estimates. The data can be accessed at http://gaez.fao.org/Main.html#.

- **Mission Stations.** Data on the location of Catholic and Protestant mission states are from Nunn (2010), originally from Roome (1924). We computed the number of mission stations in each grid cell using the digitized geo-coded map from Nunn (2010).

- **Railway Lines.** Data on the location of colonial railways are from Nunn and Wantchekon (2011), and originally from Century Company (1911). We computed an indicator that equals 1 if a grid cell is intersected by a colonial railway line.

- **Petroleum.** We compute an indicator that equals 1 if there is an oil field in the grid cell. Data on the distribution of oil fields is from the Petroleum Dataset published by the Peace Research Institute Oslo (PRIO), and can be accessed at: https://www.prio.org/Data/Geographical-and-Resource-Datasets/Petroleum-Dataset/.

- **Diamond Mines.** We compute an indicator that equals 1 if there is a diamond mine in the grid cell. Data on the distribution of diamond mines is from the Diamond Resources dataset published by the Peace Research Institute Oslo (PRIO), and can be accessed at: https://www.prio.org/Data/Geographical-and-Resource-Datasets/Diamond-Resources/

Summary statistics of all variables calculated at the ethnicity-level are reported in Table A1 and summary statistics of variables calculated at the grid-cell-level are reported in Table A9.

A3. Alternative Strategies to Investigate Causal Relationships

While the RD analysis presented in the text results is our primary estimation strategy, in this section we report several additional estimates that provide some evidence for the validity of our baseline estimates. First, we employ a strategy adapted by Nunn and Wantchekon (2011) from Altonji, Elder and Taber (2005) that allows us to determine how much stronger selection on unobservables would have to be compared to selection on observables in order to fully explain away our result. To perform this test, we calculate the ratio $\hat{\beta_F}/(\hat{\beta_R} - \hat{\beta_F})$, where $\hat{\beta_F}$ is our coefficient of interest from a regression that includes a full set of controls while $\hat{\beta_R}$ is our coefficient of interest from a regression that includes a restricted set of controls. In the first three columns of Table A2, we report the results for each of the 12 outcome variables from Table 2 of the text. The country fixed effects, geographic controls, and historical controls are included in the full set of controls, while the restricted set of controls only includes country fixed effects.

In total, this yields 12 ratios that range from −160.24 to 193.71. In some cases, the coefficient in the controlled model is larger than that on the uncontrolled model giving a negative ratio. In general, these ratios suggest that the influence of unobservable characteristics would have to be far greater than the influence of observable characteristics to fully account for our findings.

We also use results from Oster (2017) in order to calculate a lower bound for our coefficient of interest (columns 4–6). Oster's result relies on the assumption that observables and unobservables have the same explanatory power in the outcome variable, then the following estimator is a consistent estimator:

$$\beta^* = \hat{\beta_F} - (\hat{\beta_R} - \hat{\beta_F}) \times \frac{R^2_{max} - R^2_F}{R^2_F - R^2_R},$$

where $\hat{\beta_F}$ and $\hat{\beta_R}$ are as defined above, R^2_F is the R^2 from the fully controlled regression, and R^2_R is the R^2 from the regression with restricted controls. R^2_{max} is the R^2 from a regression that includes all observable and unobservable controls. R^2_{max} is unobserved; however, we know that the maximum value for R^2_{max} is 1 and this value yields the most conservative estimate of β^*. While recent research, such as Gonzalez and Miguel (2015) has shown that Oster's R^2_{max} should be below 1, which thereby raises the lower bound for β^*, in this analysis we assume $R^2_{max} = 1$ and rely only on the most conservative lower bound estimate.

We report lower bound estimates corresponding to the fully controlled and restricted regressions in columns 4–6 of Table A2. All lower bound estimates remain positive and economically significant. These results indicate that it is unlikely that our OLS estimates are biased by the presence of some unobservable factor, and suggest that the relationship that we have identified between segmentary lineage organization and conflict is indeed causal.

A second strategy is to use nearest neighbor matching to compare each segmentary lineage society to the non-segmentary lineage society that is most similar, based on a range of observable characteristics. We measure distance using Mahalanobis distance, which is defined as $D_{ij} = \sqrt{(X_i - X_j)' S^{-1} (X_i - X_j)}$, where X_i and X_j are vectors of observable covariates and S^{-1} is the variance-covariance matrix of X_j.

Table A3 presents the results from this approach using different choices of X_i and X_j. In column 1, X_i and X_j consist of latitude and longitude. In column 2, they consist of our baseline set of geographic and historical controls. Finally, in the column 3, we continue to match ethnic groups based on all geographic and historical controls, and we additionally impose the requirement that members of a matched pair have the same number of levels of jurisdictional hierarchy beyond the local community. As discussed in the body of the paper, levels of jurisdictional hierarchy is of particular interest as a potential confounder. These results are similarly robust.

A4. Robustness of the OLS Estimates

Since all of the conflict outcome variables are count variables, we check that our baseline estimates are robust to the use of count models instead of OLS. In Table A4 we reports estimates of our most stringent specification but using using either Poisson (columns 1–3) or negative binomial (columns 4–6) regression models. For all outcome variables, our results remain robust to these alternative estimation strategies. In all cases but one, the coefficient of interest is positive and significant.

One criticism of the ACLED conflict data is that it includes conflict events that do not result in fatalities (e.g. Depetris-Chauvin, 2014). Other geo-referenced conflict data, like the UCDP-GED dataset, only includes a conflict if it has at least one fatality. This criticism results in part from the fact that conflict events without fatalities are more difficult to geocode accurately. While the ACLED data provide rich additional information that we use in our main analysis, it is important to establish the robustness of our results to coding differences. One test is to calculate the outcome variables using the ACLED data but excluding conflict events that are "non-violent." Excluded event types, based on ACLED's classification, include (*i*) instances when a headquarters or base is established, (*ii*) non-violent activity by a conflict actor, and (*iii*) a non-violent transfer of territory. Results from this check are reported in Panel A of Table A5. The results are very similar to our baseline estimates.

We also test the robustness of our results by using the UCDP-GED data. Panel B of Table A5 reports the results of this exercise for three of our outcome variables, (log of) total conflict incidents, (log of) total fatalities and (log of) years of conflict. The results are very similar to our results using the ACLED dataset both in the size of the coefficients and in their levels of statistical significance, which is reassuring.

Another concern could be that our results are being driven by outliers or conflicts which have very large numbers of fatalities and last for longer stretches of time, such as those involving the Lord's Resistance Army in Uganda, in the territory of segmentary lineage societies such as the Acholi. Although Figure 4 suggests that this is not an obvious concern, we also take a more systematic approach to testing for the robustness of our estimates to outliers. One strategy is to drop observations with high Cook's Distance, which is a commonly used measure of the leverage of an observation. Following Bollen (1990), we drop observations with Cook's Distance greater than $4/n$ where $n = 141$ is the number of observations in the regression. These estimates are reported in panel A of Table A6. Our results are largely the same, aside from a drop in significance of the segmentary lineage indicator for outcome variables related to civil conflicts.

As an additional robustness test, we re-estimate the fully-controlled specification for each outcome variable after removing observations whose value for the dependent variable falls in the top 5 percent. As reported in Panel B of Table A6, the estimates remain robust to this procedure.

Another potential concern is that the results are biased by conflict incidents that are incorrectly or imprecisely geocoded in the ACLED database. To address this, we re-estimate our baseline regression after excluding conflict incidents coded in the ACLED data as having low geographic precision. Low precision incidents make up 4.75% of the overall ACLED data. While a minimum level of geographic information about a conflict incident is required for inclusion in the ACLED data, an incident is considered to have low geographic precision if the conflict can only be traced to a "larger region" within a province. These results, which are reported in panel C of Table A6, are very similar to the baseline estimates.

An additional check of our cross-ethnic group results is to examine the sensitivity of the OLS estimates to the inclusion of potentially endogenous variables. Given the evidence from Besley and Reynal-Querol (2014) that historical conflict is correlated with post-colonial conflict, we use their pre-colonial conflict data to control for the intensity of historical conflicts in our baseline regressions. It is possible that segmentary lineage organization increased conflict in the past, which results in more present-day conflict. Table A7 reports estimates where we control for historical conflict in our baseline regression, using the most conservative specification from Table 3. The estimated coefficient for our variable of interest remains significant and very similar in magnitude, suggesting that historical conflict and its relationship to current conflict is not a primary channel.

Next, we examine economic prosperity and religion as potential channels. If segmentary lineage organization is linked to prosperity or religion, it is possible that our baseline results are capturing the relationship between prosperity or religion and conflict rather than a direct effect of segmentary lineage organization. To investigate this possibility, we include two measures of prosperity and a measure of the prevalence of Islam in our baseline regressions. The measures of prosperity are (log of) light density at night normalized by population, measured in 2000 (Henderson, Storeygard and Weil, 2012, Michalopoulos and Papaioannou, 2013, 2014) and population density in 2000. Using the *World Religion Database*, we also construct an indicator variable that equals one if Islam is the majority religion of the ethnic group today.

Estimates of our baseline regression with these controls included are presented in Table A8. The point estimate of interest remains positive and its magnitude declines by approximately 10–60%. While the largest decline occurs for civil conflict incidents, the decline is much more limited for non-civil conflicts or within-group conflicts. The change in coefficient magnitude seems to be driven primarily by the inclusion of population density, which is positive and significant in all regressions. Moreover, segmentary lineage organization is associated with higher population density today (but not Islam or light density).[1] Therefore, one possible explanation for the lower magnitude of the effect of segmentary lineage organization is that segmentary lineage organization is correlated with population density and higher population density today is associated with more conflict today, especially civil conflict.

A5. Robustness of the RD Estimates

Since the RD analysis estimates differences in conflict intensity between regions that are geographically close, it may be particularly sensitive to imprecision in the geocoding of conflict events. To address this potential concern, we re-estimated our baseline RD regression, but excluding conflict events coded in the ACLED data as having a low level of geographic precision. Results from this robustness check are reported in Table A10 and look very similar to the baseline results.

In the main text, we conducted a series of balance tests accompanying the RD analysis, showing that a range of observable characteristics do not vary discontinuously at borders between segmentary lineage and non-segmentary lineage societies. In Figure A1, we present these results graphically. We find no indication of a discontinuous change in any of the characteristics that we

[1]The correlations coefficients for the relationships between the control variables and segmentary lineage are: light density (coef= 0.087, $p = 0.29$); population density (coef= 0.163, $p = 0.05$); Islam (coef= -0.020, $p = 0.81$).

examine.

In Figure 8 of the paper, we show that there is a sharp increase in the fraction of the population surveyed by Afrobarometer that identify as a member of a segmentary lineage society just inside Murdock's approximation of the society's boundary. We aggregate over all borders between segmentary lineage and non-segmentary lineage societies and graph this discontinuity in self-reported ethnic affiliation at these borders. This aggregation is perhaps less intuitive than showing the discontinuity at any single border. While for many individual borders we do not have sufficient data to document a significant trend, in Figure A2 we graph the discontinuity for two individual borders with sufficient data. First, we show the border between the Soga and the Ganda – the outcome variable is the fraction of the population that identifies as Ganda and on the x-axis, positive values indicate kilometers into Ganda territory. This graph presents a clear discontinuity in self-reported ethnicity at the border, and suggests a magnitude for the discontinuity that is very similar to Figure 8. Next, we present the same graph for the border between the Zulu and Sotho – the outcome variable is the fraction of the population that identifies as Sotho. Again, a sharp discontinuity is apparent and the magnitude is very similar. Interestingly here, for most observations inside of Murdock's Zulu territory, the fraction of the Afrobarometer population that identifies as Sotho is zero.

Finally, in our placebo RD analysis, we construct principal components to separate ethnic groups into treatment and control categories based on a broad range of historical characteristics. These principal components are used in panels C and D of Table 7. Table A11 reports the factor loading of both principal components used to construct the treatment variables for the placebo RD estimates. The first principal component (panel C of Table 8) is constructed from 12 indicator variables for each level of jurisdictional hierarchy and level of historical settlement complexity. The second principal component (panel D of Table 8) adds to these twelve variables additional ethnic group level historical characteristics.

A6. Additional Rainfall Shock Specifications

In the main text of the paper, we show that low rainfall has a more pronounced positive effect on conflict in segmentary lineage societies. These estimates are reported in Table 10. As our baseline regression, we selected a conservative specification that includes group and time fixed effects, group-specific linear time trends, and six lags of the outcome variable on the right-hand side. We test the robustness of our findings to the use of alternative specifications. The estimates, which are reported in Table A12, show that we obtain similar estimates with these alternative specifications. We find a positive effect of adverse rainfall on conflict when the outcome is either all conflicts or civil conflicts, and this effect is significantly more pronounced in segmentary lineage societies. When either non-civil conflict or within-group conflict is the outcome, we find no significant direct effect of adverse rainfall on conflict. However, when within-group conflict is the outcome, the interaction with segmentary lineage organized is positive and (weakly) significant.

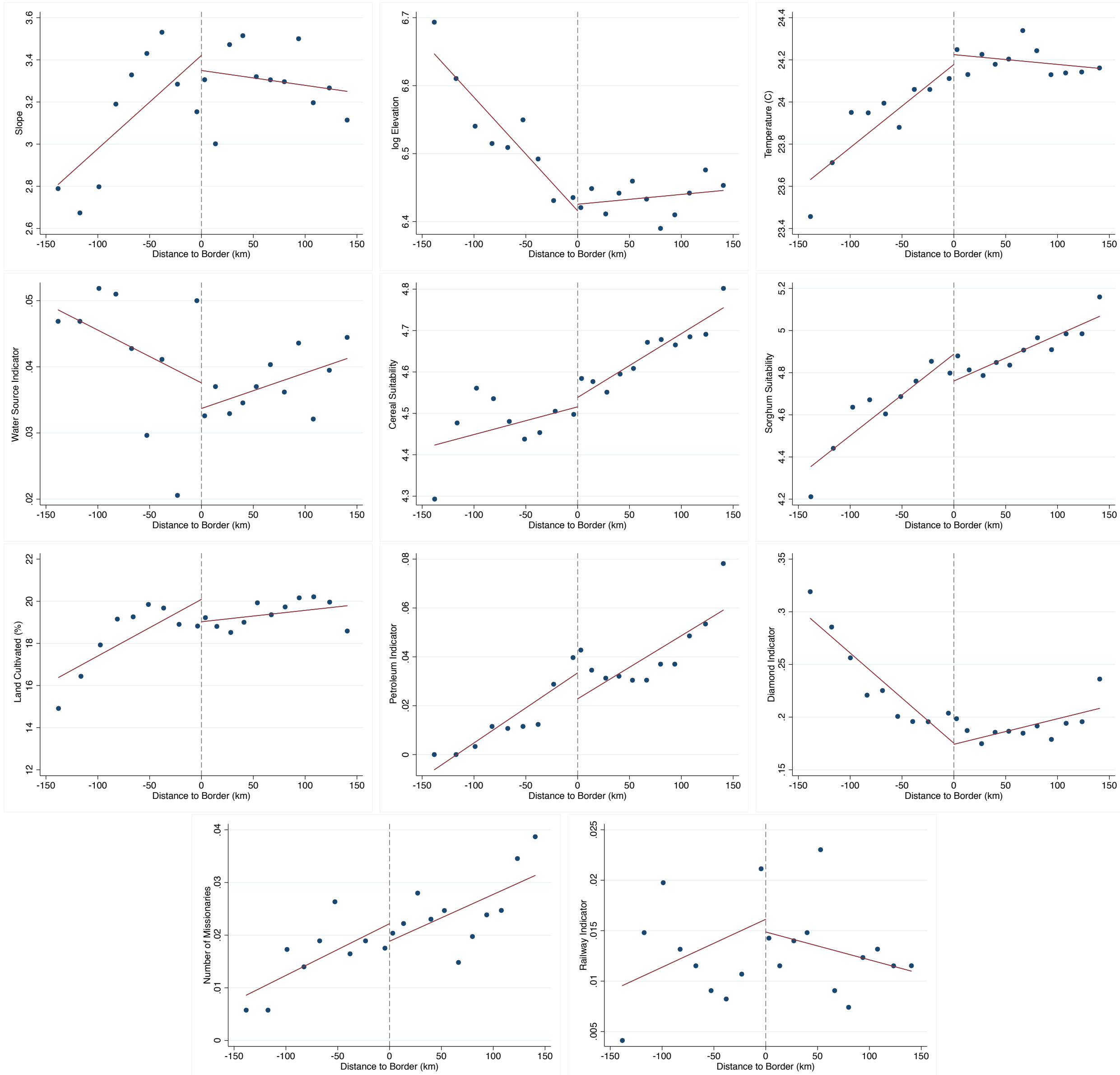
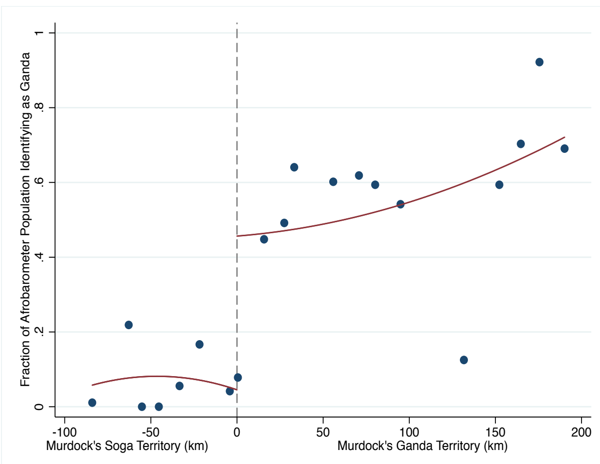


Figure A1: This figure presents graphical results from the balance tests accompanying the RD analysis. We examine whether there are discontinuities in observable characteristics at the borders between segmentary lineage and non-segmentary lineage societies. The x-axis is measured in kilometers and reports geographic distance from the borders between segmentary lineage and non-segmentary lineage societies. Positive values indicate kilometers into the segmentary lineage territor. The border is at kilometer 0. The characteristics are (beginning from the top left): land slope, (log of) elevation, temperature, an indicator that equals one if there is a water source in the grid cell, cereal suitability, sorghum suitability, the fraction of land under cultivation, an indicator that equals one if there is petroleum in a grid cell, an indicator that equals one if there are diamond deposits in a grid cell, the number of missionaries, and an indicator that equals one if a railway passes through a grid cell.



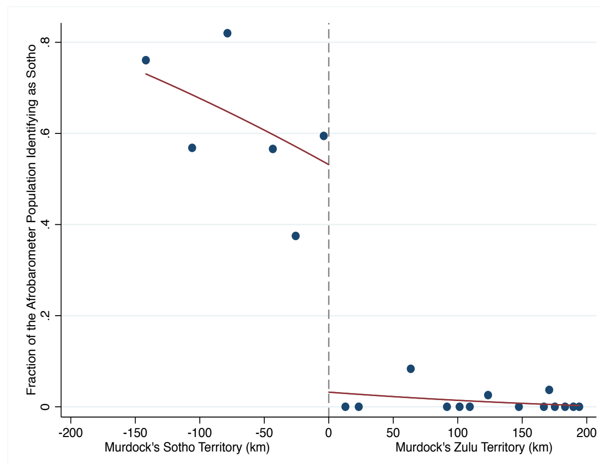


Figure A2: This figure presents the relationship between self-reported ethnicity and geographic location based on survey data from Round 3 of the Afrobarometer Survey at two individual Murdock borders: the border between the Soga and the Ganda and the border between the Sotho and the Zulu. The x-axis reports geographic distance – the borders are at kilometer 0. In the left-hand graph, the y-axis is the fraction of the surveyed population that identifies as Ganda. On the righthand graph, it is the fraction of the surveyed population that identifies as Sotho.

Table A1: Summary statistics, ethnicity-level variables.

	(1)	(2)	(3)	(4)	(5)
	Obs.	Mean.	St. Dev	Min	Max
			Ethnicity-Level Variables		
ln (1+Deadly Conflict Incidents):					
All Conflicts	145	2.556	1.798	0	6.685
Civil Conflicts	145	1.848	1.848	0	6.846
Non-Civil Conflicts	145	2.024	1.577	0	5.852
Within-Group Conflicts	145	1.266	1.299	0	5.094
ln (1+Conflict Deaths):					
All Conflicts	145	4.006	2.761	0	11.723
Civil Conflicts	145	3.109	2.817	0	11.688
Non-Civil Conflicts	145	3.046	2.369	0	8.289
Within-Group Conflicts	145	2.196	2.243	0	8.152
ln (1+Months of Deadly Conflict):					
All Conflicts	145	2.158	1.445	0	4.836
Civil Conflicts	145	1.631	1.398	0	4.625
Non-Civil Conflicts	145	1.674	1.307	0	4.543
Within-Group Conflicts	145	1.128	1.121	0	4.025
Geographic Variables:					
ln Land Area	145	9.718	1.145	7.424	12.310
Mean Altitude	145	0.365	0.342	0.002	1.676
ln Distance to National Border	145	4.401	1.099	0.575	6.293
Agricultural Suitability Index	145	0.564	0.170	0.913	0.857
Split Ethnic Group (10%)	145	0.317	0.467	0	1
Absolute Latitude	145	7.700	5.364	0	29
Longitude	145	19.679	15.994	-17	48
Historical Variables:					
Levels of Jurisdictional Hierarchy	141	1.270	0.992	0	4
Settlement Pattern	145	5.821	1.727	0	8
Endogenous Variables:					
Pre-Colonial Conflict Indicator	145	0.083	0.276	0	1
ln(1+Light Density Per Capita)	145	-6.038	0.909	-6.908	-1.679
ln(Pop. Density in 2000)	145	3.744	1.298	-1.133	7.432
Islam Indicator	145	0.200	0.401	0	1

Notes: Columns 1-5 report summary statistics for the variables listed on the left side of the table. All variables listed are calculated at the level of the ethnic group.

Table A2: Assessing the importance of bias from unobservables by controlling for observable characteristics.

Robustness Test:		(1)	(2)	(3)	(4)	(5)	(6)
		Coeff. Ratio Test (after Altonji, Elder and Taber 2005)			**Minimum Coeff. Lower Bound (after Oster 2015)**		
Controls in Restricted Set	Controls in Full Set	ln (1+Deadly Conflict	ln (1+Conflict Deaths)	ln (1+Months of Conflict)	ln (1+Deadly Conflict	ln (1+Conflict Deaths)	ln (1+Months of Conflict)
				Panel A: All Conflicts			
FE	FE, Geo., Hist.	10.916	5.282	10.001	0.881	0.827	0.69
				Panel B: Civil Conflicts			
FE	FE, Geo., Hist.	2.806	2.858	3.132	0.156	0.172	0.19
				Panel C: Non-Civil Conflicts			
FE	FE, Geo., Hist.	-12.917	-21.67	-22.546	1.153	1.74	0.862
				Panel D: Within-Group Conflicts			
FE	FE, Geo., Hist.	-160.239	11.882	193.709	0.806	0.845	0.654

Notes: Each cell in columns 1-3 report ratios based on the coefficient for the segmentary lineage indicator in two regressions; in one regression a restricted set of controls (country fixed effects) is included and in the other, a "full" set of controls is included. If B_R is the coefficient in the restricted set and B_F is the coefficient in the full set, then the ratio is B_F/(B_R-B_F). The controls included in each set are listed on the left side of the table and the dependent variables are listed at the top. In panels A-D, the dependent variable is constructed using all ACLED conflict, civil conflicts, non-civil conflicts, and within-group conflicts respectively. Each cell in columns 4-6 report coefficient lower bounds based on Oster (2015). If we define R2_R as the R2 for the regression with the restricted set of controls and R2_F as the R2 for the regression with the full set of controls, then the minimum coefficient lower bound is: B_F-(B_R-B_F)*((1-R2_F)/(R2_F-R2_R)). Again, the controls in the full and restricted sets are listed on the left side of the table, dependent variables are listed at the top, and in each panel the dependent variable is constructed using a different conflict type.

Table A3: Nearest Neighbor Matching.

	(1)	(2)	(3)
	Nearest Neighbor Matching		
	Geographic Proximity	Geographic & Historical Controls	Geographic & Historical Controls; Exact Jurisd. Hierarchy
ln (1+Deadly Conflict Incidents):			
All conflicts	1.005***	1.289***	1.449***
	(0.352)	(0.372)	(0.380)
Civil conflicts	0.653*	0.565	0.701*
	(0.337)	(0.401)	(0.372)
Non-civil conflicts	0.843***	0.990***	1.121***
	(0.304)	(0.333)	(0.355)
Within-group conflicts	0.687***	1.085***	1.243***
	(0.240)	(0.249)	(0.248)
ln (1+Conflict Deaths):			
All conflicts	1.367***	1.562**	1.691**
	(0.503)	(0.644)	(0.671)
Civil conflicts	1.046*	0.938	1.096*
	(0.539)	(0.642)	(0.638)
Non-civil conflicts	1.522***	1.882***	2.014***
	(0.457)	(0.502)	(0.559)
Within-group conflicts	1.275***	1.817***	2.035***
	(0.399)	(0.463)	(0.499)
ln (1+Months of Conflict):			
All conflicts	0.769***	1.010***	1.154***
	(0.295)	(0.308)	(0.314)
Civil conflicts	0.615**	0.733**	0.839***
	(0.275)	(0.294)	(0.283)
Non-civil conflicts	0.726***	1.018***	1.150***
	(0.271)	(0.264)	(0.280)
Within-group conflicts	0.567**	0.927***	1.072***
	(0.220)	(0.223)	(0.215)
Observations	145	141	140

Notes: Column 1 reports the average treatment effect on the treated between segmentary lineage and non-segmentary lineage societies across the 12 conflict variables listed on the left side of the table using nearest neighbor matching, where ethnic groups are matched using the Mahalanobis distance function based on their latitude and longitude. Column 2 reports the average treatment effect on the treated using nearest neighbor matching, where ethnic groups are matched using the Mahalanobis distance function based on all 'geographic' and 'historical' controls. Column 3 reports the average treatment effect on the treated using nearest neighbor matching, where ethnic groups are matched using the Mahalanobis distance function based on all 'geographic' and 'historical' controls and ethnic groups are matched exactly based on their jurisdictional hierarchy measure. In Columns 2 and 3, estimates are corrected for bias due to matching on multiple continuous variables (Abadie and Imbens 2006, 2011). *, **, and *** indicate significance at the 10%, 5%, and 1% levels.

Table A4: Segmentary lineage societies and conflict: Negative binomial and poisson estimates.

	(1)	(2)	(3)	(4)	(5)	(6)
		Poisson			Negative Binomial	
	Number of incidents	Number of deaths	Months of conflict	Number of incidents	Number of deaths	Months of conflict
			Panel A: All Conflicts			
Segmentary Lineage	0.818***	1.144**	0.657***	0.847***	0.805**	0.663***
	(0.297)	(0.496)	(0.213)	(0.286)	(0.344)	(0.215)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Geographic Controls	Yes	Yes	Yes	Yes	Yes	Yes
Historical Controls	Yes	Yes	Yes	Yes	Yes	Yes
Mean of Dependent Var.	56.95	1639.93	21.16	56.95	1639.93	21.16
Observations	141	141	141	141	141	141
			Panel B: Civil Conflicts			
Segmentary Lineage	1.125***	1.025*	0.675***	0.670**	0.415	0.510**
	(0.374)	(0.541)	(0.234)	(0.320)	(0.395)	(0.246)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Geographic Controls	Yes	Yes	Yes	Yes	Yes	Yes
Historical Controls	Yes	Yes	Yes	Yes	Yes	Yes
Mean of Dependent Var.	49.71	1393.48	13.06	49.71	1393.48	13.06
Observations	141	141	141	141	141	141
			Panel C: Non-Civil Conflicts			
Segmentary Lineage	0.888***	1.454**	0.686***	0.909***	1.472***	0.737***
	(0.331)	(0.580)	(0.227)	(0.263)	(0.404)	(0.215)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Geographic Controls	Yes	Yes	Yes	Yes	Yes	Yes
Historical Controls	Yes	Yes	Yes	Yes	Yes	Yes
Mean of Dependent Var.	26.14	230.58	11.67	26.14	230.58	11.67
Observations	141	141	141	141	141	141
			Panel D: Within-Group Conflicts			
Segmentary Lineage	1.022***	1.700***	0.827***	1.096***	2.601***	0.907***
	(0.314)	(0.630)	(0.261)	(0.264)	(0.461)	(0.230)
Country FE	Yes	Yes	Yes	Yes	No	Yes
Geographic Controls	Yes	Yes	Yes	Yes	Yes	Yes
Historical Controls	Yes	Yes	Yes	Yes	Yes	Yes
Mean of Dependent Var.	9.26	123.7	5.54	9.26	123.7	5.54
Observations	141	141	141	141	141	141

Notes: The unit of observation is the ethnic group and the right hand side variable of interest is an indicator variable that equals one if an ethnic group is a segmentary lineage society. Along with the segmentary lineage variable, all regressions include country fixed effects, 'geographic controls' (log of the land area occupied by the ethnic group, the log of the minimum distance between the ethnic group centroid and a national border, an indicator variable that equals one if the ethnic group is split by a national border, mean altitude, absolute latitude, longitude and an agricultural suitability index), and 'historical controls' (historical political centralization -- jurisdictional hierarchy beyond the local community -- and historical settlement pattern complexity). Columns 1-3 present results from a Poisson regression model and columns 4-6 present results from a negative binomial model. In Panel A, the dependent variables are constructed using all conflicts in the ACLED data; in Panel B, they are constructed using civil conflicts; in Panel C, they are constructed using non-civil conflicts; and in Panel D they are constructed using within-group conflicts. In order for the negative binomial model to converge, in column 5 of Panel D, we remove country fixed effects. Robust standard errors are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels.

Table A5: Segmentary lineage societies and conflict: Robustness of OLS estimates to the use of UCDP-GED conflict data.

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent Variable:	ln (1+Conflict Incidents)		ln (1+Conflict Deaths)		ln (1+Months)	
	Panel A: Dep. Var. Constructed from ACLED Data Excluding "Non-Violent" Incidents					
Segmentary Lineage	1.028***	0.675***	1.330***	0.855**	0.791***	0.496***
	(0.250)	(0.232)	(0.432)	(0.411)	(0.201)	(0.180)
Observations	141	141	141	141	141	141
Mean of Dependent Var.	2.69	2.69	4.00	4.00	2.26	2.26
R-squared	0.724	0.802	0.699	0.769	0.725	0.809
	Panel B: Dep. Var. Constructed from UCDP-GED Conflict Data					
Segmentary Lineage	0.922***	0.687**	1.778***	1.451***	0.484***	0.367**
	(0.256)	(0.262)	(0.475)	(0.497)	(0.149)	(0.150)
Observations	141	141	141	141	141	141
Mean of Dependent Var.	1.96	1.96	3.30	3.30	1.20	1.20
R-squared	0.741	0.769	0.720	0.743	0.745	0.769
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Geographic Controls	Yes	Yes	Yes	Yes	Yes	Yes
Historical Controls	Yes	Yes	Yes	Yes	Yes	Yes
Contemporary Controls	No	Yes	No	Yes	No	Yes

Notes: This table tests the sensitivity of our results to alternative calculations of the dependent variables. In Panel A, outcome varaibles are constructed using the ACLED data but all "non-violent" forms of conflict are excluded from the calculation. Excluded conflict types, based on ACLED's classification, include (i) Headquarters or base established, (ii) Non-violent activity by a conflict actor, and (iii) Non-violent transfer of territory. In Panel B, dependent variables are constructed using all conflict data from the UCDP-GED conflict data set. All dependent variables are constructed from all conflict incidents in their respective data sets (i.e. without restricting to civil conflicts, non-civil conflicts, within group conflicts). All regressions include a set of country fixed effects , 'geographic controls' (including the log of the land area occupied by the ethnic group, the log of the minimum distance between the ethnic group centroid and a national border, mean altitude, absolute latitude, longitude, an agricultural suitability index, and an indicator that equals one if an ethnic group is split by a national border), and 'historical controls' (historical political centralization -- jurisdictional hierarchy beyond the local community -- and historical settlement pattern complexity). Columns 2, 4 and 6 add to these a set of contemporary controls, log of light density per capita in 2000, log of population density in 2000, and an indicator variable that equals one if Islam is the majority religion. *, **, and *** indicate significance at the 10%, 5%, and 1% levels.

Table A6: Segmentary lineage societies and conflict: Robustness of OLS estimates to restricted samples.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	All Conflict			Civil Conflict			Non-Civil Conflict			Within-Group Conflict		
Dependent Variable, as ln(1+x):	Incidents	Deaths	Months	Incidents	Deaths	Months	Incidents	Deaths	Months	Incidents	Deaths	Months
Panel A: Excluding Observations with Cook's Distance > 4/n (n=141)												
Segmentary Lineage	0.971***	1.051***	0.707***	0.474*	0.409	0.335*	0.871***	1.397***	0.536***	0.628***	1.002***	0.577***
	(0.229)	(0.366)	(0.175)	(0.247)	(0.374)	(0.187)	(0.170)	(0.297)	(0.177)	(0.155)	(0.287)	(0.151)
Observations	125	124	124	129	126	125	128	129	126	127	131	128
R-squared	0.771	0.806	0.789	0.768	0.808	0.816	0.810	0.786	0.795	0.755	0.742	0.766
Panel B: Excluding Top 5% of Each Dependent Variable Variable												
Segmentary Lineage	1.080***	1.382***	0.777***	0.566**	0.910**	0.419*	0.992***	1.474***	0.798***	0.683***	0.982***	0.602***
	(0.241)	(0.424)	(0.205)	(0.259)	(0.442)	(0.225)	(0.214)	(0.329)	(0.185)	(0.185)	(0.334)	(0.165)
Observations	133	133	133	133	133	133	133	133	133	133	133	133
R-squared	0.676	0.670	0.684	0.654	0.599	0.603	0.696	0.701	0.657	0.634	0.659	0.653
Panel C: Excluding Conflict Events with Low Geographic Precision												
Segmentary Lineage	1.036***	1.360***	0.811***	0.668**	0.939**	0.512**	0.986***	1.595***	0.790***	0.782***	1.339***	0.646***
	(0.250)	(0.434)	(0.202)	(0.261)	(0.452)	(0.218)	(0.225)	(0.375)	(0.193)	(0.202)	(0.374)	(0.170)
Observations	141	141	141	141	141	141	141	141	141	141	141	141
R-squared	0.706	0.694	0.716	0.656	0.656	0.647	0.689	0.669	0.699	0.680	0.658	0.693
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Geographic controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Historical controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: The unit of observation is the ethnic group and the right hand side variable of interest is an indicator variable that equals one if an ethnic group is a segmentary lineage society. Along with the segmentary lineage variable, all columns we include a set of country fixed effects and language group fixed effects, 'geographic controls' (including the log of the land area occupied by the ethnic group, the log of the minimum distance between the ethnic group centroid and a national border, mean altitude, absolute latitude, longitude, an agricultural suitability index, and an indicator that equals one if an ethnic group is split by a national border), and 'historical controls' (including historical political centralization (jurisdictional hierarchy beyond the local community), historical settlement pattern complexity, and an indicator variable that equals one if the ethnic group is "split" by a national border). The dependent variable is listed at the top of the column. In Panel A, we exclude ethnic groups (observations) with a Cook's Distance value greater than 4/n (where n=141 is the sample size) in the baseline regression. In Panel B, in each column we exclude ethnic groups in the top 5% in the corresponding dependent variable. In Panel C, we calculate each outcome variable excluding conflict events coded in the ACLED data as having low geographic precision (geographic precision score of 3). *, **, and *** indicate significance at the 10%, 5%, and 1% levels.

Table A7: Segmentary lineage societies and conflict: Robustness of OLS estimates to controlling for pre-colonial conflict.

	(1)	(2)	(3)	(4)	(5)	(6)
	ln (1+Incidents)	ln (1+Deaths)	ln (1+Months)	ln (1+Incidents)	ln (1+Deaths)	ln (1+Months)
	Panel A: All Conflicts & Civil Conflicts					
	All conflicts			Civil conflicts		
Segmentary Lineage	0.980***	1.199**	0.727***	0.570**	0.949*	0.470**
	(0.268)	(0.458)	(0.215)	(0.273)	(0.479)	(0.233)
Pre-colonial Conflict	0.330	-0.171	0.440	0.273	-0.067	0.270
	(0.438)	(0.841)	(0.327)	(0.480)	(0.849)	(0.391)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Geographic Controls	Yes	Yes	Yes	Yes	Yes	Yes
Historical Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	141	141	141	141	141	141
R-squared	0.787	0.769	0.805	0.768	0.732	0.741
	Panel B: Non-Civil Conflicts & Within-Group Conflicts					
	Non-Civil Conflicts			Within-Group Conflicts		
Segmentary Lineage	0.950***	1.710***	0.722***	0.790***	1.381***	0.623***
	(0.246)	(0.394)	(0.206)	(0.221)	(0.411)	(0.190)
Pre-colonial Conflict	0.217	-0.607	0.424	0.001	-0.372	0.215
	(0.349)	(0.577)	(0.304)	(0.316)	(0.540)	(0.284)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Geographic Controls	Yes	Yes	Yes	Yes	Yes	Yes
Historical Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	141	141	141	141	141	141
R-squared	0.802	0.747	0.794	0.747	0.707	0.749

Notes: The unit of observation is the ethnic group and the right hand side variable of interest is an indicator variable that equals one if an ethnic group is a segmentary lineage society. Along with the segmentary lineage variable, all columns we include a set of country fixed effects fixed effects, 'geographic controls' (including the log of the land area occupied by the ethnic group, the log of the minimum distance between the ethnic group centroid and a national border, mean altitude, absolute latitude, longitude, an agricultural suitability index, and an indicator that equals one if an ethnic group is split by a national border), and 'historical controls' (including historical political centralization (jurisdictional hierarchy beyond the local community) and historical settlement pattern complexity). We also control for pre-colonial conflict using data from Besley and Reynal-Querol (2014). In columns 1-3 of Panel A, the dependent variables are constructed using all conflicts in the ACLED data; in columns 4-6 of Panel A, they are constructed using civil conflicts; in columns 1-3 of Panel B, they are constructed using non-civil conflicts; and in columns 4-6 of Panel B they are constructed using within group conflicts. Robust standard errors are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels.

Table A8: Segmentary lineage societies and conflict: OLS estimates conditioning on light density, population density, and Islam.

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent Variables, parameterized as ln(1+X):	Number of incidents	Number of deaths	Months of conflict	Number of incidents	Number of deaths	Months of conflict
	Panel A: All Conflicts & Civil Conflicts					
	All conflicts			Civil conflicts		
Segmentary Lineage	0.687***	0.885**	0.510***	0.270	0.387	0.200
	(0.235)	(0.408)	(0.181)	(0.252)	(0.424)	(0.202)
Jurisdictional Hierarchy	-0.138	-0.415**	-0.0765	-0.236*	-0.481**	-0.186*
	(0.133)	(0.197)	(0.101)	(0.139)	(0.199)	(0.102)
Contemporary Controls:						
ln Light Density pc	0.198	0.118	0.198*	0.330**	0.424*	0.331***
	(0.141)	(0.253)	(0.107)	(0.142)	(0.254)	(0.119)
ln Population Density	0.599***	0.888***	0.485***	0.488***	0.812***	0.427***
	(0.132)	(0.221)	(0.0989)	(0.132)	(0.227)	(0.104)
Islam Indicator	-0.338	-0.404	-0.260	-0.101	-0.0307	-0.108
	(0.275)	(0.435)	(0.226)	(0.277)	(0.466)	(0.237)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Geographic Controls	Yes	Yes	Yes	Yes	Yes	Yes
Historical Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	141	141	141	141	141	141
R-squared	0.787	0.769	0.805	0.768	0.732	0.741
	Panel B: Non-Civil Conflicts & Within-Group Conflicts					
	Non-Civil Conflicts			Within-Group Conflicts		
Segmentary Lineage	0.674***	1.221***	0.538***	0.574***	1.014***	0.481***
	(0.203)	(0.348)	(0.176)	(0.190)	(0.355)	(0.168)
Jurisdictional Hierarchy	0.0617	-0.0402	0.0433	-0.0596	-0.159	-0.0545
	(0.121)	(0.190)	(0.105)	(0.121)	(0.232)	(0.104)
Contemporary Controls:						
ln Light Density pc	0.147	0.00892	0.146	0.232*	0.230	0.205*
	(0.142)	(0.254)	(0.113)	(0.138)	(0.237)	(0.111)
ln Population Density	0.554***	0.777***	0.453***	0.313***	0.504**	0.255***
	(0.121)	(0.203)	(0.0973)	(0.108)	(0.199)	(0.0900)
Islam Indicator	-0.296	-0.610	-0.322	-0.522**	-1.003**	-0.389*
	(0.265)	(0.425)	(0.221)	(0.243)	(0.433)	(0.214)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Geographic Controls	Yes	Yes	Yes	Yes	Yes	Yes
Historical Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	141	141	141	141	141	141
R-squared	0.802	0.747	0.794	0.747	0.707	0.749

Notes: The unit of observation is the ethnic group and the right hand side variable of interest is an indicator variable that equals one if an ethnic group is a segmentary lineage society. All regressions include country fixed effects, 'geographic controls' (log of the land area occupied by the ethnic group, the log of the minimum distance between the ethnic group centroid and a national border, an indicator variable that equals one if the ethnic group is split by a national border, mean altitude, absolute latitude, longitude, and an agricultural suitability index), 'historical controls' (historical political centralization -- jurisdictional hierarchy beyond the local community -- and historical settlement pattern complexity) and the following 'contemporary controls': log of light density per capita in 2000, the log of population density in 2000, and an indicator that equals one if Islam is the majority religion. In columns 1-3 of Panel A, the dependent variables are constructed using all conflicts in the ACLED data; in columns 4-6 of Panel A, they are constructed using civil conflicts; in columns 1-3 of Panel B, they are constructed using non-civil conflicts; and in columns 4-6 of Panel B they are constructed using within-group conflicts. Robust standard errors are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels.

Table A9: Summary statistics, grid-cell level.

	(1)	(2)	(3)	(4)	(5)
	Obs.	Mean.	St. Dev	Min	Max
	Grid-Cell Level Variables (Base Sample, <60 km from Border)				
ln (1+Deadly Conflict Incidents):					
All Conflicts	10739	0.088	0.382	0	5.220
Civil Conflicts	10739	0.059	0.319	0	5.024
Non-Civil Conflicts	10739	0.040	0.231	0	4.585
Within-Group Conflicts	10739	0.020	0.157	0	3.296
ln (1+Conflict Deaths):					
All Conflicts	10739	0.158	0.709	0	8.619
Civil Conflicts	10739	0.103	0.588	0	8.619
Non-Civil Conflicts	10739	0.077	0.460	0	7.910
Within-Group Conflicts	10739	0.042	0.345	0	6.753
ln (1+Months of Deadly Conflict):					
All Conflicts	10739	0.077	0.325	0	4.554
Civil Conflicts	10739	0.051	0.268	0	4.060
Non-Civil Conflicts	10739	0.037	0.208	0	4.111
Within-Group Conflicts	10739	0.019	0.142	0	2.944
Geographic Variables:					
ln Elevation	10739	6.445	0.991	0	8.375
Agricultural Suitability Index	10739	4.033	1.876	0	9
Split Grid Cell	10739	0.050	0.217	0	1
Slope	10739	3.351	4.600	0	47.684
Mean Temperature	10739	24.135	2.748	14.200	30.100
Water Indicator	10739	0.037	0.189	0	1
Land Cultivated	10739	19.189	18.022	0	84.315
Petroleum Indicator	10739	0.030	0.170	0	1
Diamond Indicator	10739	0.190	0.392	0	1
Historical Variables:					
Mission Stations	10739	0.022	0.157	0	3
Railway Indicator	10739	0.015	0.121	0	1
Explorer Route Indicator	10739	0.047	0.211	0	1
Fraction SL, Self Reported	275	0.285	0.381	0	1

Notes: Columns 1-5 report summary statistics for the variables listed on the left side of the table. All variables listed are calculated at the level of the 10km-by-10km grid-cell, and the summary statisics are reported for the sample used in the baseline regression discontinuity analysis, consisting of all grid-cells within 60km of a border.

Table A10: Baseline RD Estimates Excluding Conflict Events with Low Geographic Precision

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Sample: Observations <60 km from Ethnic Group Boundary								
	Linear Running Variable in Euclidean Distance to the Border								
Dependent Variable:	ln(1+Deadly Conflict Incidents)			ln(1+Conflict Deaths)			ln(1+Months of Deadly Conflict)		
					Panel A: All Conflicts				
Segmentary Lineage	0.0421***	0.0385**	0.0389***	0.0875***	0.0804***	0.0817***	0.0327***	0.0295**	0.0298**
	(0.0146)	(0.0148)	(0.0145)	(0.0280)	(0.0280)	(0.0275)	(0.0119)	(0.0121)	(0.0120)
R-squared	0.088	0.091	0.092	0.084	0.088	0.089	0.090	0.093	0.094
					Panel B: Civil Conflicts				
Segmentary Lineage	0.0314***	0.0283**	0.0283**	0.0589**	0.0527**	0.0529**	0.0244***	0.0214**	0.0213**
	(0.0117)	(0.0119)	(0.0118)	(0.0234)	(0.0234)	(0.0230)	(0.00919)	(0.00934)	(0.00930)
R-squared	0.092	0.096	0.096	0.089	0.094	0.094	0.092	0.097	0.098
					Panel C: Non-Civil Conflicts				
Segmentary Lineage	0.0228***	0.0215**	0.0219***	0.0591***	0.0565***	0.0575***	0.0203**	0.0193**	0.0197**
	(0.00852)	(0.00844)	(0.00829)	(0.0172)	(0.0165)	(0.0163)	(0.00802)	(0.00794)	(0.00779)
R-squared	0.049	0.051	0.052	0.046	0.049	0.050	0.051	0.053	0.054
					Panel D: Within-Group Conflicts				
Segmentary Lineage	0.0128**	0.0125**	0.0126**	0.0300**	0.0285**	0.0287**	0.00999*	0.00984*	0.00985*
	(0.00567)	(0.00572)	(0.00566)	(0.0128)	(0.0125)	(0.0123)	(0.00513)	(0.00517)	(0.00510)
R-squared	0.034	0.036	0.036	0.034	0.036	0.036	0.037	0.038	0.038
Ethnic Groups	80	80	80	80	80	80	80	80	80
Observations	10,739	10,739	10,739	10,739	10,739	10,739	10,739	10,739	10,739
Ethnic Group Pair FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Geographic Controls	No	No	Yes	No	No	Yes	No	No	Yes

Notes: In columns 1-3, the dependent variable is the number of conflicts that resulted in at least one death; in columns 4-6, the dependent variable is the number of conflict deaths; and in columns 7-9, the dependent variable is the number of months during the sample period with at least one conflict, all parameterized as ln(1+x). All dependent variables are constructed excluding conflicts with low geographic precision based on the precision coding in the ACLED data. The unit of observation is a 10km grid cell. All regressions include a linear polynomial in latitude and longitude, interacted with ethnic group cluster indicator variable, and ethnic group pair fixed effects (68 pairs total). In Panel A, the dependent variables are constructed using all conflict types in the ACLED data; in Panel B, they are constructed using civil conflicts; in Panel C, they are constructed using non-civil conflicts; and in Panel D, they are constructed using within-group conflicts. All dependent variables are parameterized as ln(1+x). Geographic controls include elevation, agricultural suitability, and an indicator variable that equals one if a grid cell intersects with a national border. Robust standard errors clustered at the ethnicity level are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels.

Table A11: Factor loadings of principal components used in placebo RD estimates (Table 8)

Principal Components Reported		
	Panel C	Panel D
Levels of Jurisdictional Hierarchy:		
0	0.0406	0.0235
1	-0.6203	-0.2411
2	0.4705	0.1979
3	0.2351	0.0649
Settlement Complexity:		
Nomadic or fully migratory	-0.334	-0.4275
Seminomadic	-0.2621	-0.2222
Semisendentary	0.0197	0.0015
Compact but impermanent settlements	0.2207	0.0364
Neighborhoods of dispersed family homesteads	0.2767	0.0848
Separated hamlets, forming a single community	-0.1095	0.1769
Compact and relatively permanent settlements	0.1334	0.0978
Complex settlements	-0.0346	0.0651
Dependence on Agriculture	-	0.5104
Dependence on Husbandry	-	-0.4875
Major City in 1800	-	0.0433
ln Slave exports (/land area)	-	0.2193
ln Pop. Density 1960	-	0.2071
Split by National Border	-	-0.1455
Proportion of Variation Explained:	**16.40%**	**18.90%**

Notes: Columns 1 and 2 report the factor loadings for the principal component used to construct the treatment variable in Panels C and D of Table 8 respectively. Variables used to construct the principal component are listed on the left side of the table. The first twelve variables are indicators that equal one if an ethnic group has the listed number of levels of jurisdictional hierarchy or historical settlement complexity. The proportion of variation explained by the first principal component used for the analysis is listed at the bottom of each column.

Table A12: Robustness of estimates of the differential effect of adverse rainfall shocks on conflict.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
	ln (1+Deadly Conflict Incidents)								ln (1+Conflict Deaths)							
	All		Civil		Non-Civil		Within-Group		All		Civil		Non-Civil		Within-Group	
	Panel A: Ethnicity FE & Linear Trends															
Negative Rainfall Shock (1000 mm/day)	0.633*	-0.188	0.765**	0.221	0.0283	-0.275	0.0460	-0.175	1.015	-0.767	1.288**	0.168	0.159	-0.753	0.224	-0.524
	(0.372)	(0.337)	(0.296)	(0.252)	(0.307)	(0.312)	(0.132)	(0.158)	(0.766)	(0.658)	(0.614)	(0.540)	(0.672)	(0.692)	(0.344)	(0.366)
Negative Rainfall Shock x SL		1.843**		1.220*		0.681		0.497*		4.002**		2.514**		2.048		1.680**
		(0.755)		(0.620)		(0.635)		(0.265)		(1.546)		(1.270)		(1.379)		(0.688)
Ethnic Group FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Ethnicity-Specific Linear Time Trends	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
6 Lags of Dependent Variable	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Observations	29,580	29,580	29,580	29,580	29,580	29,580	29,580	29,580	29,580	29,580	29,580	29,580	29,580	29,580	29,580	29,580
R-squared	0.319	0.319	0.281	0.281	0.264	0.264	0.202	0.202	0.270	0.270	0.254	0.254	0.206	0.206	0.146	0.146
	Panel B: Ethnicity FE & Time FE															
Negative Rainfall Shock (1000 mm/day)	0.433	-0.308	0.700**	0.223	-0.251	-0.491	-0.0903	-0.296	0.0770	-1.193	0.805	0.0286	-0.797	-1.282	-0.145	-0.786*
	(0.410)	(0.398)	(0.321)	(0.309)	(0.335)	(0.358)	(0.140)	(0.181)	(0.796)	(0.792)	(0.631)	(0.663)	(0.678)	(0.782)	(0.352)	(0.420)
Negative Rainfall Shock x SL		1.731**		1.114*		0.560		0.480*		2.966*		1.814		1.134		1.498**
		(0.772)		(0.622)		(0.647)		(0.267)		(1.592)		(1.288)		(1.402)		(0.702)
Ethnic Group FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ethnicity-Specific Linear Time Trends	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
6 Lags of Dependent Variable	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Observations	29,580	29,580	29,580	29,580	29,580	29,580	29,580	29,580	29,580	29,580	29,580	29,580	29,580	29,580	29,580	29,580
R-squared	0.229	0.229	0.197	0.197	0.184	0.184	0.120	0.121	0.200	0.200	0.178	0.178	0.151	0.151	0.096	0.096
	Panel C: Ethnicity FE, Time FE & Linear Trends															
Negative Rainfall Shock (1000 mm/day)	0.660*	-0.0431	0.831***	0.335	-0.0271	-0.229	0.00356	-0.154	0.531	-0.914	1.092*	0.143	-0.388	-0.991	0.0178	-0.571
	(0.386)	(0.367)	(0.305)	(0.282)	(0.313)	(0.336)	(0.130)	(0.169)	(0.740)	(0.725)	(0.592)	(0.595)	(0.624)	(0.727)	(0.332)	(0.398)
Negative Rainfall Shock x SL		1.640**		1.157*		0.471		0.368		3.371**		2.215*		1.408		1.375**
		(0.744)		(0.609)		(0.632)		(0.262)		(1.534)		(1.244)		(1.375)		(0.686)
Ethnic Group FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ethnicity-Specific Linear Time Trends	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
6 Lags of Dependent Variable	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Observations	29,580	29,580	29,580	29,580	29,580	29,580	29,580	29,580	29,580	29,580	29,580	29,580	29,580	29,580	29,580	29,580
R-squared	0.334	0.335	0.291	0.291	0.278	0.278	0.216	0.216	0.285	0.285	0.264	0.264	0.219	0.219	0.157	0.157
	Panel D: Ethnicity FE, Time FE, Linear Trends & 6 Lags of the Dependent Variable															
Negative Rainfall Shock (1000 mm/day)	0.768**	-0.144	0.747***	0.165	0.184	-0.199	0.113	-0.102	1.008	-0.957	1.084**	-0.0619	0.130	-0.866	0.209	-0.496
	(0.372)	(0.349)	(0.262)	(0.255)	(0.313)	(0.303)	(0.140)	(0.161)	(0.741)	(0.697)	(0.535)	(0.553)	(0.660)	(0.675)	(0.353)	(0.384)
Negative Rainfall Shock x SL		2.129***		1.360**		0.896		0.502*		4.590***		2.675**		2.327		1.646**
		(0.735)		(0.602)		(0.620)		(0.280)		(1.593)		(1.316)		(1.462)		(0.733)
Ethnic Group FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ethnicity-Specific Linear Time Trends	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
6 Lags of Dependent Variable	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	29,538	29,538	29,538	29,538	29,538	29,538	29,538	29,538	29,538	29,538	29,538	29,538	29,538	29,538	29,538	29,538
R-squared	0.452	0.452	0.440	0.440	0.388	0.388	0.254	0.254	0.379	0.379	0.380	0.380	0.295	0.295	0.181	0.182

Notes: All columns present results from a 216 month panel (1997-2014) of all ethnic groups in the sample. The ethnic group level negative rainfall shock variable is included in every column -- this is cacluated as realized monthly rainfall subtracted from the ethnic group average over the sample period. In even numbered colums, an interaction between negative rainfall and the segmentary lineage indicator is also included. In columns 1-8, the dependent variable is deadly conflict incidents and in columns 9-16, it is conflict deaths, both parameterized as ln(1+x). In columns 1-2 & 9-10, the dependent variable is constructed using all conflicts; in columns 3-4 & 11-12, it is constructed using civil conflicts; in columns 5-6 & 13-14 it is constructed using non-civil conflicts; and in columns 7-8 & 15-16, it is constructed using within-group conflicts. Each panel has a different set of controls included on the right hand side. All regressions include ethnic group fixed effects. Panel A also includes linear group-specific time trends. Panel B includes time fixed effects. Panel C includes both the linear trends and time fixed effects. Panel D includes time fixed effects, linear time trends, and 6 lags of the dependent variable. Standard errors clustered at the ethnic group level are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels.

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