Social Structure and Conflict: Evidence from Sub-Saharan Africa

Jacob Moscona[*†]
M.I.T.

Nathan Nunn[*‡]
Harvard University, NBER and BREAD

James A. Robinson[*§]
University of Chicago, NBER, and BREAD

28 April 2017

Abstract: We test the long-standing hypothesis that ethnic groups that are organized around 'segmentary lineages' are more prone to violence and conflict. 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 a relationship between segmentary lineage organization and conflict today by collecting information on the traditional social structures of 145 African ethnic groups. Using a number of estimation strategies, including an RD design at ethnic boundaries, we find strong evidence that segmentary lineage societies experience significantly more conflict today. While we observe escalation and intensification for all types of conflicts in segmentary lineage societies – consistent with the mechanism suggested by qualitative work – the effects appear most pronounced for more localized conflicts that are not against the national government. Our findings not only help to explain observed patterns of conflict today, but also highlight the importance of the diverse forms of social organization that are present in developing countries.

Key words: Civil War, Conflict, Social Structure, Segmentary Lineage
JEL classification: D74, O55, Z1.

[*]For helpful feedback and comments, the authors thank Jean Ensminger, Francisco Gallego, Joseph Henrich, and Sara Lowes, as well as seminar participants at UC Berkeley, Brown, Chicago Harris, UC Irvine, Princeton, Stanford, and various conferences. We thank Ariel Gomez of excellent research assistance.

[†]Department of Economics, M.I.T., 50 Memorial Drive, Cambridge, MA 02142, U.S.A. (e-mail: moscona@mit.edu; website: http://economics.mit.edu/graduate/directory).

[‡]Department of Economics, Harvard University, 1805 Cambridge Street, Cambridge, MA 02138, U.S.A. (e-mail: nnunn@fas.harvard.edu; website: http://www.economics.harvard.edu/faculty/nunn).

[§]Harris School of Public Policy, University of Chicago, 1155 E. 60th Street, Chicago, IL 60637, U.S.A. (e-mail: jamesrobinson@uchicago.edu; website: http://harris.uchicago.edu/directory/james-robinson).

1. Introduction

Civil wars are a prevalent 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 (UCDP/PRIO Armed Conflict Dataset). Some of these wars have been very protracted. An example is the conflict between the Lord's Resistance Army and the Ugandan state can be traced back to 1987 (Allen and Vlassenroot, 2010). The civil war in Mindanao, the southern island of the Philippines has been on going since the late 1960s. These wars also caused a great deal of damage and loss of human life. In 2013 alone, for example, an estimated 70,451 people died fighting in civil wars (UCDP Battle-Related Deaths Dataset) and 10.7 million civilians were newly displaced (UNHCR Statistical Yearbook 2013). At the end of 2013, it is estimated that there were over 33 million people displaced by conflict in total.

In this paper, we propose a new explanation that can help to account for the incidence and longevity of civil war. Civil wars are created and sustained not simply by the costs and benefits of fighting, but also by an ability to solve the collective action problem. Though often this can be short circuited by forced recruitment, for example of children, and some surveys suggest that such forced recruitment is quantitatively very large (Humphries and Weinstein, 2008), many people clearly enter into conflict voluntarily. The importance of these issues is dramatically illustrated by the recent success of Islamic State in mobilizing large numbers of fighters in Syria and Iraq to carve out an extensive territory. Though their ability to do this is obviously related to many things, their su success at mobilization is remarkable. A similar situation arose with the Houthi conquest of much of Yemen in 2015.

A critical aspect of the ability of a group to solve the collective action problem and mobilize fighters towards a goal is the nature of the social structure of the people under consideration. Though people in the West might be considered to be living in "nuclear families," in most parts of the world where we observe civil war, people live in much more complex social structures, connected by kinship and other ties. Perhaps the most famous ethnographic example of a society based on such a kinship structure is the Nuer, studied by Evans-Pritchard (1940a) in the 1930s. The Nuer, living in what is now the South Sudan, became the archetype of what anthropologists call a "segmentary lineage society."

The basis of such a society is unilineal descent where people trace their ancestry back either

through the male (a patrilineal society), or female line (matrilineal). A lineage is a group of persons within such a society that are differentiated geneologically from others and typically living in close proximity to each other. Individuals in a lineage trace their ancestry back to a common, often mythical, founder, such as Somali in Somalia. A segmentary lineage society is then defined as a lineage society in which sub-sets or segments of a full lineage function as coherent autonomous corporate groups (Smith, 2009, pp. 39–40).

The important distinctive aspect of segmentary lineage societies is that they fuse a number of distinct activities and functions into the segment which takes on political, judicial and administrative functions. As Fortes (1953, p. 26) puts it: "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 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 indicator by "I". Also, shown in the figure are segments of the full lineage. The segments can be of different size. In the figure, the smallest segment shown is the "Minimal Segment". The next larger is the "Minor Segment" and the largest is the "Major Segment".

Although it is true that the presence of ancestry and decent is universal among human societies, not all group 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 or 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 of kinship systems also varies widely. Unlike in a segmentary lineage society, where lineage and kinship are of the utmost importance, in many societies, local residence alone functions as a 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 people and the primary 'corporate form', meaning that they are central in administrative and political life

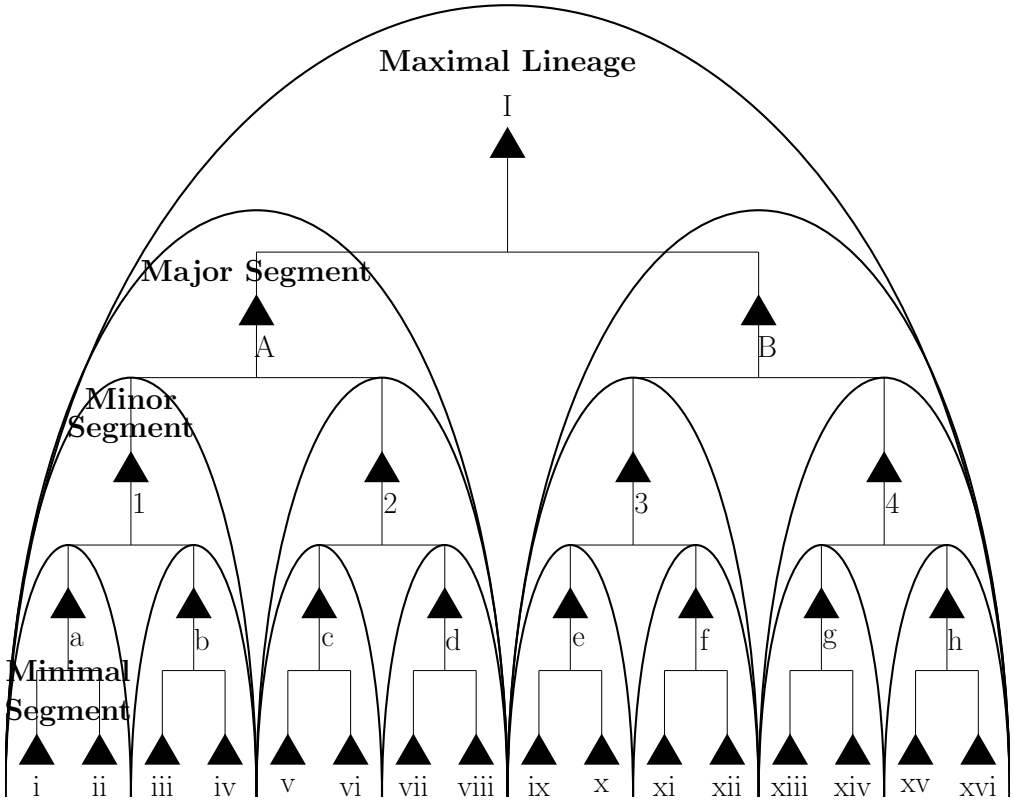


Figure 1: The figure provides a representation of a hypothetical segmentary lineage society.

A number of scholars in the anthropology literature have hypothesized that there is a relationship between the social structure of groups and the extent of civil conflict. More specifically, it has been argued that segmentary lineage societies are more prone to become engaged in conflicts that are longer and larger in scale than societies that do not have a segmentary lineage structure. This is not because segmentary lineage societies harbor particular grievances or structures of costs and benefits of fighting, but simply because the social structure is well-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 lineage, as well as the segments within a lineage, take a corporate form and are central in administrative and political life. Thus, lineages and segments and one's responsibility to them is 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 defence of individual "i". Similarly, all individuals in "Major Segment B" would be allied with and come to the defence of individual "ix". Thus, a dispute between two individuals immediately escalates into a dispute between to large communities. Outside

of segmentary lineage systems, these allegiances do not exist and the dispute instead would comprise, at most, a small number of friends or family of the two involved in the dispute.

This logic is 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). Thus, the number of individuals involved in a conflict depends on the geneological 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 dispute can easily escalate into larger-scale and sustained fighting and even warfare. In the modern context, and particularly in Africa, conflict can take the form of civil conflict, where the external enemy is the government. However, even in the context of civil war, the same characteristics of segmentary lineage societies are still at play. 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 long-recognized by anthropologists. For example, (Sahlins, 1961, p. 323, 333) writes "the 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'. Evans-Pritchard (p. 142 1940a) 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 goal of this paper is to take this long-standing hypotheses to the data by constructing, for the first time, a database of whether or not societies within Africa belong to a segmentary lineage society. Although segmentary lineage societies are present all over the world, we restrict our analysis to the continent of Africa since this is the only part of the world for which fine-grained conflict data are available with full coverage over an extended period of time. We use conflict data from the Armed Conflict Location and Event Data Project (ACLED), a geo-coded data set that catalogues information about each conflict event in Africa since 1997. The database includes information on the location, date, and characteristics of what they term "politically violent events". These include conflict that we would consider part of a civil conflict, namely between the government military and other non-government groups. These account for 39.4%

of the 117,823 events in their database. The other 60.6% of the conflict events do not involve the government military and instead involve rebels, militias, rioters, protesters, civilians, and others that do not fall within these classifications.

We also collect information on the social organization of ethnic groups within Africa; particularly, whether they are traditionally organized into a segmentary lineage system. Since this information is not available in standard ethnographic sources such as the *Ethnographic Atlas* or the *Standard Cross-Cultural Sample*, this was done using existing ethnographies to code whether or not societies are organized by segmentary lineages. The primary source used for the data construction was the *Ethnographic Survey of Africa*, which is a series of studies, produced from the 1940s until the 1970s, that were edited by Daryll Forde. We identified an ethnic group as having a segmentary lineage organization: if (1) there is a recognized and known unilineal descent system; (2) the branching of the lineage determines both administrative divisions and political allegiances; and (3) lineages influenced residence location. We code an ethnicity as not having a segmentary lineage organization if any of these three characteristics are not present.[1] 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.[2]

We merge our coding of societies with and without segmentary lineage organization with information on the location and intensity of conflicts from 1997–2015 using a digitized map of the location of ethnic groups taken from (Murdock, 1959). We then measure the prevalence of conflict, using the ACLED data, in the locations of each ethnic group. This strategy follows the same logic as Michalopoulos and Papaioannou (2013) and Michalopoulos and Papaioannou (2014), who examine the cross-ethnicity relationship between historical state centralization and economic prosperity, and current institutional quality and economic prosperity, respectively.

In addition to being the only feasible strategy given data limitations, we feel that using location to link segmentary lineage is the best one. Disputes and conflicts that do not involve the government military will tend to be localized and very near to the locations of the participants. Thus, the location of the conflict viz a vis the social structure of the dominant ethnic group is the relationship of interest. For conflicts that involve the government military – i.e., conflicts that

[1] Section 3 of the paper describe our coding method in detail and in the Appendix we document the sources that are used.

[2] Based on NASA *EarthData* estimates of population in 2000, our sample comprises 212 million people, or $\sim$ 37.8% of Africa's population at the time.

we typically refer to as civil conflicts – the conflicts tend to occur within the ethnic homelands of the combatants.[3] Therefore, for these forms of conflicts as well, the presence of a segmentary lineage organization of the ethnic groups in the location of the conflict is the relevant relationship of interest.[4]

Our analysis consists of two strategies. Our first is to estimate the cross-ethnicity relationship between the traditional presence of a segmentary lineage system and the presence and intensity of conflict from 1997–2015. Our estimates show a positive and statistically significant relationship between segmentary lineage and a wide range of conflict measures, including conflict fatalities and conflict duration. In addition, the estimated effects are very large in magnitude. For example, when the dependent variable is years of conflict between 1997 and 2015, we find that segmentary lineage societies experienced $\sim$ 125% more months with at least 1 conflict death.

We find that these relationships are robust to controlling for a large number of covariates, 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 center of the ethnic group to 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.

As a first step towards examining channels, we also condition our estimates on a set of covariates that are potentially endogenous to social structure, namely, per capita income as measured by satellite night light density, population density, and an indicator if the ethnic group's primary religion is Islam. We find that adding these contemporary controls does reduce our estimated effect by approximately 30%, suggestion that income and Islam may be part of the channel explaining our findings. Importantly, however, we find that 70% of the total effect remains explained by other channels.[5]

[3]See for example the recent findings of Michalopoulos and Papaioannou (2016).

[4]This said, it is true that it would also be informative to examine the relationship between the social structure of the participants of the conflict and the incidence of conflict. However, this is not feasible for a number of reasons. First, we do not have sufficiently fine-grained information to identify the ethnicity of the participants involved in the conflicts. For example, in many cases we just know that they are "protestors" or "civilians". With this strategy we are not able to assign ethnicity to the conflicts that do not occur, since we have no information on who the participants would have been. When we use location, the location allows us to link the presence of non-conflict to a measure of social structure. This is not possible when we use the ethnicity of actors involved in the conflict.

[5] We recognize that interpreting estimates that condition on endogenous covariates has the usual inference issues and so should be treated with caution. For more details see Angrist and Pischke (2008).

The conditional correlations 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 take 10km-by-10km grid-cells to be the unit of observation, and implement a regression discontinuity identification strategy, where we estimate the effect of segmentary lineage 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 estimates are 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 strategies for accounting for the two-dimensional running variables.

The benefit of the RD estimates over the OLS estimates is that unobservable factors are better accounted for. As long as unobservables vary smoothly over space, because physically close units have a similar geography, climate, and history, they will be controlled for with the RD estimation strategy. However, a shortcoming of the strategy is that other factors may also vary discontinuously at the border. In other words, there may be other differences between the ethnic groups besides the presence of segmentary lineage and the RD estimates may be capturing these differences as well.

To explore the importance of this potential 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, both using the entire sample and focusing on observables close to the border between groups in the RD sample.[6] Second, we conduct a series of placebo tests. We classify ethnic groups as either treatment or control based on a range of alternative ethnicity-level characteristics and generate RD estimates of the treatment effects. In order to make sure that any observed effect is not driven by segmentary lineage organization, we focus for this analysis on borders between groups with the same segmentary lineage classification. Reassuringly, we find no statistically significant effects and

[6] The balance of observables across ethnicities with and without segmentary lineage organization 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).

all point estimates are quantitatively small.

An important aspect of the RD estimates is that it is important that the border is correctly identified and that it does actually delineate differences in the locations of different ethnic groups. We check whether this assumption is satisfied in the data by using information from the third round of the Afrobarometer surveys on the location and ethnicity of over 5,500 respondents. Estimating our RD equations, but with self-reported ethnicity as the outcome variable, we find a sharp discontinuity at ethnicity borders, which provides confidence that our regression discontinuity results really do capture the differences in social structures corresponding to the different ethnicities on either side of the border.

The primary mechanism explaining our estimated relationship between segmentary lineage and conflict is the structure of segmentary lineage systems, which because of their strong in-group allegiances and their segmented structure can result in significant escalation of initially small disputes to large scale conflicts. Given this, we attempt to unpack our conflict finding by examining the effects of segmentary lineage on the onset of conflicts versus their effect on the duration of existing conflicts. The mechanisms that have been identified by anthropologists suggest that segmentary lineage likely affects both onset and duration, but the effect may be particularly important for duration. Examining these two effects with hazard models, we find that segmentary lineage both increases the probability of a conflict starting, as well as the duration of conflict given its start. We also find that the effect on duration is stronger statistically and larger in magnitude.

We implement a second method to examine the escalation effect of segmentary lineage, which is to estimate the relationship between segmentary lineage and conflicts of different scales. We measure the scale of a conflict by the number of fatalities in the conflict and create the following four groups: conflicts with no fatalities, conflicts with 1–10 fatalities, conflicts with 11–100 fatalities, and conflicts with more than 100 fatalities. We find that a segmentary lineage organization is associated with conflicts of all types, but the estimated relationship is significantly stronger, both in terms of statistical significance and magnitude, for larger-scale conflicts. In addition, these differences are large. For example, we find that while segmentary lineage societies have 1.79 times more conflicts with zero fatalities, they have 6.25 more conflicts with more than 100

fatalities.[7] These findings are consistent with segmentary lineages having a particularly strong effect on the escalation of conflicts once they start.

Our findings contribute to a better understanding of the incidence, intensity, and longevity of violence in developing countries (see Blattman and Miguel (2010) for an overview). This literature has proposed various types of explanations, many based on the dichotomy between 'greed' and 'grievance' (Collier and Sambanis, 2005a,b). Greed factors influence whether or not individuals or groups decide to engage in civil war. These include things like the presence of natural resources, such as oil and diamonds, or 'lootable wealth' (Weinstein, 2006, Ross, 2004, 2006) and possibly the presence of international aid (De Ree and Nillesen, 2009, Nunn and Qian, 2014, Crost, Felter and Johnston, 2014). On the grievance side, civil war could be induced by inequality in 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), or the lack of political accountability and democracy (Gleditsch and Ruggeri, 2010) or other types of exploitative institutions (Richards, 1996, Wood, 2003). Also important could be factors that influence the opportunity cost of engaging in conflict (Miguel, Satyanath and Saiegh, 2004, Dube and Vargas, 2013) perhaps turning fighting in civil war into a kind of occupational choice (Debos, 2011, 2016, Hoffman, 2011, McGovern, 2011). A final recurrent theme is that civil war occurs as a consequence of state weakness proxied by GDP per-capita (Fearon and Laitin, 2003) or measured more directly by state history (Depetris-Chauvin, 2014).[8]

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 escalation. See for example Evans-Pritchard (1940a,b), Bohannon (1958), Kelly (1985), Lewis (1994, 1989), Salzman (2007), Zeman (2009), Stearns (2013), Ahmed (2013), and Hoehne (2015). While these studies focus on the effects that segmentary lineages can have on within ethnicity conflict, whether it be individuals from the same village against one another or individuals from separate villages against one another, they also recognize that in some cases segmentary lineage can also be effective in mobilizing fighters of one ethnicity against another ethnicity.

[7]This is the incidence rate ratio, calculated by taking the exponential function of coefficients in columns 1 and 4 of panel A in Table 11.

[8]There is a great deal of controversy about the empirical explanatory power of any of these theories, e.g. the debate over the effect of negative economic shocks on civil war outbreak (see Miguel et al., 2004, Ciccone, 2013), or the connection between income per-capita and civil war (Djankov and Reynal-Querol, 2010).

An important point about our analysis is that we are not able to test this consequence of segmentary lineage organization. In particular, our estimates, particularly our RD estimates, examine the effect of segmentary lineage on conflict *within* the ethnicity in question. Thus, any conflicts that occur outside of the group itself, will not be captured in our estimates. Examining such a relationship would require that we know who the parties in each conflict were and to which ethnicity they belonged. This information is not available. Thus, we are able to show that segmentary lineage societies experience more conflict within their own society. We are unable to examine whether segmentary lineage societies are also more involved in conflicts occurring elsewhere outside of their ethnic group.

Our findings also contribute to a deeper understanding of the 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 aspect of pre-colonial societies is clearly an important determinant of subsequent development, our analysis draws from an important anthropology literature that documents how pre-colonial African societies were organized in many different ways that cannot be adequately described by their being more or less centralized. One important form of organization for both more-centralized and less-centralized societies was a segmentary lineage organization. The relationship between political centralization and segmentary lineage organization is a point to which we will return throughout the paper, and will be central to our empirical analysis.

Our findings also contribute to the limited number of pre-existing studies by economists or political scientists that examine the importance of social structure within developing countries. A seminal paper by Gneezy, Leonard and List (2009) shows that whether or not a society is matrilineal or patrilineal influences how competitive women are compared to men. Relatedly, La Ferrara (2007) and Lowes (2016) have examined other aspects of the difference between these two groups. Dunning and Harrison (2010) shows how the social institution of cousinage influenced the appeal of ethnic political appeals in Mali. Greif (1994) examined 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.

Economists following the seminal work of Becker (1981) have developed models of resource allocation where the family is distinct from other people, usually being linked by altruism. Such distinctions between family and non-family have a basis in biology (see Hamilton, 1963, Henrich and Henrich, 2007) and have been applied to study problems of development (e.g. by Banfield, 1958). Kinship as determined by family ties has also been extensively used in the literature on social networks (see Ansell and Padgett, 1993, Naidu, Robinson and Young, 2015) . In the political economy literature, family ties have also been explored as sources of political power and dynastic politics (see Dal Bo, Dal Bo and Snyder, 2009, Querubín, 2016, Cruz, Labonne and Querubin, 2015). Our findings contribute to these literatures by studying the effect that differences in the nature of traditional kinship organization has on contemporary violence and conflict.

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 reports additional estimates that provide insights into mechanisms. Section 7 concludes.

2. Background

A. *Theories on the Causes of Segmentary Organization*

Although the reasons why some societies are organized in segmentary lineages and others are not has never been a focus of systematic empirical research, several theories have been presented to explain the origin of segmentary organization.[9] One school of thought, exemplified by the work

[9]Indeed, since the 1970s such notions as segmentary lineages have been severely criticized by anthropologists, many of whom have come to see kinship as being much more fluid and flexible and not contained so well into different categories (see Kuper, 1982, Schneider, 1984, Carsten, 2003, Sahlins, 2013). In consequence, they have not been interested in proposing theories of the origins of such organization. Another line of thought argues that concepts like segmentary lineages were largely imposed on African societies by colonial anthropologists and administrators and therefore do not represent the reality of African society (see Kuper, 2014). Nevertheless, our reading of the ethnographic evidence is that, even though there are always many idiosyncratic differences between any two societies, it is possible to make such a classification based on clear and observable criteria, and whether or not this is important for different social outcomes is an empirical issue which has never been investigated before econometrically to our knowledge. If, for example, lineage organization in Africa was as irrelevant as Kuper (1982) claims, then one would not expect it to be robustly and significantly correlated with any social variable of interest.

of anthropologist Daryll Forde, suggests that there is an ecological basis for the development of segmentary lineage societies (Forde, 1953, 1970, Verdon, 1982). Forde sees lineage organization as historically dominant and argues that a less "exacting" physical environment would have allowed groups to preserve tribal organization based on lineage structures:

> "[T]he much less exacting physical conditions for both cultivation and cattle-rearing, which permitted greater stability of settlement and did not impose extensive seasonal movements and dispersal in search of dry season pastures and water supplies, made it possible for the segmenting agnatic descent groups to maintain territorial continuity and to combine in securing and defending resources over an expanding field from the land holding minor lineage to the tribe" (Forde, 1970, p. 21).

Forde cites the presence of a perennial river as an ecological characteristic that might preserve a segmentary structure (p. 22). If individuals are able to survive without significant travel outside their tribal sub-group's territory, and without forming associations (economic or otherwise) with individuals outside of their tribal sub-group, then the segmentary lineage system tends to be maintained.

Anthropologist E.E. Evans-Pritchard makes a similar type of argument: that group characteristics which allowed (or forced) tribes to survive with limited interactions outside more immediate geographical or genealogical networks bolstered segmentary organization. In his analysis of the Nuer, Evans-Pritchard writes, "Nuer have, it will be acknowledged, a low technology which, taken with their meagre food-supply and scanty trade, may be supposed to have some effect on their social relations and their character. Social ties are narrowed, as it were, and the people of a village and camp are drawn closer together, in a moral sense, for they are as a consequence highly interdependent" (Evans-Pritchard, 1940a, p. 89). Lack of access to trade or ability to interact with distant groups strengthened genealogical bonds that form the basis of the segmentary structure and inhibited the development of other relationships that might interfere with lineage allegiances.

Similar arguments were made by Fortes (1953), who also notes a relationship with the scale of the community when he observes "unilineal descent groups are not of significance among peoples who live in small groups, depend on rudimentary technology, and have little durable property" (Fortes, 1953, p. 24). Lowie (1921, p. 149) also argues that the roots of unilineal descent groups could be traced in part to the transmission of property rights so that one would not

expect unilineal descent to emerge in societies without property to transfer, such as many hunter-gatherer groups.[10]

Others claim that segmentary organization is not dependent on physical conditions but instead is a diffused ideology that can, however, be made more or less prominent in daily life by changing external conditions (Smith, 2009, Salzman, 1978). Philip Salzman argues that since physical conditions are constantly changing, it cannot be that the divergence of tribal organization was dependent on ecological differences. Instead, for segmentary lineage organization to develop, it has to be part of tribal culture as an "asserted ideology." While particular ecological conditions may strengthen or weaken a segmentary system by making it more or less advantageous as a social ideology during a given time period, the system develops as a part of tribal culture and not in response to particular ecological conditions (Salzman, 1978).

Anthropologist Raymond Kelly (1983) presents additional evidence suggesting that segmentary lineage structures are ideological and do not result purely from being in close proximity (because of ecological conditions, etc.) to the same group of people. Kelly (1983) finds fault with a claim made in Verdon (1982) that "Nuer [a segmentary lineage group] patterns of association are reducible to ecological exigencies" (Kelly, 1983, p. 906). He argues that although Lou Nuer (one of the sub-tribes of the Nuer) "dry season aggregations share pastures with neighboring Dinka groups... this does not engender a pattern of military alliance among the Nuer and Dinka aggregated at the same locations, but instead leads to quite the opposite: armed conflict. This same lack of correspondence between dry season aggregations and patterns of alliance is the norm. For example, portions of the Kwachbur section of the Lak tribe share dry season pastures with the Riah section of the Thiang tribe, yet the Kwachbur identify themselves as part of Lak and form military alliances accordingly" (p. 906). This suggests that segmentary lineage systems are the product of tribal ideology and do not form and incorporate all individuals in close geographic proximity because of unexacting ecological conditions (Forde, 1970) or inability to form social relationships across longer distances (Evans-Pritchard, 1940a).

While more recent work in anthropology thus suggests that segmentary lineage adoption is based on ideological development rather than ecological conditions, we nevertheless include a broad range of geographic control variables in our model. Moreover, we find no correlation between segmentary lineage organization and a broader set of geographic variables, including,

[10]See Richards (1950) for an application of this idea to explain the lack of unilineal descent amongst the Bemba.

for example, mean temperature, mean altitude, ethnic group land area, malaria ecology, absolute latitude, a measure of agricultural suitability, and dependence on agriculture or animal husbandry. These findings are consistent with the notion that the creation and or persistence of segmentary lineage organization may be a quite idiosyncratic matter and possibly related to the type of ideological forces that Salzman (1978) and Kelly (1983) discuss.

B. ***Case Studies: Segmentary Organization and Conflict***

There is a great deal of case study evidence from conflicts in Africa and the Middle East which suggests an intimate link between segmentary lineage organization and the initiation and propagation of conflict. These studies of conflict and its causes span the fields of anthropology, ethnography, and political science and help delineate the mechanisms that link segmentary lineage organization to conflict. A main conclusion from these case studies, which is corroborated by our empirical analysis, is the strong effect that segmentary lineage organization can have on the continuation and exacerbation of conflict. While the link between segmentary structure and conflict initiation is less overt, once a conflict begins, segmentary lineage organization makes it much more difficult to demobilize and resolve. It has this effect primarily by broadening the conflict's reach and institutionalizing opposition among large portions of society.

Apart from the Nuer in the South Sudan, one of the best studied classic segmentary lineage societies is in Somalia. Somali social structure is dominated by segmentary organization. The anthropologist Ioan Lewis argues that the segmentary lineage system plays a major role in shaping and exacerbating conflict in Somalia. In *A Pastoral Democracy*, Lewis (1961) 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" (p. 243). Not only do these animosities, institutionalized by the segmentary lineage structure, lead to the scale-up of conflict, but they are so entrenched that the national government can do almost nothing to halt violence rooted in lineage opposition. Lewis continues, "Inevitable government intervention eventually halts fighting between groups and causes compensation to be paid, but this is little deterrent to continued bloodshed" (p. 244).

In *Blood and Bone*, Lewis (1994) outlines the mechanistic link between segmentary lineage organization and violence during the 1980s, which was ostensibly unrelated to tribal antagonism. After the Ogaadeen war of 1977–1978, there was an "upsurge of tribalism." What seemed like emergent Somali nationalism was in reality the fact that "President Siyad had consolidated the position of his own clan and family" (Lewis, 1994, p. 225). Lewis describes the strategy of the government, which was not to develop a national identity but rather to recruit as many tribal segments as possible within the segmentary system. However, this was met with corresponding allegiances among segments opposed to the government: "The regime's appeal for Daarood solidarity evoked a corresponding attempt by the Isaaq to invoke a wider based, higher level 'Prrir' solidarity to include the important Hawiye clans in whose territory Mogadishu, the capital of the republic, is located" (p. 226). This growing societal polarization along tribal and genealogical lines lay at the foundation of Somalia's "political" conflict. Lewis concludes, "As in the past, political unity was now not absolutely limited to the clan level" and the segmentary structure allowed both the government and opposition forces to mobilize large swaths of the lineage system for their cause (p. 232).

In Somalia, the relationship between lineage organization and violent conflict remains relevant in the present day. A 2015 Rift Valley Institute Report reaffirms its importance in a discussion of an upsurge of conflict during 2006:

> "The Warsangeli/Dubays fighters secured the support of other Warsangeli sub-clans and lineages in eastern Sanaag and around US $20,000 were sent by the diaspora for rations and ammunition. Warsangeli military officers, not all of them members of the Dubays sub-clan, coordinated the fighting, which meant that fighting in the Majayahan area involved and concerned all the Warsangeli. This is very much 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" (p. 127).

The segmentary organization forces an individual to align with large portions of society against external threat, even if the individual or the individual's tribal segment have no personal or pragmatic incentive to participate in conflict (other than a desire to preserve lineage loyalty). This facilitates and drastically simplifies recruitment to conflict.

This cycle in which segmentary organization exacerbates conflict has been described in several other countries and ethnic homelands. South Sudan is home to the Nuer and the Dinka, two ethnic groups that strictly abide by segmentary lineage organization. Evans-Pritchard writes of the Nuer: "Between tribe and tribe, there is no means of bringing together the parties to a dispute and compensation is neither offered or demanded... if a man of one tribe kills a man of another tribe, retribution can only take the form of intertribal warfare" (Evans-Pritchard, 1940b, p. 278). Segmentary organization can thus facilitate the scale-up of existing hostilities and intensify conflict. Evans-Pritchard writes:

> "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. Nuer themselves 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).

He concludes, "Hostility between smaller segments of a tribe may involve the larger segments of which they form part. A quarrel between two villages may thus, as we have noted, bring about a fight between secondary, and even primary, tribal sections" (p. 160).

Segmentary lineage structure can thus result in the escalation of conflict that begins as a feud among small portions of the society. This scale-up logic applies even to conflicts that begin as feuds among individual Nuer, especially following homicide. Although "responsibility for homicide and the duty of exacting vengeance directly fall only on the close agnatic kin of slayer and slain, the communities to which the two parties belong are, in one way or another, involved in the hostility that ensues and, often enough, in any fighting that may result from the dispute" (Evans-Pritchard, 1940a, p. 150). The Dinka similarly exhibit patterns of allegiance which, as in the Nuer case, can exacerbate conflict. Lienhardt describes the process by which large segments of Dinka society are compelled to unite in conflict with outsiders or Dinka with more distant genealogical ties. Lienhardt asserts, "It is only when Dinka from different parts of the country meet together among foreigners that their common culture and language may draw them together, simply as Dinka, in opposition to foreigners whom they understand less well than

each other" (Lienhardt, 1958, p. 107). As in Somalia, segmentary lineage structures in Sudan exacerbate violent conflict, both within and among ethnic groups.

Conflict among the Tiv of Nigeria – a segmentary lineage society – exhibits a similar pattern. Bohannan asserts that the "spread of war is determined by the segmentary order of the groups involved. The fighting spreads until equivalent segments are engaged and it is limited to them" (Bohannon, 1958, p. 46). She elaborates on this process in the context of a specific example of conflict: "When fighting broke out between Morov of MbaKetsa and MbaHura of Tondov, all MbaKetsa was engaged against all Tondov. The spread of the war thus followed the order of political segmentation" (ibid.). The segmentary structure facilitated recruitment to conflict, which significantly escalated a feud that began between just two tribal segments.

C. *Other Systems of Kinship*

There is no overarching taxonomy of kinship systems accepted by anthropologists; nevertheless, the existing literature identifies several important systems which clearly do not have the form of the segmentary lineage system and they make up our control group.

Most studied are the non-segmentary systems in modern Zambia, particularly the Bemba and the Lozi.[11] Radcliffe-Brown (1950, p. 42), discussing this part of Central Africa, points out that "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 it's constitution a 'closed' group".

Radcliffe-Brown (1950, p. 43) later points to what he perceives as the key difference between societies based on unilineal descent and those based on cognatic descent. "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

[11] The Lozi are the dominant ethnic group in a region of western Zambia called Barotseland or Loziland.

cognatic kinship cannot provide this; it is only made possible by the use of the principle of unilineal descent."

The major scholar of the Lozi was the anthropologist Max Gluckman who in a series of works documented their social, economic and political systems. Significant for our present discussion is his summary statement: "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). This reinforces Radcliffe-Brown's characterization of such a society, one with cognatic descent, as being "open". Moreover, "The only corporate group of kindred is the village" (Gluckman, 1950, p. 167) and since people are always moving about or are moved about by the Lozi king "the pattern of kinship links in local communities is constantly altering" (p. 177).

As Gluckman points out, the kinship system of the Lozi is shared not just by other ethnic groups of Central Africa, such as the Bemba (see Richards, 1950), and the Tonga but also the Wabena of Tanzania and the Ankole and Toro of Uganda (Gluckman, 1950, p. 178). These Central African contrasts are interesting since, while the Lozi and Bemba had states prior to colonial contact, the Tonga were a stateless society (see Colson, 1951).[12]

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 both "closed" in a way cognatic societies are not and the fact that all of the functions that a corporate group might undertake – social, political, juridicial 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, in these societies, a clearer structural differentiation between the field of domestic relations based on kinship and descent and the field of political relations, than in segmentary societies" (Fortes, 1953, p. 26). This analysis is echoed in Gluckman's description

[12]There is a great deal of consensus about the nature of these systems in this part of Africa. For example, Fortes states "among the Bemba, the Tonga, the Lozi and many of their neighbors... the social structure must be thought of as a system of interconnected politico-legal statuses symbolized and sanctioned by ritual and not as a collective of people organized in self-perpetuating descent units" (Fortes, 1953, p. 37).

of the Lozi when he notes "I have described how Loziland is divided and the Lozi people are grouped into neighbourhoods. . . and pointed out that this was not the administrative and military organization of the nation. This organization consisted of a number of sections. . . The members [of which] did not live in a compact block, within a defined area, but were scattered over the whole of Barotseland" (Gluckman, 1951, p. 31).

Robinson (2001) develops a theoretical model where societies which feature "closed groups" (ethnic groups) experience more conflict than societies with "open groups" (classes) due to the mitigating effects that social mobility has on conflict.

Cognatic kinship societies do not exhaust the types of kinship systems in our dataset. Other prominent cases are includes societies, like the Kikuyu in Kenya, whose politics and administration are organized around by age groups, and not lineages. One could imagine that age could also provide a useful axis for mobilization and collective action and there is some evidence that it does today (see the essays in Kurimoto and Simonse, 1998). Moreover, the Zulu state was created by Shaka by turning age sets into military regiments (Gluckman, 1940, Eldredge, 2014). Nevertheless, what is distinct about segmentary lineage societies is that while segments may oppose each other locally, they unite together in larger lineage groups to oppose other. This process of what Evans-Pritchard (1940a, p. 137) called "fission and fusion" implies that a segmentary lineage society could mobilize far more people than one based on age where different age sets or grades stand opposed to each other with no institutionalized way of uniting.[13]

Finally, also distinct are very small scale societies which never develop either unilineal or cognatic kinship in any institutionalized form, which include such groups as the Hadza or the San people.

3. Data

A. *Conflict Data (ACLED)*

Our main conflict data come from the Armed Conflict Location and Event Data Project (ACLED), which provides details of all known conflict evens within Africa from 1997–2014. Included in the information provided is the location of the event (latitude and longitude), the actors involved

[13]This is not to say that age sets and lineage structures cannot arise in the same society. The Nuer had age sets, though they were not of importance in terms of the organization of the society while lineage was critical in Zulu society and indeed it is coded as a segmentary lineage society in our data despite Shaka Zulu's military innovations (indeed, Gluckman, 1950, counterpoises it to the Lozi).

(government forces, rebel militia, civilians, protestors, etc), and the motivation of the actors involve (e.g., aimed at taking over land, riots, protests, etc).

Both our OLS and RD analyses rely on the reported latitude and longitude of each conflict event. Using the location, we assign each conflict to a particular ethnic group using a digitized version of the map of ethnic boundaries taken from Murdock (1959). The digitized version is taken from Nunn (2008), which is the same map as used in Michalopoulos and Papaioannou (2013, 2014, 2016).

Given the potentially different effects that segmentary lineage structures have on civil conflicts relative to within ethnicity conflicts, our analysis distinguishes between a host of different types of conflicts. Specifically, we examine the following four types of conflict events: (1) an aggregate measure of conflict that includes all conflict types; (2) conflicts that are part of a civil war; (3) conflicts that are not part of a civil war; (4) conflicts that are more localized and between unorganized groups (i.e., do not involve government forces or rebel groups). We provide a precise definition of each below.

1. **All Conflicts.** This is an aggregate measure that includes all conflict events listed in the ACLED database (with the exclusion of conflicts that result in no fatalities).

2. **Civil Conflict.** This is a measure that include all conflict events that involve the government military or rebels (who are seeking to replace the central government) as one of the actors.[14]

3. **Non-Civil Conflict.** This includes all conflict events that are not coded as being part of a civil conflict.[15]

4. **Within Ethnicity Conflict.** This includes conflict events for which both actors in the conflict are geographically local and/or ethnically local groups.[16]

We construct a range of different measures of the extent of the presence of the different forms of conflict from 1997–2014: number of conflict events, number of conflict deaths, and number of months during the sample period that experienced a conflict incidence.

Thus, in total we have three different measures of conflict extent/intensity and four different types of conflict, resulting in twelve different conflict measures.

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

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

[16]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 (eg. UN)."

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

The central variable of our analysis is a measure of whether ethnic groups were a segmentary lineage society. The most commonly used ethnographic source is the *Ethnographic Atlas*, which is a digitized database providing information on over 100 characteristics of 1,265 ethnic groups globally. However, this source does not include information on whether an ethnic group has a segmentary lineage system.[17] Therefore, to identify the presence or absence of a segmentary lineage system, we relied an alternative source, the *Ethnographic Survey of Africa*, 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. When a particular group was not included in the *Ethnographic Survey of Africa*, or when the information there was insufficient to determine whether or not it was a segmentary lineage society, we then consulted primarily the references from Murdock's *Ethnographic Atlas* to try to determine if the group had a segmentary lineage structure.

For a group to be coded as being a segmentary lineage society, they needed to satisfy the following three criteria.[18]

1. The first criterion is that the society must be based on unilineal descent and there must have been direct and explicit evidence that peoples' identities are based on their lineages. Moreover, all individuals must be aware of their genealogical connections to members of other sub-groups.

2. The second criterion is that the segments of the lineages take on a corporate form. Branching lineage segments determine both administrative functions and political allegiances, and centralized political authority entirely divorced from the lineage structure does not exist.

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

[18] The sources used to code each tribe are included in the online Appendix.

For example, Evans-Pritchard and Fortes (1940, p. 13) write that segmentary societies are organized in "equilibrium between a number of segments, spatially juxtaposed and structurally equivalent, which are defined in local and lineage, and not in administrative terms... the set of inter-segmentary relations that constitutes the political structure is a balance of opposed local loyalties and of divergent lineage and ritual ties".

3. The third necessary criterion is that the members of the ethnic group live closest, geographically, to individuals with whom they are most genealogically related and farther from individuals with a more distant common ancestor. Sahlins (1961) emphasizes this characteristic of segmentary organization: "The closer the genealogical relation between focal lines, the closer their respective segments on the ground" (p. 328).[19] Thus, a third necessary condition is that there is explicit evidence that a geographic organization based on the lineage system is expected and observed in a consistent pattern.

For an ethnic group to be coded as non-segmentary lineage society, we required direct evidence that either of the three criteria were not satisfied. That is, lack of evidence for any criteria is not sufficient for a variable to be coded as not being a segmentary lineage system. We required direct evidence that the criteria were not satisfied. Thus, in the end we are only able to code our segmentary lineage society variable for a subset of all ethnic groups within Africa, 145 in total (using the ethnic classification from Murdock (1959)), for which we were able to definitively conclude that the ethnic group did or did not have a segmentary lineage system. For all other ethnic groups, the existing evidence was not sufficient to determine with confidence whether an ethnic group is organized based on segmentary lineages or not.

As a check on the validity of our coding, after the variable construction, we consulted the existing secondary literature to determine whether 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 existing consensus. These literature matches,

[19] Radcliffe-Brown (1950, p. 42) notes about societies which lack unilineal descent "Some of these tribes have clans, ... but the clans are dispersed and not corporate. Thus the Ila and Bemba and other tribes have dispersed matrilineal clans. The members of one clan are scattered through the tribe; they do not ever come together to take any kind of collective action, and have no single authority (headman or clan council)." Fortes (1953, p. 36) concurs observing that "A lineage cannot easily act as a corporate group if its members can never get together for the conduct of their affairs. It is not surprising therefore to find that the lineage in African societies is generally locally anchored."

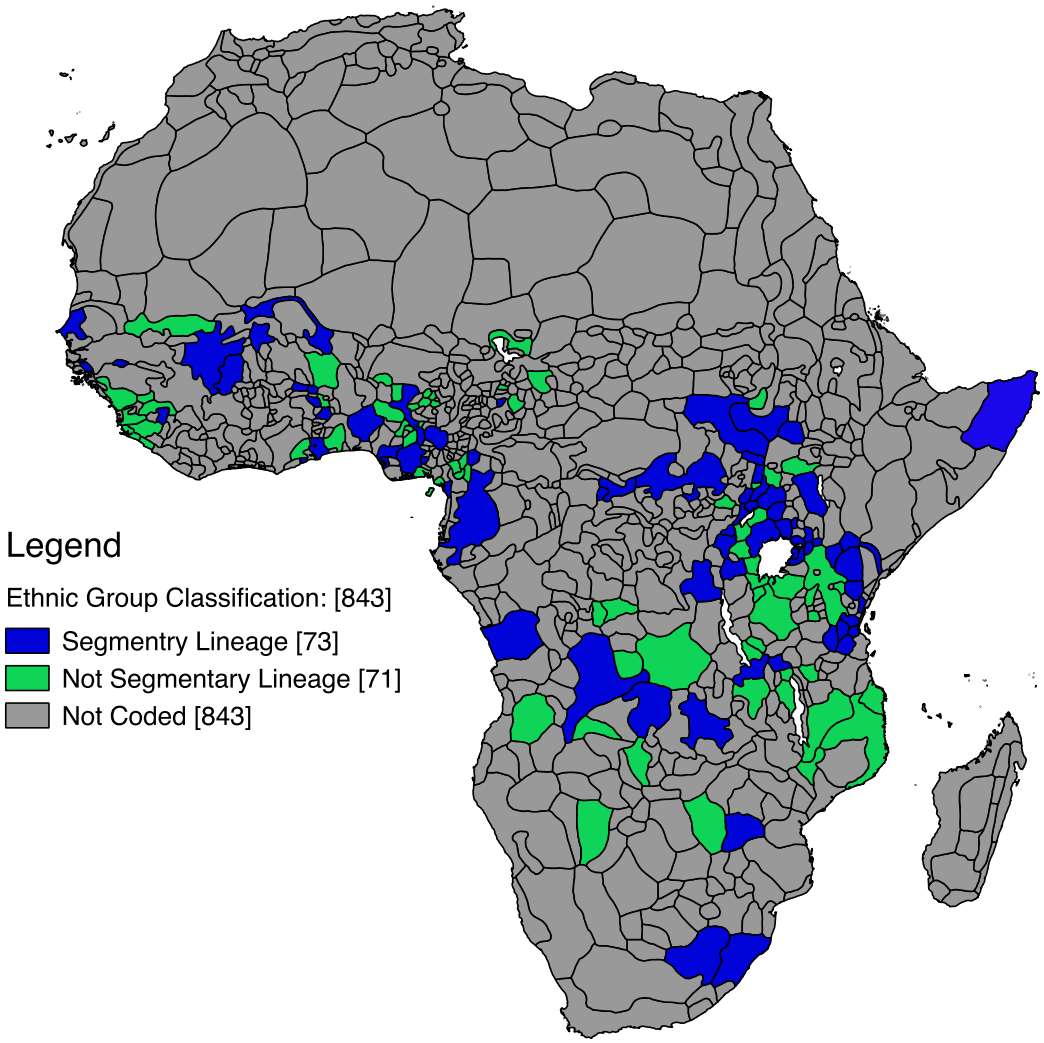


Figure 2: Map of ethnic groups within Africa. Ethnicities that are shaded blue are segmentary lineage societies, ethnicities that are shaded green are not segmentary lineage societies, and ethnicities that are shaded grey are not classified and not part of our sample.

where applicable, are listed along with our original coding source in the paper's Appendix.[20]

The 145 ethnic groups are shown in Figure 2. Segmentary lineage societies are depicted in blue

[20]This is not to say that there is not some inevitable controversy in the literature on the classification of different societies. Sahlins (1961), for example, argues that the Dinka are not a segmentary lineage society. In our dataset they are because as in the relevant volume of the ethnographic survey of Africa, Butt (1952, p. 121) writes "There appears to be a co-ordination of territorial and kinship units which suggests the type of segmentary organization typical of the neighboring Nuer tribes." She cites earlier work by Stubbs as saying, "Each lineage is controlled by its lineage heads and elders and it seems that within a wut [village settlement] the members of a lineage build their homesteads near each other and herd their cattle in common." This meshes with the definition we are working with. De Wolf, 1990 (referencing in part Kelly, 1985) writes that the "larger size of [Nuer] minimal segments" is the primary difference in social structure between the Nuer and Dinka." Sahlins seems to have been working toward a narrower definition of segmentary lineage than is standard and against the contributors to the *Tribes Without Rulers* project (Middleton and Tait, 1958) who argued that there could be some variation in groups that could be considered to have a segmentary lineage organization. In *Tribes without Rulers*, the Dinka are listed as a segmentary lineage society (Middleton and Tait, 1958, p. 14).

and non-segmentary lineage societies in green. The map shows that we have managed to identify segmentary lineage societies and definitively non-segmentary lineage societies from many parts of Africa. There are large clusters of observations in Uganda, Tanzania and Kenya. They are also present in Ethiopia, in Mozambique, the Democratic Republic of the Congo, and Zambia, as well as in West Africa, in Nigeria, Ghana, Liberia and southern Sierra Leone.

An important question is the extent to which our sample of 145 ethnic groups is representative of the full population of societies within sub-Saharan Africa. We can examine this question by comparing the characteristics of the ethnic groups within our sample with 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. For 145 of these, we have information on whether they have a segmentary lineage structure or not. For 275 of these, we do not have this information, and they are not included in our sample. The average for each group for a range of variables is reported in Table 1. Also reported are the differences in the means of the two groups and the statistical significance. In total, 19 different variables are examined. We find that for 16 of the 19 variables, there is no statistically significant difference between the two (at a 5% significance level or stronger). Thus, along these dimensions, our sample appears very similar to the full population from sub-Saharan Africa. For three variables – jurisdictional hierarchy, log population, and longitude – our sample appears different from those groups outside of our sample. In particular, larger groups that have a more centralized political system are more likely to be in our sample. This potentially is explained by the fact that larger ethnic groups were more likely to be studied and documented by anthropologists. Thus, they are more likely to appear within our sample. This potential 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 it is simply due to the large number of variables that we examine. With almost 20 variables being examined, it is expected that one of the twenty may be significantly different from zero at a 5% significance level.

C. *Descriptive Statistics*

Table 2 presents descriptive statistics. Column 1 reports the mean and standard deviations of various measures for the 74 African societies that we code as being segmentary lineage societies,

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

	(1) Ethnic groups within the sample (N = 145)	(2) Ethnic groups not within Sample (N = 275)	(3) Difference (within minus outside)	(4) t-statistic of difference
Jurisdictional Hierarchy, 1-5	2.27	1.95	0.32***	3.36
	[0.08]	[0.05]	[0.10]	
log 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.

while column 2 reports the means and standard deviations for the 71 non-segmentary lineage ethnic groups. Column 3 reports the difference in means between the two groups (and the standard deviation in brackets).

Panel A of the table reports statistics for four conflict measures, constructed from the ACLED database: log conflict incidents for all conflicts, civil conflicts, non-civil conflicts, and within-ethnicity conflicts. As reported, we observe that for all conflict measures, conflict is significantly higher within segmentary lineage societies.

Panel B reports descriptive statistics but for eight geographic measures. The measures include 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 groups is split by a national border, distance from the equator, average altitude, average temperature, and average malaria ecology index. As can be seen, the differences are not statistically different from zero in all cases but one.

Panel C reports balance statistics using eight historical measures. These include: the number of levels of jurisdictional hierarchy beyond the local community, fixed effects measuring the historical complexity of settlement, measures of pre-industrial dependence of an ethnic group on animal husbandry and agriculture, the presence of a major city in 1800, the log number of slave taken per land area, the natural log of population density in 1960, and an indicator that equals one if, in the contemporary period, the majority of the ethnic group is Muslim.

In all cases but one, the differences between the two groups are not statistically different from zero. Particularly noteworthy is the similarity between the two groups in terms of reliance on animals husbandry. This alleviates concerns that segmentary lineage organization happens to 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 for segmentary lineage societies is levels of jurisdictional hierarchy beyond the local community, which is a particularly important characteristic given existing evidence that this is associated with better development outcomes today (Gennaioli and Rainer, 2007, Michalopoulos and Papaioannou, 2013). Since it is plausible that stateless societies might experience more conflict than ones with a state, it may be that any finding that being a segmentary lineage society is associated with greater conflict intensity is due to the fact that such societies were historically stateless. It is worth observing that, although segmentary

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

	(1) Segmentary Lineage (n=74)	(2) Not Segmentary Lineage (n=71)	(3) Difference
		Panel A. Conflict Measures	
Log Deadly Conflict Incidents:			
All conflicts	3.32	1.76	1.55***
	[0.21]	[0.17]	[0.27]
Civil conflicts	2.55	1.57	0.97***
	[1.84]	[1.73]	[0.30]
Non-civil conflicts	2.53	1.5	1.03***
	[1.51]	[1.48]	[0.25]
Within-ethnicity conflicts	1.78	0.73	1.06***
	[1.38]	[0.96]	[0.20]
		Panel B. Geographic Characteristics	
Land Area	36901.45	27946.43	8955.02
	[48907.15]	[36282.44]	[7175.14]
Distance to National Border	110.53	145.76	35.23**
	[96.16]	[113.30]	[17.43]
Split Ethnic Group (10%)	0.35	0.28	0.07
	[0.48]	[0.45]	[0.08]
Absolute Latitude	6.87	8.56	1.69
	[5.74]	[4.83]	[0.88]
Agricultural Suitability Index	0.56	0.57	0.01
	[1.43]	[1.31]	[0.03]
Mean Altitude	0.38	0.35	0.03
	[0.36]	[0.33]	[0.06]
Mean Temperature	24.07	24.27	0.20
	[3.08]	[2.58]	[0.47]
Malaria Ecology Index	14.65	13.43	1.21
	[9.83]	[8.88]	[0.78]
		Panel C. Historical Characteristics	
Levels of Jurisdictional Hierarchy	2.04	2.38	0.34**
	[0.96]	[1.11]	[0.17]
Settlement Pattern	5.93	5.70	0.23
	[1.54]	[1.91]	[0.29]
Dependence on husbandry	2.03	2.00	0.03
	[1.45]	[1.36]	[0.23]
Dependence on agriculture	5.70	5.97	0.27
	[1.42]	[1.49]	[0.24]
Major City in 1800	0.04	0.04	0.00
	[0.20]	[0.23]	[0.03]
Slave exports (normalized by land area)	0.40	0.29	0.11
	[0.88]	[0.59]	[0.13]
Pop. Density 1960 (Log)	2.82	2.48	0.34
	[1.18]	[1.31]	[0.21]
Muslim Majority	0.19	0.21	0.02
	[0.39]	[0.41]	[0.07]

Notes : Column 1 displays the mean of each covariate on the left among the segmentary lineage societies in our sample along with standard deviations in brackets. Column 2 does the same for non-segmentary lineage societies. Column 3 displays the difference in the mean value of each covariate between the two groups, along with the standard error in brackets. *, **, and *** indicate significance at the 10%, 5%, and 1% levels.

	State	*Stateless*
Segmentary Lineage	n=20 Eg. Somali, Duala, Ndembu	n=53 Eg. Nuer, Tiv, Rega
Not Segmentary Lineage	n=32 Eg. Kuba, Haya, Igala	n=36 Eg. Kung, Masai, Mende

Figure 3: Matrix showing the number of segmentary lineage and non-segmentary lineage societies that are considered stateless or having a state by the Ethnographic Atlas. Stateless is defined by having a jurisdictional hierarchy measure of 0 or 1, while having a state is defined as having a jurisdictional hierarchy measure of 2, 3, or 4.

lineage societies tend to be less centralized, there are many examples of segmentary lineage societies that also experienced processes of political centralization and of societies that do not have segmentary lineages and were not centralized politically. To show this, in Figure 3 we categorize our societies into four bins depending on whether or not they have the segmentary lineage structure and whether or not they are politically centralized (defined as having two or more levels of political authority beyond the local community). As shown, the societies are distributed fairly equally between the different cells. Indeed, Southall (1956) pioneered the term 'segmentary state' to refer to the co-existence of these different structures.

Thus, although we observe large and highly significant differences between segmentary lineage societies and non-segmentary lineage societies, we see that the two groups look very similar on most other observable dimensions.

4. OLS Estimates

We now turn to our estimating equations. We first present the relationship between our segmentary lineage indicator variable and several dependent variables that measure the extent of conflict in a given ethnic homeland. We begin by presenting our baseline OLS estimating equation:

$$y_i = \alpha + \beta I_i^{SL} + \mathbf{X}_i' \mathbf{\Gamma} + \varepsilon_i \tag{1}$$

where y_i is a measure of conflict intensity among 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. The

coefficient of interest is β, which we expect to be positive. Segmentary lineage societies are more likely to participate in conflicts. $\mathbf{X}$ is a vector of historical and geographic covariates. The set of geographic controls includes: 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 the average agricultural suitability. The historical controls include: 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 a 1–8 integer measure.[21]

Estimates of equation (1) are reported in Table 3. The table reports estimates using a number of different measures of conflict taken from the ACLED database. Each panel reports estimates of a different type of conflict, either all conflicts, civil conflicts, non-civil conflicts, or within ethnic group conflicts. The intensity of each conflict is measured in three different ways, either using the log number of conflict events (columns 1–3), the log number of conflict deaths (column 4–6), or the log number of months of conflict (columns 7–9).

For each outcome of interest, we report three specifications, each with a different set of covariates. The first specification, reported in columns 1, 4, and 7, is the most parsimonious and only includes country fixed effects. In the second specification (columns 2, 5, and 8), we also control for our set of geographical covariates. The final specification (columns 3, 6, and 9) also includes the above mentioned historical covariates.

We find that regardless of which measure of conflict we use, or which specification, we estimate a positive and significant relationship between the presence of segmentary lineage organization and conflict. The magnitudes of the estimated effects are large. For example, according to the estimates for number of conflict events (columns 1–3), a segmentary lineage society has between 80–110% more conflict events than a society that does not have a segmentary lineage organization. Interestingly, the magnitude of the effects are fairly similar across the different conflict types. Thus, segmentary lineage organization appears to have similar effects on all forms of conflict.

In Figure 4, we report the partial correlation plots for the specification that examines total conflict incidents and includes country fixed effects, the geographic controls, and the historical controls (column 3). For each of our conflict types, we find a strong positive relationship between

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

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

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Dep. Var. is log(1+Number of Conflict Events)			Dep. Var. is log(1+Number of conflict deaths)			Dep. Var. is log (1+Number of months of 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			-0.0874			-0.337*			-0.0347
			(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)			(0.0969)
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			0.0155			0.0787
			(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			-0.0466			-0.147			-0.0422
			(0.116)			(0.216)			(0.0991)
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

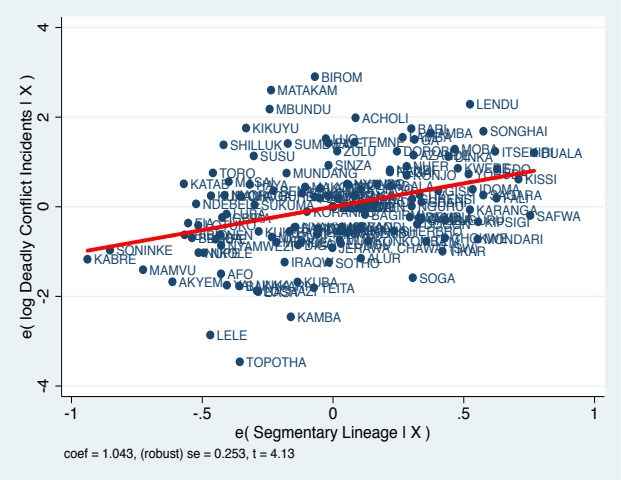
Notes : The unit of observation is the ethnic group and the right hand side variable of interest is an indicator variable that equals 1 if an ethnic group is a segmentary lineage society. Along with the segmentary lineage variable, in columns 1, 4 & 7, we include country fixed effects. In Columns 2, 5 & 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 1 if the ethnic group is "split" by a national border, mean altitude, absolute latitude, and an agricultural suitability index. In Columns 3, 6 & 9, we add a set of 'historical controls,' which include historical political centralization (jurisdictional hierarchy beyond the local community), historical settlement pattern complexity. The coefficient on the political centralization variable is displayed since it is of independent interest. Robust standard errors are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels.

the presence of a segmentary lineage society and conflict. The relationships appear general and to not be driven by a small number of influential observations. Interestingly, consistent with priors, the strength of the relationships appear to be greater for more localized conflicts. The fit appears tightest for localized within-group conflicts, and the relationship for civil conflicts appear to be less strong than for non-civil conflicts.

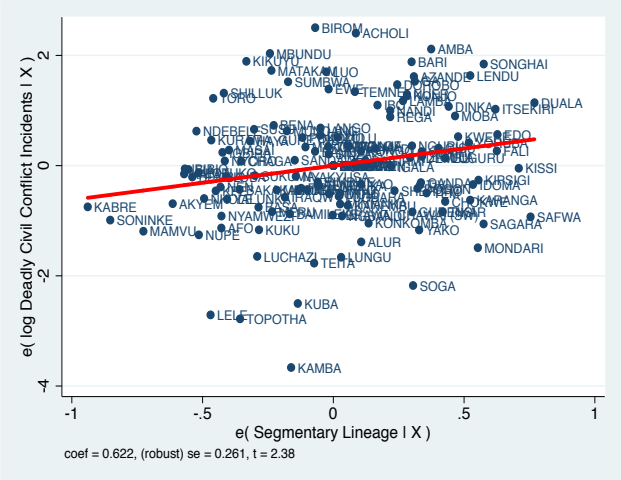
A noteworthy group in the figures is the the Lele, in Kasai province of the Democratic Republic of the Congo. They are a society based on age sets, not lineage and this has been an area of the country with little conflict (Douglas, 1963). Also noteworthy are the Bemba and Toro, two societies singled out by anthropologists, as we discussed above, as not having segmentary lineage structures, and who also have experienced relatively little conflict. On the other hand, noticeable towards 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 there the Songhai from the Democratic Republic of the Congo, a segmentary lineage society studied by Rouch (1954). Also noticeable are the Douala, a society in the Cameroon commonly identified as being of the segmentary lineage form (e.g., Ardener, 1956, Terretta, 2013).

All of the variables from Table 3 are count variables of some form, either of the number of deaths, incidents, or years of conflict. Given this, we check that our estimates are robust to estimation methods other than OLS, namely Poisson or a negative binomial regression model. Table 4 reports estimates using both models for the most stringent specification that includes country fixed effects, geographic controls, and the historical controls. As reported, our findings are robust to the use of alternative estimators. In every specification in Table 4, the coefficient on the segmentary lineage indicator is positive, and in all specifications but one highly significant.

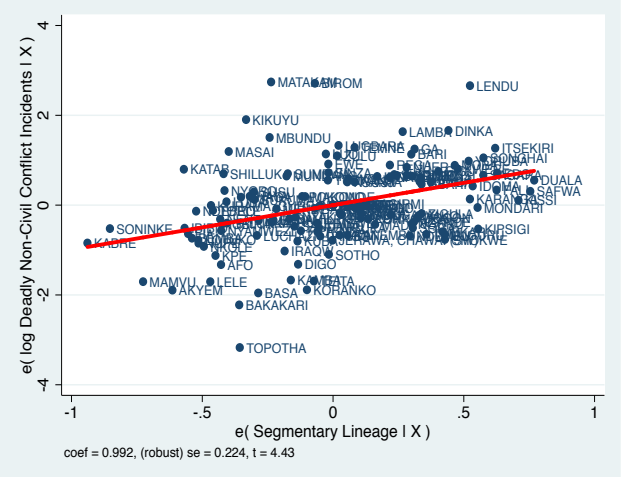
We next turn to the question of channels and the sensitivity of our estimates to accounting for a set of covariates measured contemporaneously to conflict. To motivate our chosen covariates, we return to the example of the Nuer, who in addition to being a segmentary lineage society, are very poor today. The South Sudan today, dominated by the Nuer and Dinka ethnic groups, has a GDP per-capita of around $2,000. Given this, it is possible that our estimates are picking up, in part, the relationship between poverty and conflict, along the lines suggested by Fearon and Laitin (2003). This would occur if segmentary lineage societies have lower incomes today, either due to a causal effect or due to omitted factors. Thus, in our analysis, we account for two measures of economic



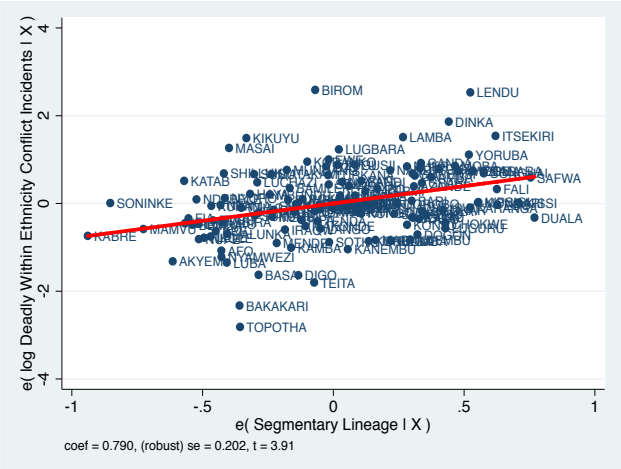
(a) All conflicts.



(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 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 for an ethnic group being divided by a national border, mean altitude, absolute latitude, and an agricultural suitability index), and 'historical controls' (historical political centralization and historical settlement complexity) are included.

Table 4: 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 Outcome 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 Outcome 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 Outcome 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 Outcome 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, and an agricultural suitability index), and 'historical controls' (historical political centralization (jurisdictional hierarchy beyond the local community) and historical settlement pattern complexity). Panel A presents results from Poisson regression and Panel B presents results from negative binomial regression. Robust standard errors are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels.

prosperity. One is a measure of night light intensity normalized by population, measured in 2000 (Henderson, Storeygard and Weil, 2012, Michalopoulos and Papaioannou, 2013, 2014). The second is population density (in 2000), which is a Malthusian measure of prosperity.

In many segmentary lineage societies involved in conflict, whether in the Horn of Africa, the Sahel or the Arabian peninsular, the dominant religion is Islam. It is clear in many of these cases that Islam is used as a tool of mobilization and has ideological force, so it is possible that our estimates are also influenced by the fact that many such societies practice Islam, which provides powerful ideological tools, such as the notion of Jihad, which facilitates mobilization for conflict. To account for this possibility, we use data from the *World Religion Database*, which records religious affiliation for different ethnicities in Africa, to construct an indicator variable that equals one if Islam is the dominant religion of the ethnic group.

To better understand whether part of the reduced-form effects of segmentary lineage systems on conflict is working through prosperity or religion, we re-estimate equation (1), but accounting for measures of contemporary night light intensity, population density, and religion. The estimates are reported in Table 5.

The estimated effect of segmentary lineage on conflict remains positive. However, the magnitude of the estimated effects decline in each of the twelve specifications, with the decline ranging from between approximately 10–60%. Interestingly, the most notable decline is for civil conflicts, while the decline is modest for non-civil conflicts or within-group conflicts. This sheds light on mechanisms, indicating that for civil conflicts prosperity and Islam appear to be important channels (with population density appearing particularly important). However, for the other forms of conflict, the effect of segmentary lineage on conflict appears to be operating primarily through other channels.

If we examine the correlation of segmentary lineage with the additional outcomes, we find that segmentary lineage organization is associated with greater population density (but not Islam or light intensity).[22] In addition, we find that population density is positively associated with all types of conflicts. This is intuitive and not surprising, given that one needs people to fight and thus fights tend to occur where there are people. Put differently, because our conflict measures are total conflicts, and not conflicts per capita, it is expected that more people result in more

[22]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$=-0.020$, $p=0.81$).

Table 5: Segmentary lineage societies and conflict: OLS estimates conditioning on light density, population density, and Islam.

	(1)	(2)	(3)	(4)	(5)	(6)
	Log 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)
Contemporary Controls:						
Log 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)
Log 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 & Local Conflicts					
	Non-Civil Conflicts			Within Ethnicity 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)
Contemporary Controls:						
Log 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)
Log 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. `Segmentary Lineage' is an indicator variable that equals 1 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 1 if the ethnic group is "split" by a national border, mean altitude, absolute latitude, 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 1 if Islam is the majority religion. *, **, and *** indicate significance at the 10%, 5%, and 1% levels.

conflicts.[23] Beyond this mechanical relationship, higher population density may indicate greater population pressures which has been shown to correlate with conflict (e.g., Andre and Platteau, 1998).

Overall, a plausible explanation for the decrease in the estimated effect of segmentary lineage on conflict when we include our endogenous outcomes is that segmentary lineage is associated with greater population density today, and greater population density is associated with more conflict.

A. *Robustness*

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 UCDP GED which Depetris-Chauvin (2014) uses, only geocodes a conflict incident if there is at least one fatality. This criticism results in part from the fact that conflict events without fatalities are more difficult to geocode accurately. While we do not wish to exclude non-fatal conflict events from our analysis (since, for example, instances of violence against civilians may not result in death but remain relevant) it is important to establish the robustness of our results to the use of UCDP GED data. We therefore re-estimate our baseline specifications using the UCDP GED data. Appendix Table A1 reports the results of this exercise for our outcomes of interest. We find that the estimates using the UCDP GED data are very similar to the estimates using the ACLED data.

Another potential concern is that our results are being driven by outliers or a small number of conflicts events with large numbers of fatalities and that last for a long period of time. An example would be the conflicts initiated by the Lord's Resistance Army in Uganda, which have primarily occurred within the territory of segmentary lineage societies like the Acholi. Though this does not appear to be the case from the partial correlation plots reported in Figure 3, we investigate this possibility further here. Specifically, we also re-estimate our baseline specification with both geographic and historical controls, but we remove observations whose value for the dependent variable falls in the top 5 percent. For the outcome variables related to conflict duration, rather than remove the top 5 percent we removed observations related to all ethnic groups who engaged

[23]The correlations coefficients for the relationships between conflict and population density are: all conflicts (coef= 0.231, $p = 0.00$); civil conflict (coef= 0.184, $p = 0.00$); non-civil conflict (coef= 0.296, $p = 0.00$); intra-group conflict (coef= 0.260, $p = 0.00$).

in conflict for all 18 years. The estimates, which we report in Panel A of Table A2 in the Appendix, show that our estimates are robust to this procedure.

A final concern is that there tends to be more conflict in capital cities because of their high population densities and because these are natural focal points for any form of coordinated or group violence. In addition, conflicts that occur in or near capitals may be more likely to be observed and to enter into our database. Given these potential concerns, we also check the robustness of our estimates to the omission of ethnic groups that have a national capital city within their territory. These estimates are reported in Panel B of Table A2. The estimates remain robust to this procedure.

B. ***Accounting for Observables***

The strong positive correlation between our segmentary lineage indicator variable and various measures of conflict coincide with our hypothesis that segmentary lineage organization propagates conflict. However, as with any conditional correlation there is concern that omitted factors may generate biased estimates.

In Tables 2–4, we provided informal evidence of the robustness of our estimates to controlling for observable characteristics. In columns 1–3 of Appendix Table A4, we more formally assess the potential role of unobservables using the methods developed by Altonji, Elder and Taber (2005) to determine how much greater the influence of unobservable variables compared to observable variables would have to be in order to explain away the positive relationship between segmentary lineage societies and conflict. We find that the influence of unobservable characteristics would generally have to be significantly greater than the influence of observable characteristics to explain away our findings. Therefore, it appears unlikely that the our results could be explained by unobserved variation.

As an alternative strategy, we also calculate the minimum possible true value for the coefficient on our segmentary lineage variable using the methods from Oster (2014). As reported in columns 3–6 of appendix Table A4, we find that all of the coefficients remain positive and economically significant. Thus, using this method yields the same conclusion as when the method from Altonji et al. (2005) is used.

5. Accounting for Unobservables: Spatial RD Estimates

Despite the fact that our findings are robust to accounting for observable characteristics, there remains the concern that there are unobservables that may be biasing our estimates. For example, if ethnic groups have an unobservable propensity to participate in local conflict, and historically this affected whether ethnic groups adopted a segmentary lineage form of social organization, then this unobservable trait will bias our estimates of interest. In this case, we would observe a relationship between segmentary lineage systems and conflict even if they do not, in fact, have a causal effect on conflict. These unobservable traits may originate from a range of different sources, including the natural environment, historical shocks, or purely idiosyncratic or random reasons, including cultural drift.

Given this possibility, we also undertake an alternative analysis. Since unobservable factors are, by definition, unobservable, the strategy we undertake is to examine and compare units of observation that are close spatially. In particular, we will examine locations, that are geographically close, but one location is inhabited by a segmentary lineage society and the other by society that does not have a segmentary lineage system. For this analysis, our units of observation are 10km-by-10km grid-cells. The sample consists of all pairs of contiguous ethnic groups where one ethnicity has segmentary lineages and the other does not.[24] Figure 5 illustrates this setup, showing pairs of contiguous ethnic groups, one of which is a segmentary lineage society and the other is not. Also shown are the observations in the analysis – 10km by 10km grid-cells. The exact location of a cell is measured by its centroid. Also reported in the figure are the locations of conflicts events.

Our RD strategy restricts attention to grid-cells that are close to the ethnicity borders, and uses this difference to estimate the effect of segmentary lineage systems on conflict today. The benefit of this estimation is that it will explicitly account for any unobservable factors that vary smoothly across space, either because historical shocks or geographic factors have a smooth spatial dimension and/or because the diffusion process occurs smoothly over space.

Our RD estimating equation takes the following form:

$$y_{jip} = \omega_p + \gamma I_{ip}^{SL} + f(location)_j + \mathbf{Z}'_{ji}\mathbf{\Gamma} + \varepsilon_{jip} \tag{2}$$

[24]This means that 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.

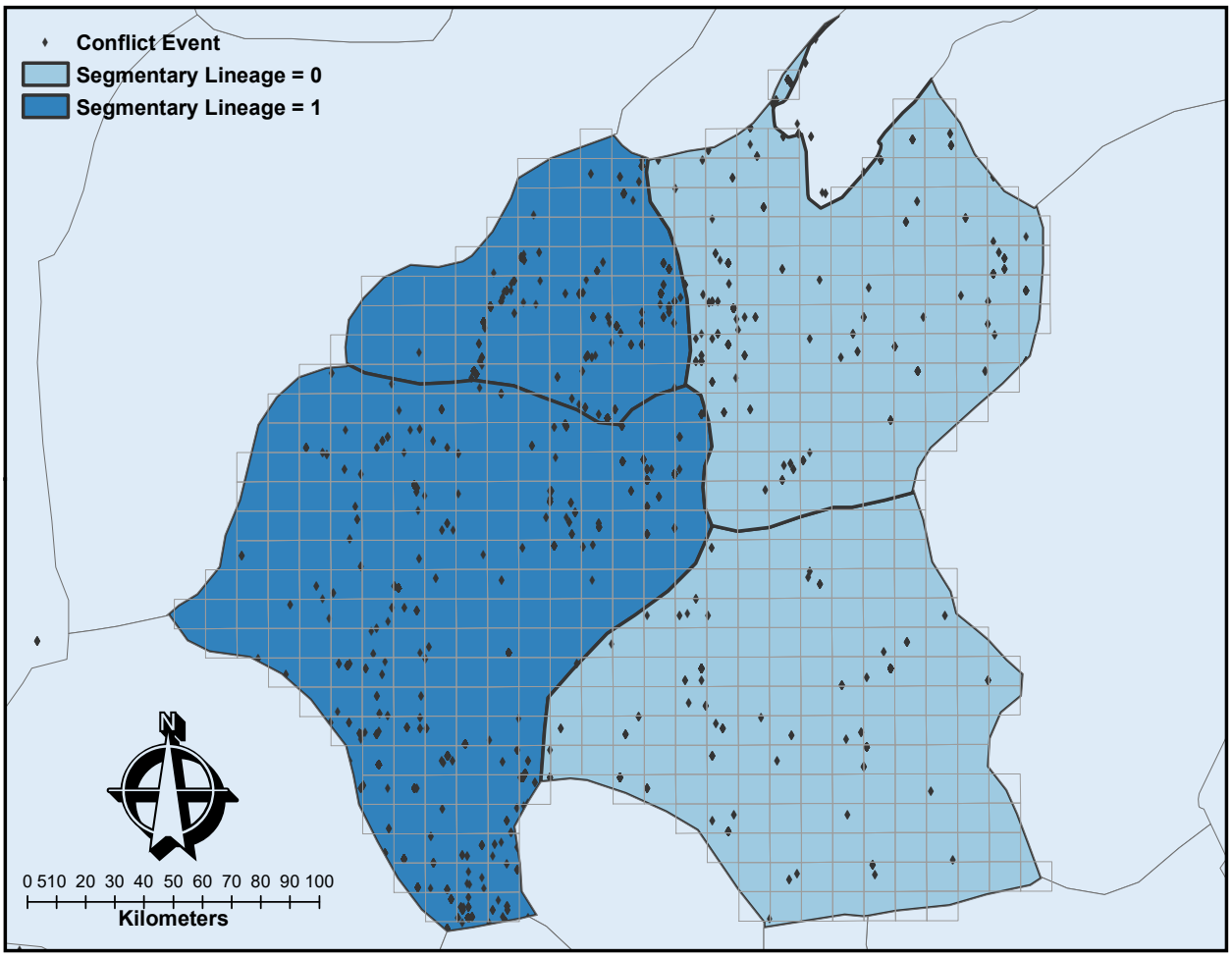


Figure 5: An illustration of the RD setting: an example of ethnicity pairs, conflict events, and 10km grid-cells. The two segmentary lineage ethnic groups shown are Ambo (top) and Konjo (bottom), and the two non-segmentary lineage groups shown are Toro (top) and Nkole (bottom).

where j denotes 10km grid-cells, i ethnic groups, and p ethnicity pairs. y_{jpi} is a measure of the presence of conflict in grid-cell j, which is inhabited by ethnic group i, which belongs to ethnicity pair p. I_{ip}^{SL} is an indicator variable that equals one if ethnicity i, which belongs to pair p, is a segmentary lineage society. $f(location)$ is the RD polynomial controlling for smooth functions of the geographic location of the grid cells. We report estimates using several different functional forms. ω_p denotes ethnicity-pair fixed effects, which are included in all specifications. The sample is restricted to grid-cells that are within a certain distance of the ethnicity-pair border, either 60, 80, or 100 kilometers.

Estimates of equation (2) are reported in Table 6. Estimates are reported using the number of deadly conflicts (columns 1–3) or the number of conflict deaths (columns 4–6) as outcome variables. Columns 1 and 4 only include ethnicity pair fixed effects. Columns 2 and 5 add country fixed effects, and columns 3 and 5 add both country fixed effects and a set of geographic controls measured at the grid-cell level (elevation, agricultural suitability, and an indicator if the grid-cell is intersected by a national border). In Panel A, the outcome variable is calculated using all conflict events while in Panels B–D we report results using civil conflicts, non-civil conflicts, and intra-group conflicts respectively. Following Gelman and Imbens (2014), we use a local linear polynomial as our baseline running variable. In Table 6, the running variable is measured in Euclidean distance, although we present results using coordinate-based running variables below. All regressions in Table 6 use a restricted sample of grid cells within 60km of the ethnicity-pair border.

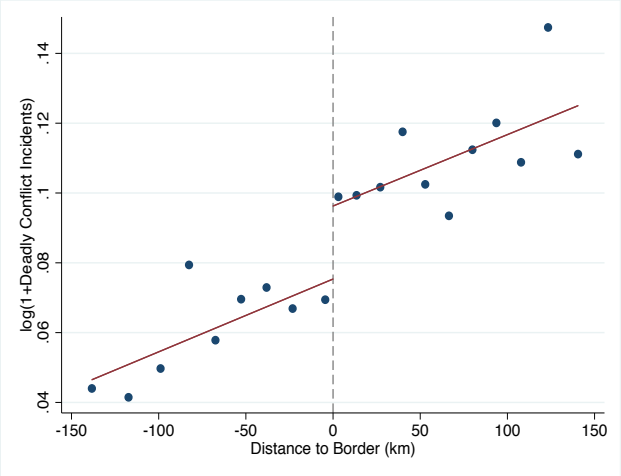
We find that the estimated effect of segmentary lineage systems on conflict is positive and significant. This is true for all measures of conflict and for all specifications. We also find that for each outcome, the magnitude of the estimated effect is stable in the different specifications. The estimates, using conflict incidents, are shown graphically in Figure 6 for each of the four types of conflict: all conflicts, civil conflicts, non-civil conflicts and intra-group conflicts.

In an RD approach, there are several reasons to check multiple specifications for the running variable (see e.g., Dell, 2010, pp. 1875–1876). Table 7 reports estimates of our RD regressions from a number of different specifications. Each panel reports a different specification, estimated either by OLS, negative binomial, or Poisson regression models, and using different running variables. In columns 1–3, conflict is measured by total deadly conflicts, and in columns 4–6, it is measured

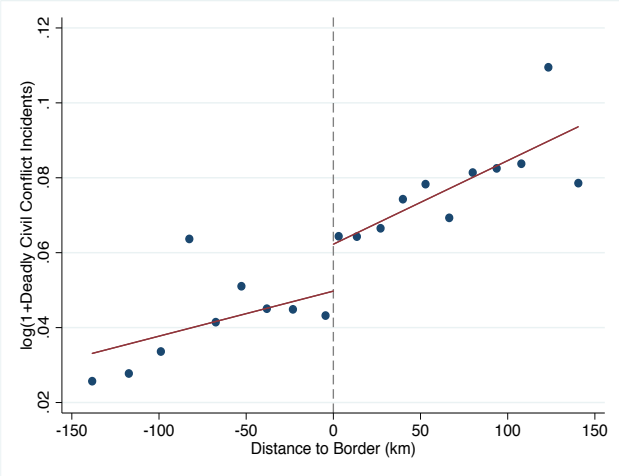
Table 6: Baseline RD estimates.

	(1)	(2)	(3)	(4)	(5)	(6)
	Sample: Observations <60 km from Ethnic Group Boundary Linear Running Variable in Euclidean Distance to the Border					
Outcome Variables:	log(1+Deadly Conflicts)			log(1+Conflict Deaths)		
	Panel A: All Conflicts					
Segmentary Lineage	0.0420***	0.0373**	0.0377**	0.0862***	0.0791***	0.0800***
	(0.0158)	(0.0153)	(0.0153)	(0.0283)	(0.0283)	(0.0282)
R-squared	0.095	0.122	0.122	0.084	0.088	0.088
	Panel B: Civil Conflicts					
Segmentary Lineage	0.0301**	0.0263**	0.0265**	0.0563**	0.0503**	0.0510**
	(0.0134)	(0.0125)	(0.0125)	(0.0238)	(0.0238)	(0.0238)
R-squared	0.103	0.139	0.139	0.088	0.092	0.092
	Panel C: Non-Civil Conflicts					
Segmentary Lineage	0.0253***	0.0237***	0.0241***	0.0600***	0.0570***	0.0578***
	(0.00883)	(0.00871)	(0.00859)	(0.0175)	(0.0168)	(0.0167)
R-squared	0.047	0.050	0.050	0.044	0.047	0.048
	Panel D: Intra-Group Conflicts					
Segmentary Lineage	0.0133**	0.0130**	0.0132**	0.0302**	0.0286**	0.0288**
	(0.00577)	(0.00585)	(0.00588)	(0.0129)	(0.0126)	(0.0127)
R-squared	0.035	0.036	0.036	0.034	0.035	0.036
Ethnic Groups	80	80	80	80	80	80
Observations	10,739	10,739	10,739	10,739	10,739	10,739
Ethnic Group Pair FE	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	No	Yes	Yes	No	Yes	Yes
Geographic Controls	No	No	Yes	No	No	Yes

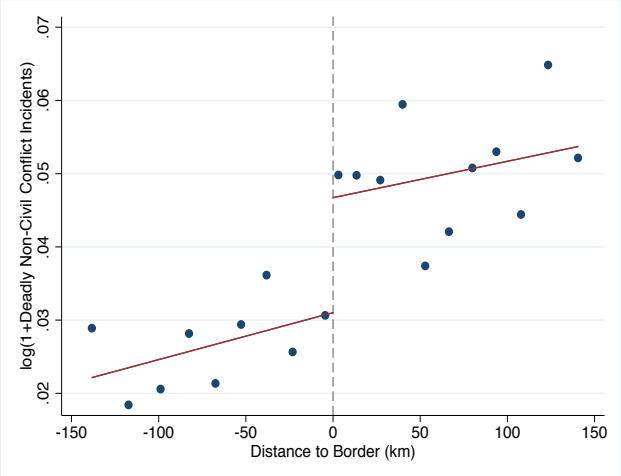
Notes: In columns 1-3 the oucome variable is the number of conflicts that resulted in at least one death in column and in columns 4-6 the outcome variable is the number of conflict deaths (both parameterized as ln(1+X). The unit of observation is a 10km grid cell. All regressions include a linear polynomial 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. Geographic controls include elevation, agricultural suitability, and an indicator variable that =1 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.



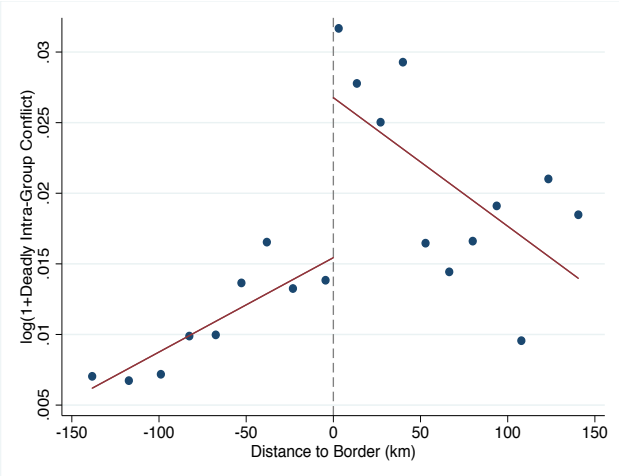
(a) All conflicts.



(b) Civil conflicts.



(c) Non-civil conflicts.



(d) Intra-group conflict.

Figure 6: This figure presents the main RD results graphically. The y-axis reports (log of) deadly conflict incidents for the four different types of conflict. The x-axis is measured in kilometers and reports geographic distance 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.

by total conflict deaths.[25] For each specification and outcome variable we restrict observations to be within 100km (columns 1 and 4), 80km (columns 2 and 5), or 60km (columns 3 and 6) of the ethnic group border.

In panel A, for reference, the running variable is identical to Table 6. In Panels B and C, since our conflict outcomes are count variables, we use the same running variable but estimate negative binomial and Poisson models respectively. In the remaining panels, we turn to more flexible specifications of the running variable.[26]

First, rather than force a single running variable on our entire sample, we allow a different running variable for each continuous cluster of ethnic groups in our sample. That is, we interact the running variable with a set of 14 indicator variables each of which equals 1 for all grid cells that are part of the same cluster of contiguous ethnic groups. For example, the four ethnic groups in Figure 5 would all be considered part of the same cluster. In Panel D, we include the baseline running variable (from Table 6), interacted with the 14 cluster indicator variables, on the right hand side of the regressions. In Panel E, rather than use a measure of Euclidean distance as the running variable, we interact the latitude and longitude of each grid cell with the 14 indicators and include all interactions on the right hand side of the regressions, to control for the geographic location of each grid cell. Similarly, regressions in Panel E include all interactions between a quadratic polynomial in the latitude and longitude of each grid cell with the 14 indicators.[27] Using latitude and longitude instead of Euclidean distance allows us to control more directly for features that vary over two-dimensional space rather than collapse grid cells' geographic location into a one-dimensional distance measure (see Dell, 2010). Results from these specifications broadly mirror those in Panel A. If anything, the magnitude and statistical significance of the estimates are greater in Panels D–F.

Next, we interact the baseline running variable with a set of 68 ethnic group pair indicator variables. This allows us to estimate unique running variable coefficients for each pair of segmentary lineage and non-segmentary lineage ethnic groups used in the analysis. While we include ethnic group pair fixed effects in each regression, allowing the running variable to vary for each ethnic

[25] Both are modeled as $\ln(1 + X)$ when an OLS model is used and left as a count variable when a negative binomial or Poisson model is used.

[26] For the specifications in Panels D-I, it is not possible to estimate either a negative binomial or Poisson model, so we focus exclusively on OLS.

[27] Here, if x is latitude and y is longitude, the polynomial is $x + y + x^2 + y^2 + xy$. Each term is then interacted with the set of indicator variables and included on the right hand side of the regression.

group pair allows us to control for unique conflict patterns around each border segment. Panels G–I are equivalent to Panels D–F, except instead of interacting distance or location measures with 14 cluster indicator variables, we interact them with the 68 pair indicator variables. These are demanding specifications – the running variable in Panel I, for example, consists of 340 variables. Nevertheless, our results remain similar using this final set of specifications. The coefficient of interest loses significance only once, in column 3 (60km bandwidth) of Panel I.

A. *Treatment Assignment*

The boundaries used for our RD estimates are from Murdock (1959), a source that has been used previously by Michalopoulos and Papaioannou (2013, 2014, 2016). An important assumption when using the ethnic borders is that they accurately reflect patterns of present day ethnic affiliation. We now turn to a test of the validity of this assumption by estimating whether actual self-reported ethnic affiliation varies at the borders. For this, we use round 3 of the *Afrobarometer* survey, which records the self-reported ethnicity of respondents. In addition, for this round of the survey, Nunn and Wantchekon (2011) have geo-referenced the location of all respondents using information on the neighborhood or town of each respondent using restricted data from the *Afrobarometer*. Combining the information on location and self-reported ethnicity from the *Afrobarometer*, with the ethnicity maps from Murdock (1959), we are able to calculate for any individual whether he or she belongs to the ethnic group that is reported to inhabit that location as reported by Murdock (1959).

With this information, we can estimate our RD equation (2), but using an indicator variable that equals one if a person reports being a member of the segmentary lineage society of the ethnicity-pair. We continue to use the same sample of ethnicity-pairs, which are pairs of contiguous ethnic groups for which one is a segmentary lineage society and the other is not.

The RD estimates are shown in Figure 7. We find a clear discontinuity that occurs exactly at the borders as defined by Murdock. That is, there is a discontinuous change in the fraction of the population that report that they are members of a segmentary lineage society at our borders between segmentary lineage and non-segmentary lineage societies. The y-axis displays the fraction of the population in a bin that report that they are a member of the segmentary lineage society of the ethnicity pair and the x-axis is distance in kilometers from the border, with

Table 7: Additional RD estimates.

	(1)	(2)	(3)	(4)	(5)	(6)
Outcome Variables:		Deadly Conflict Incidents			Conflict Deaths	
Distance to Border:	<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***
	(0.0187)	(0.0176)	(0.0153)	(0.0392)	(0.0346)	(0.0283)
Ethnic Group Pair FE	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.125	0.114	0.122	0.086	0.080	0.088
	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**
	(0.289)	(0.280)	(0.281)	(0.452)	(0.494)	(0.484)
Ethnic Group Pair FE	Yes	Yes	Yes	Yes	Yes	Yes
	Panel C: Poisson Estimates, Linear Running Variable in Euclidean Distance					
Segmentary Lineage	0.799**	0.667*	0.791**	0.271	0.265	0.599
	(0.338)	(0.351)	(0.385)	(0.637)	(0.718)	(0.815)
Ethnic Group Pair FE	Yes	Yes	Yes	Yes	Yes	Yes
	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***
	(0.0181)	(0.0174)	(0.0157)	(0.0367)	(0.0336)	(0.0284)
Ethnic Group Pair FE	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.130	0.119	0.127	0.094	0.088	0.095
	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***
	(0.0142)	(0.0136)	(0.0131)	(0.0281)	(0.0259)	(0.0237)
Ethnic Group Pair FE	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.132	0.121	0.130	0.093	0.088	0.094
	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***
	(0.0171)	(0.0151)	(0.0141)	(0.0319)	(0.0278)	(0.0252)
Ethnic Group Pair FE	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.143	0.134	0.143	0.108	0.103	0.108
	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***
	(0.0144)	(0.0134)	(0.0139)	(0.0255)	(0.0237)	(0.0243)
Ethnic Group Pair FE	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.160	0.152	0.159	0.129	0.123	0.123
	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**
	(0.0179)	(0.0174)	(0.0171)	(0.0347)	(0.0324)	(0.0303)
Ethnic Group Pair FE	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.163	0.154	0.161	0.135	0.128	0.127
	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**
	(0.0145)	(0.0138)	(0.0165)	(0.0268)	(0.0253)	(0.0278)
Ethnic Group Pair FE	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.189	0.183	0.190	0.168	0.163	0.160
Ethnic Groups	80	80	80	80	80	80
Observations	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 column and in columns 4-6 the outcome variable is the number of conflict deaths. The oucome is parameterized either as ln(1+X) when an OLS model is used or as a count variable when a negative binomial or Poisson model is used. The model used for each regression is noted in the panel heading. The unit of observattion is the 10-by-10 kilometer grid cell. The RD polynomial varies and is noted in the header of each column. In columns 1 & 4, the sample only includes observations located within 100km of the relevant ethnic group boundary, and this threshold is reduced to 80 and 60km in columns 2 and 5, and 3 and 6, respectively. All regressions include border segment fixed effects (there are 68) where a border segment is the part of an ethnic group boundary between any two ethnic groups of opposite type (segmentary lineage and not segmentary lineage). 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.

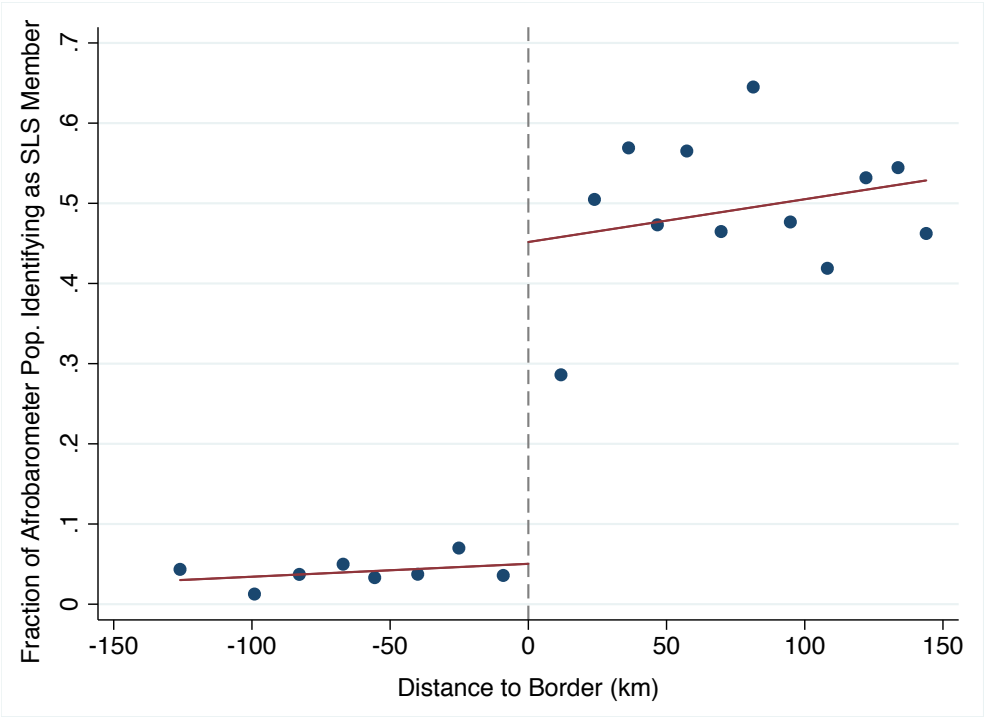


Figure 7: This graph presents the relationship between self-reported ethnicity and geographic location based on survey data from Round 3 of the Afrobarometer Survey. Data are aggregated from survey data along all borders between segmentary lineage and non-segmentary lineage societies. The x-axis reports geographic distance – positive values imply kilometers into the territories that are considered segmentary lineage societies based on the geographic borders between ethnic groups from Murdock's Map. Negative values are kilometers into the adjacent non-segmentary lineage society. The y-axis measures the fraction of the Afrobarometer population at each distance that self identifies as a member of the given boundary's corresponding segmentary lineage society.

a positive distance indicating a location within the territory of the segmentary lineage society and a negative distance indicating a location outside of the territory of the segmentary lineage society.

We can also focus on individual borders to highlight that declared ethnicity changes discontinuously at the border between ethnic groups. Figure A2 in the Appendix shows two examples. In the first graph, the y-axis reports the fraction of the population in each grid cell that identifies as Ganda and the dotted line is the border between the Ganda and the Soga. The second graph reports the fraction of the population in each grid cell that identifies as Sotho, and the dotted line is the border between the Sotho and the Zulu. In both cases, we observe a discontinuous and sharp change in self reported ethnicity at Murdock's ethnic group boundaries.

Table 8: RD estimates examining observable characteristics.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Outcome Variable:	log Mean Elevation	Mean Slope	Mean Temp.	Water Indicator	Cereal Suitability	Sorghum Suitability	% Land Cultivated	Petroleum Indicator	Diamond Indicator	Number of Missionaries	Railway Indicator
Segmentary Lineage	-0.00118	-0.000954	0.0549	-0.00152	0.0337	-0.0114	0.620	-0.00401	-0.0399	0.00817	-0.00154
	(0.0331)	(0.217)	(0.100)	(0.0163)	(0.0649)	(0.0745)	(1.072)	(0.0120)	(0.0312)	(0.00525)	(0.0110)
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	10,697	10,699	10,699	10,699	10,638	10,642	10,645	10,699	10,575	10,699	10,699
R-squared	0.857	0.166	0.843	0.133	0.396	0.534	0.538	0.619	0.892	0.040	0.089

Notes: The unit of observation is the 10 km by 10 km 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 to observations within 60km 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.

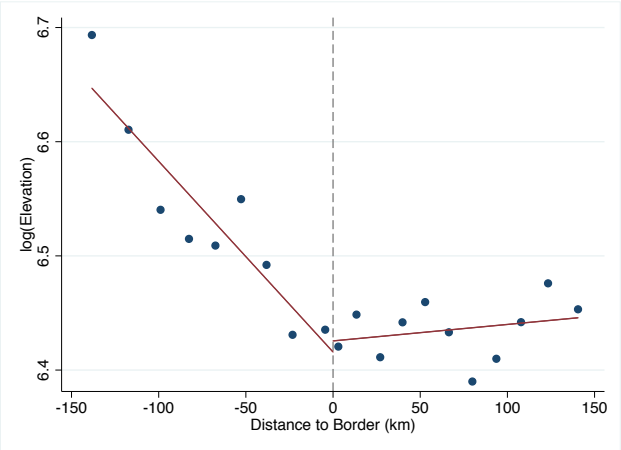
B. *Balance*

One assumption of the RD approach is that unobservables vary smoothly across the borders. Although this is impossible to assess, we check the validity of this assumption by examining observables and estimating whether there appears to be a discontinuity at the border for these variables. The characteristics we examine are: elevation, slope, average temperature, an indicator for the presence of a body of water, the suitability of the cell for the cultivation of cereals,[28] the percentage of land that is currently cultivated, an indicator for the presence of petroleum, an indicator for the presence of diamonds, the number of mission stations during the early colonial period, and an indicator for the presence of a colonial railway.

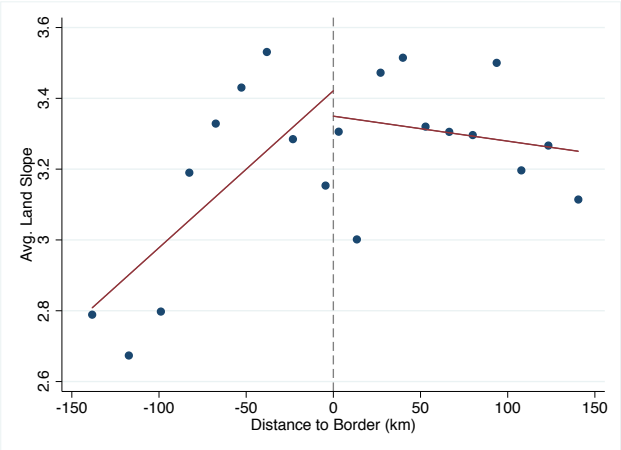
The estimates are reported in Table 8. Each column reports RD estimates with a different characteristic as the outcome variable. For consistency, we report the same baseline specification as column 2 of Table 6. We find that in all ten specifications the coefficient on the segmentary lineage indicator is not statistically different from zero, and is always very small in magnitude. These estimates reduce the concern that other factors may also vary discontinuously at the borders that we use in our RD analysis.

Figure 8 shows four of these results using the dependent variables (log of) elevation, slope, temperature, and cereal suitability. The figures show that these variables vary smoothly at the border and there is no sign of the type of discontinuities we find in Figure 6.

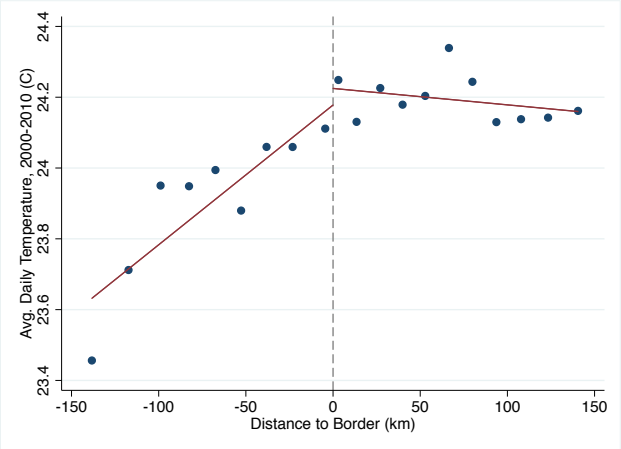
[28]Crops included in the calculation of cereal suitability are: wheat, wetland rice, dryland rice, maize, barley, rype, pearl millet, foxtail millet, sorghum, oat, and buckwheat (FAO GAEZ).



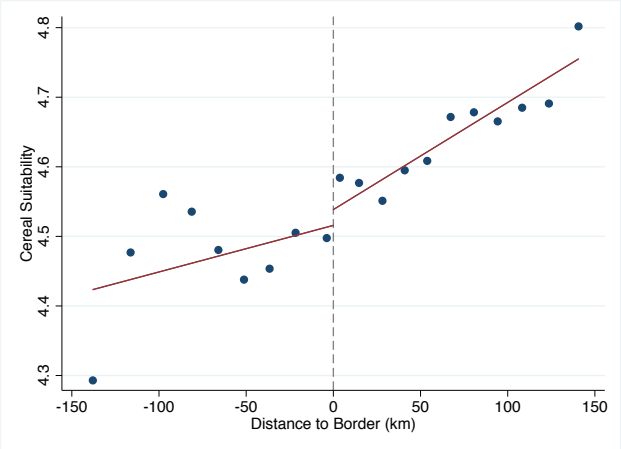
(a) Elevation.



(b) Slope.



(c) Temperature.



(d) Agricultural suitability.

Figure 8: This figure presents the part of the balance test for the RD analysis graphically.The x-axis is measured in kilometers and reports geographic distance from the borders between segmentary lineage and non-segmentary lineage societies. Positive values imply kilometers into the territories that are considered segmentary lineage societies based on the geographic borders between ethnic groups from Murdock's Map. The border is at kilometer 0. The y-axis variables are listed in each sub-figure.

C. *Placebo Tests*

One concern with our RD estimates is that the estimated differences that we find are due to segmentary lineage being correlated with other ethnicity-level traits that also vary discontinuously at the border. Thus, the effects we are finding are not really a segmentary lineage effect, but are really due to some other social or cultural trait.

To check for this possibility, we conduct a series of 'placebo' estimates. We do this by defining ethnicities as belonging to treatment and control groups using a range of characteristics other than segmentary lineage organization. Using this new categorization, we then re-estimate our RD equation (2). To ensure that the characteristics we are examining are orthogonal to segmentary lineage, and thus they serve as a true placebo, our sample only includes ethnicity pairs for which both ethnicities within the pair have the same classification of segmentary lineage organization.

The result of these placebo RD estimates are reported in Table 9. All specifications are equivalent to the baseline specification in the main RD (column 2 of Table 6). In columns 1–3, the outcome variable is the natural log of deadly conflict incidents and in columns 4–6 it is the natural log of the number of conflict deaths. For both outcomes, we report RD estimates for grid-cells within 100km, 80km and 60km of the border. Each panel reports estimates with a different treatment 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 political authority. We find no estimated effect of this characteristic on conflict. In all six specifications, the point estimates are small in magnitude and statistically insignificant.

Panel B of Table 9 reports estimates from the exact same procedure as Panel A, except that we us the measure of an ethnic group's historical settlement complexity, which is measured on a 1–8 scale. In the Panel C, we use the first principal component from a factor analysis that uses the jurisdictional hierarchy measure and the settlement patterns measure. In Panel D, we use the first principal component from a factor analysis that uses a broader range of historical variables: levels of jurisdictional hierarchy, settlement patterns, presence of a major city in 1800, slave exports, population density in 1960, Muslim majority indicator, and ethnic group split by border indicator.

All estimates from the additional panels are small in magnitude and statistically insignificant. Thus, we find no evidence that other historical factors also have effects on conflict that are similar

Table 9: Placebo RD estimates, using other ethnicity-level characteristics.

	(1)	(2)	(3)	(4)	(5)	(6)
Outcome:	Deadly Conflict Incidents			Conflict Deaths		
Distance to Border:	<100km	<80km	<60km	<100km	<80km	<60km
			Panel A: Jurisdictional Hierarchy			
> Jurisdictional Hierarchy	-0.0216	-0.0225	-0.0293	-0.00525	-0.0127	-0.0162
	(0.0244)	(0.0257)	(0.0255)	(0.0397)	(0.0350)	(0.0308)
Ethnic Groups	74	74	74	74	74	74
Observations	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
			Panel B: Historical Settlement Complexity			
> Historical Settlement Complexity	-0.0122	-0.0113	-0.0291	-0.0371	-0.0379	-0.0711
	(0.0211)	(0.0225)	(0.0229)	(0.0368)	(0.0382)	(0.0434)
Ethnic Groups	79	79	79	79	79	79
Observations	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
	Panel C: First Principal Component (Jurisdictional Hierarchy & Settlement Complexity)					
> Principal Component	-0.00564	-0.0109	-0.0227	-0.000549	-0.0150	-0.0322
	(0.0161)	(0.0163)	(0.0156)	(0.0301)	(0.0268)	(0.0244)
Ethnic Groups	98	98	98	98	98	98
Observations	23,500	19,645	15,250	23,500	19,645	15,250
R-squared	0.200	0.201	0.200	0.113	0.123	0.144
	Panel D: First Principal Component (Broader Set of Historical Variables)					
> Principal Component (Broader Var. Set)	0.00735	0.00815	-0.00551	0.00473	-0.000793	-0.0245
	(0.0171)	(0.0194)	(0.0191)	(0.0310)	(0.0312)	(0.0303)
Ethnic Groups	98	98	98	98	98	98
Observations	23,500	19,645	15,250	23,500	19,645	15,250
R-squared	0.201	0.202	0.200	0.114	0.123	0.145
Ethnic Group Pair FE	Yes	Yes	Yes	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes

Notes: The unit of observation is the 10 km by 10 km grid cell. All regressions use the same specification as 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. In Panel A, the independent variable of interest is an indicator variables that equals 1 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 1 if an ethnic group has greater historical setttlemtn complexity; in Panel C it is an indicator variable that equals 1 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 1 if an ethnic group has a greater first principal component after conducting principal component analysis using jurisdictional hierarchy, settlement complexity, log of slave exports normalized by land area, log of population density in 1960, and an indicator variable that equals 1 if a major city was present in 1800. Observations are restricted to be within 100km (columns 1 & 3), 80km (columns 2 & 5) and 60km (columns 3 & 6) 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.

to segmentary lineage organization.

6. Mechanisms

A. *Onset and Duration*

To this point, our findings suggest that segmentary lineage organization causes ethnic groups to experience greater conflict. This could be either because there are more new conflicts (onsets), because any conflict that starts last longer, or both. To better understand the reason behind greater conflict, we estimate the following discrete-time logistic hazard model:[29]

$$\log\left[\frac{h_{i,t}^{onset}}{1-h_{i,t}^{onset}}\right] = \theta(t) + \beta I_{e(i)}^{SL} + \mathbf{X}'_{e(i)}\mathbf{\Gamma} + \varepsilon_{i,t} \tag{3}$$

where $h_{i,t}^{onset}$ is the discrete-time hazard rate: $h_{i,t}^{onset} = \text{prob}(T_i = t | T_i \leq t; \mathbf{X})$, where T_i denotes the time at which the end of the episode of peace (i.e., conflict onset) occurs. e indexes ethnic groups, i episodes of peace, and t years into the episode of peace. We estimate $\theta(t)$ using a third-order polynomial in duration. The sample includes all episodes of peace – i.e., years and ethnic groups that are 'at risk' of conflict onset. In equation (3), we assume that $h_{i,t}^{onset}$ follows a logistic distribution.

The estimating equation for conflict offset is:

$$\log\left[\frac{h_{i,t}^{offset}}{1-h_{i,t}^{offset}}\right] = \psi(t) + \gamma I_{e(i)}^{SL} + \mathbf{X}'_{e(i)}\mathbf{\Omega} + \epsilon_{i,t} \tag{4}$$

where $h_{i,t}^{offset}$ 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 end of the episode of war (i.e., conflict offset) occurs.e indexes ethnic groups, i episodes of conflict, and t years into the conflict episode. We estimate $\psi(t)$ using a third-order polynomial in duration. The sample includes all episodes of conflict – i.e., years and ethnic groups that are 'at risk' of the offset of conflict. As in equation (3), here too we assume that $h_{i,t}^{offset}$ follows a logistic distribution.

Estimates of equations (3) and (4) are reported in Table 10. 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 only include the third-order duration polynomials – i.e., $\theta(t)$ and $\psi(t)$, respectively. In columns 2 and 5, we add country fixed effects, while in columns 3 and 6 we

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

add the geographical and historical controls. Each panel of the table reports estimates for a different form of conflict.

We find evidence that both onset and offset appear to be affected by segmentary lineage systems. Looking at all forms of conflict, we find positive estimates of the effect of segmentary lineage organization on conflict onset. Segmentary lineage is associated with a greater probability of conflicts starting. We also estimate a negative effect of segmentary lineage organization on conflict offset. That is, segmentary lineage is associated with wars being less likely to end and thus lasting longer after they start. The effect of segmentary lineage on offset appears to be greater than for onset. The point estimates are consistently larger and more robustly significant. The nature of the estimates are similar when conflicts are disaggregated into civil conflicts and non-civil conflicts, or when small-scale within-group conflicts are examined.

Overall, both conflict onset and conflict offset appear to be important channels, although the offset estimates are larger and more precisely estimated. The effect of segmentary lineage on the length of conflicts once they start is consistent with an observation that emerges from the case study literature: segmentary lineage societies, because they are able to mobilize large number of combatants, may have a particularly large influence on the duration and scale of conflicts. Once a conflict starts, it may be much more likely to escalate in segmentary lineage societies.

B. ***Conflict Scale***

As another way of gaining an better understanding of the mechanisms underlying our estimates, we also examine the effects of segmentary lineage on conflicts of different sizes: 0 deaths, 1-10 deaths, 11-100 deaths, 100+ deaths. Negative binomial estimates of equation (1), but with the incidence of conflicts of different sizes as the outcome variable, are reported in Table 11. In all specifications, we control for country fixed effects, geographical controls, and historical controls.

While the segmentary lineage indicator is positive and significant in all columns, the interesting fact here is that the magnitude of the coefficient increases monotonically as the number of fatalities rise. This is also true for all four types of conflicts examined. For all conflicts, the estimated effect is 3 times larger for events that involve more than 100 casualties as compared to incidents with no casualties. This is even more stark when one recognizes that larger conflicts are much more rare than smaller conflicts. At the bottom of each panel, we report the mean of the dependent variables.

Table 10: Estimated effects of segmentary lineage on conflict onset and duration.

	(1)	(2)	(3)	(4)	(5)	(6)
	Outcome Var. is Conflict Onset			Outcome Var. is Conflict Offset		
			Panel A: All Conflicts			
Segmentary Lineage	0.472***	0.266	0.313	-0.753***	-0.850***	-0.805***
	(0.181)	(0.224)	(0.278)	(0.166)	(0.233)	(0.239)
Mean of Outcome Var.	0.23	0.23	0.23	0.18	0.18	0.18
Ethnic groups	120	117	113	137	129	125
Observations	1,162	1,143	1,094	1,303	1,183	1,164
			Panel B: Civil Conflicts			
Segmentary Lineage	0.712***	0.449*	0.477*	-0.741***	-0.996***	-0.988***
	(0.180)	(0.231)	(0.258)	(0.193)	(0.245)	(0.276)
Mean of Outcome Var.	0.20	0.20	0.20	0.28	0.28	0.28
Ethnic groups	138	134	130	124	119	115
Observations	1,488	1,464	1,410	977	951	937
			Panel C: Non-Civil Conflicts			
Segmentary Lineage	0.703***	0.513**	0.551**	-0.775***	-0.807***	-0.696***
	(0.176)	(0.206)	(0.241)	(0.187)	(0.236)	(0.248)
Mean of Outcome Var.	0.21	0.21	0.21	0.23	0.23	0.23
Ethnic groups	135	130	126	129	120	116
Observations	1,442	1,403	1,346	1,023	904	893
			Panel D: Intra-Group Conflicts			
Segmentary Lineage	0.761***	0.492**	0.414*	-0.553***	-0.621***	-0.633**
	(0.174)	(0.205)	(0.251)	(0.183)	(0.238)	(0.266)
Mean of Outcome Var.	0.17	0.17	0.17	0.30	0.30	0.30
Ethnic groups	141	135	131	120	115	112
Observations	1,702	1,659	1,600	763	734	725
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 onset. In this context, survival is continued peace. Columns 4-6 report estimates of a discrete time hazard model for incidence of conflict offset. In this setting, survival is continued conflict. 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 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. Robust standard errors, clustered at the ethnicity level, are reported in parentheses. *, **, and *** indicate significance at the 10%, 5%, and 1% levels.

Table 11: Negative binomial estimates of the effect of Segmentary Lineage Systems on conflict of different sizes.

Outcome Variable:	Incidents with 0 deaths	Incidents with 1-10 deaths	Incidents with 11-100 deaths	Incidents with 100+ deaths
	(1)	(2)	(3)	(4)
		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: Intra-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 1 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 control,' (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 1 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.

These findings are consistent with the large and robust estimates of the effect of segmentary lineage on duration. Taken together, the estimates suggest that segmentary lineage is associated with the presence of larger wars that also last longer.

7. Discussion and Concluding Thoughts

In this paper we have tested a long-standing hypothesis from anthropology about the relationship between the presence of segmentary lineage organization in society and the presence of conflict. An ethnographic literature suggests that such societies were able to organize large numbers of men for warfare, against other segments in the same society, and also against other societies. Though the idea that such societies are prone to conflict and violence for this reason could be dated to the work of Evans-Pritchard in the 1930s, and particularly to Sahlins (1961), to our knowledge it has never been empirically tested.

To investigate these ideas, we collected information from existing ethnographic sources on the social structure of 145 African societies. From this we constructed our primary variable of interest, an indicator variable that measures whether whether or not segmentary lineage organization was present historically.

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 grid-cells we then estimated the the effect of segmentary lineage organization on conflict using a regression discontinuity approach. This approach allowed us to better control for any omitted factors that change smoothly over space – e.g., geographic and ecological characteristics, historical shocks, idiosyncratic trends, etc.

The estimation results from both strategies were similar, and both found a strong positive relationship between segmentary lineage organization and conflict today. We found that this relationship is present for all types of conflicts examined – from civil conflicts to within-group conflicts that occur at the local level.

We then tested the validity of existing case study and historical arguments that a primary mechanism linking segmentary lineage organization to conflict is that it tends to exacerbate minor conflicts, resulting in the scaling-up and lengthening of the duration of conflicts that otherwise

would have been very small and short in duration. Estimating hazard models, we find that segmentary lineage organization does have a particularly large effect on the duration of existing conflicts. In addition, we do find that it has a smaller, but still significant effect on the onset of new conflicts.

Overall, our findings provide support for existing hypotheses that were based on ethnographic case study evidence. Segmentary lineage societies, even today, are more prone to conflict and to conflicts that are larger in scale and duration.

Our findings contribute to a better understanding of the determinants of conflict today. Though existing theories have emphasized various types of factors which influence the intensity of 'greed' and 'grievance' and factors like state capacity or 'rough terrain,' which influence the probability of success once a civil war is launched, many unresolved puzzles remain. Perhaps the most obvious is why some groups, once they decide to launch an armed conflict, are much more successful at recruiting armed men and mobilizing forces than others. It is hard to imagine, for example, that the success of Boko Haram in Northern Nigeria can simply be attributed to the extent of greed and grievances. 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. No doubt also the North 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 what anthropologists call a segmentary lineage society.

That there is a connection between segmentary lineage societies and Boko Haram has been argued by Akbar Ahmed who argues that they actively recruit where segmentary lineage structures are most prominent. Ahmed avers:

> "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

> Nigerian history, who Boko Haram announced was Fulani, blew himself up in the national police headquarters in Abuja in June 2011" (2014, p. 129).

Though we have conducted our analysis within Africa because of the rich geocoded sub-national conflict data, the applicability of the ideas we present is not restricted to that continent. Osama bin Laden and many individuals recruited to Al Qaeda were and are Yemeni, and "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, 2013, p. 110). The same logic of conflict and revenge among segmentary groups in Somalia and Sudan applies to the Yemeni. According to 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). This group response to and group responsibility for conflict can cause conflict to persist. The more "distant" the two individuals who initiate the conflict (by homicide, etc.), the more people are likely to ultimately be involved.

Understanding segmentary lineage systems is not merely an intellectual exercise or new way to understand violence in several African countries. It may also shed important light and new understanding on key international security issues. It is associated not only with local-level warfare but also with patterns of international conflict, violence, and terrorism. Ahmed 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 speech, Ahmed (2013) claimed,

> "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."

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. Salzman 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" (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.[30] Thus, although the relationship between social structure and violence has received little attention in empirical work, our finding suggest that it may be a crucial driver of global conflict.

[30]This logic is moreover not confined to the writing of academic anthropologists. Philip Zeman (2009), 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" (ibid.).

References

Ahmed, Akbar, *The Thistle and the Drone: How America's War on Terror Became a Global War on Tribal Islam*, Brookings Institution Press, 2013.

Allen, Tim and Koen Vlassenroot, *The Lord's Resistance Army: Myth and Reality*, London: Zed Books, 2010.

Altonji, Joseph G., Todd E. Elder, and Christopher R. Taber, ""An Evaluation of Instrumental Variable Strategies for Estimating the Effects of Catholic Schooling," *Journal of Human Resource*, 2005, *40* (4), 791–821.

Andre, Catherine and Jean-Philippe Platteau, "Land Relations under Unbearable Stress: Rwanda Caught in the Malthusian Trap," *Journal of Economic Behavior & Organization*, 1998, *34* (1), 1–47.

Angrist, Joshua D. and Jorn-Steffen Pischke, *Mostly Harmless Econometrics*, Princeton: Princeton University Press, 2008.

Ansell, Christopher K. and John F. Padgett, "Robust Action and the Rise of Medici, 1400-1434," *American Journal of Sociology*, May 1993, *98* (6), 1259–1319.

Ardener, Edwin, *Coastal Bantu of the Cameroons (the Kpe-Mboko, Duala-Limba and Tanga-Yasa groups of the British and French trusteeship territories of the Cameroons)*, London: International African Institute, 1956.

Banfield, Edward C., *The Moral Basis of a Backward Society*, Glencoe IL: The Free Press, 1958.

Barth, Fredrik, "Descent and Marriage Reconsidered," in Jack Goody, ed., *The Character of Kinship*, Cambridge: Cambridge University Press, 1973, pp. 3–19.

Becker, Gary, *A Treatise on the Family*, Cambridge, MA: Harvard University Press, 1981.

Blattman, Christopher and Edward Miguel, "Civil War," *Journal of Economic Literature*, 2010, *48* (1), 3–57.

Bo, Ernesto Dal, Pedro Dal Bo, and Jason Snyder, "Political Dynasties," *Review of Economic Studies*, 2009, *76* (1), 115–142.

Bohannon, Laura, "Political Aspects of Tiv Social Organization," in John Middleton and David Tait, eds., *Tribes Without Rulers*, London: Routledge Keegan & Paul, 1958, pp. 33–67.

Butt, Audrey J., *The Nilotes of the Anglo-Egyptian Sudan and Uganda*, London: International African Institute, 1952.

Carsten, Janet, *After Kinship*, New York: Cambridge University Press, 2003.

Cederman, Lars-Erik, Kristian Skrede Gleditsch, and Halvard Buhaug, *Inequality, Grievances, and Civil War*, New York: Cambridge University Press, 2013.

Ciccone, Antonio, "Estimating the Effects of Transitory Income Shocks on Civil Conflict," *Review of Economics and Institutions*, 2013, *4* (2), 1–14.

Collier, Paul and Nicholas Sambanis, *Understanding Civil War: Evidence andAnalysis, Vol. 1-Africa, Washington:*, Washington: World Bank Publications, 2005.

_ **and** _ , *Understanding Civil War: Evidence andAnalysis, Vol. 1-Africa, Washington:*, Washington: World Bank Publications, 2005.

Colson, Elizabeth, "The Plateau Tonga of Northern Rhodesia," in Elizabeth Colson and Max Gluckman, eds., *Seven Tribes of British Central Africa*, New York: Oxford University Press, 1951, pp. 94–102.

Combs-Schilling, M. Elaine, "Family and Friend in a Moroccan Boom Town: The Segmentary Debate Reconsidered," *American Ethnologist*, 1985, *12* (4), 659–675.

Crost, Benjamin, Joseph Felter, and Patrick Johnston, "Aid under Fire: Development Projects and Civil Conflict," *American Economic Review*, 2014, *104* (6), 1833–1856.

Cruz, Cesi, Julien Labonne, and Pablo Querubin, "Politician family networks and electoral outcomes: Evidence from the Philippines," 2015. Mimeo.

Debos, Mariella, "Living by the Gun in Chad: Armed Violence as a Practical Occupation," *Journal of Modern African Studies*, 2011, *49* (3), 409–428.

Debos, Marielle, *Living by the Gun in Chad*, London: Zed Books, 2016.

Dell, Melissa, "The Persistent Effect of Peru's Mining Mita," *Econometrica*, 2010, *78* (6), 1863–1903.

Depetris-Chauvin, Emilio, "State History and Contemporary Conflict: Evidence from Sub-Saharan Africa," 2014. Mimeo, Brown University 2679594.

Djankov, Simeon and Marta Reynal-Querol, "Poverty and Civil Wars: Revisiting the Evidence," *Review of Economics and Statistics*, 2010, *92* (4), 1035–1041.

Douglas, Mary, *The Lele of Kasai*, London: International African Institute, 1963.

Dresch, Paul, *Tribes, Government and History in Yemen*, New York: Oxford University Press, 1989.

Dube, Oeindrila and Juan F. Vargas, "Commodity Price Shocks and Civil Conflict: Evidence from Colombia," *Review of Economic Studies*, 2013, *80* (4), 1384–1421.

Dunning, Thad and Lauren Harrison, "Cross-Cutting Cleavages and Ethnic Voting: An Experimental Study of Cousinage in Mali," *American Political Science Review*, 2010, *104* (1), 21–39.

Eldredge, Elizabeth A., *Creation of the Zulu Kingdom, 1815-1828: War, Shaka, and the Consolidation of Power*, New York: Cambridge University Press, 2014.

Esteban, Joan, Laura Mayoral, and Debraj Ray, "Ethnicity and Conflict: An Empirical Study," *American Economic Review*, 2012, *102* (4), 1310–1342.

Evans-Pritchard, E. E., *The Nuer*, Oxford: Clarendon, 1940.

_ , "The Nuer of Southern Sudan," in E. E. Evans-Pritchard and Meyer Fortes, eds., *African Political Systems*, New York: Oxford University Press, 1940, pp. 272–297.

_ **and Meyer Fortes**, "Introduction," in E. E. Evans-Pritchard and Meyer Fortes, eds., *African Political Systems*, New York: Oxford University Press, 1940, pp. 1–25.

Fearon, James D. and David D. Laitin, "Ethinicity, Insurgency, and Civil War," *American Political Science Review*, 2003, *97* (1), 75–90.

Ferrara, Eliana La, "Descent Rules and Strategic Transfers. Evidence from Matrilineal Groups in Ghana," *Journal of Development Economics*, 2007, *83* (2), 280–301.

Forde, Daryll, "The Conditions of Social Development in West Africa: Retrospect and Prospect," *Civilisations*, 1953, *3* (4), 471–489.

_ , "Ecology and Social Structure," *Proceedings of the Royal Anthropological Institute of Great Britain and Ireland*, 1970, pp. 15–29.

Fortes, Meyer, "The Structure of Unilineal Descent Groups," *American Anthropologist*, 1953, *55* (1), 17–41.

Gelman, A. and G. Imbens, "Why High-order Polynomials Should not be Used in Regression Discontinuity Designs," 2014. Working Paper No. 20405, National Bureau of Economic Research.

Gennaioli, Nicola and Ilia Rainer, "The Modern Impact of Precolonial Centralization in Africa," *Journal of Economic Growth*, 2007, *12* (3), 185–234.

Gleditsch, Kristian Skrede and Andrea Ruggeri, "Political Opportunity Structures, Democracy, and Civil War," *Journal of Peace Research*, 2010, *47* (3), 299–310.

Gluckman, Max, "The Kingdom of the Zulu in South Africa," in E. E. Evans-Pritchard and Meyer Forter, eds., *African Political Systems*, New York: Oxford University Press, 1940, pp. 25–55.

_ , "Kinship and Marriage among the Lozi of Northern Rhodesia and the Zulu of Natal," in A. R. Radcliffe-Brown and Daryll Forde, eds., *African Systems of Kinship*, New York: Oxford University Press, 1950, pp. 166–206.

_ , "The Lozi of Barotseland in North-Western Rhodesia," in Elizabeth Colson and Max Gluckman, eds., *Seven Tribes of British Central Africa*, New York: Oxford University Press, 1951, pp. 1–93.

Gneezy, Uri, Kenneth L. Leonard, and John A. List, "Gender Differences in Competition: Evidence from a Matrilineal and a Patriarchichal Society," *Econometrica*, 2009, *77* (5), 1637–1664.

Greif, Avner, "Cultural Beliefs and the Organization of Society: A Historical and Theoretical Reflection on Collectivist and Individualist Societies," *Journal of Political Economy*, 1994, *102* (5), 912–950.

_ **and Guido Tabellini**, "Cultural and Institutional Bifurcation: China and Europe Compared," *American Economic Review*, 2010, *100* (2), 135–140.

Grosjean, Pauline, "A History of Violence: The Culture of Honor and Homicide in the U.S. South," *Journal of the European Economic Association*, 2014, *12* (5), 1285–1316.

Hamilton, W.D., "The Evolution of Altruistic Behavior," *American Naturalist*, 1963, *97* (896), 354–356.

Henderson, J. Vernon, Adam Storeygard, and David N. Weil, "Measuring Economic Growth from Outer Space," *American Economic Review*, 2012, *102* (2), 994–1028.

Henrich, Natalie and Joseph Henrich, *Why Humans Cooperate*, New York: Oxford University Press, 2007.

Hoehne, Markus V., *Between Somaliland and Puntland: Marginalization, Militarization and Conflicting Political Visions*, London: Rift Valley Institute, 2015.

Hoffman, Danny, *The War Machines: Young Men and Violence in Sierra Leone and Liberia*, Durham, NC: Duke University Press, 2011.

Humphries, Macartan and Jeremy Weinstein, "Who Fights? The Determinants of Participation in Civil War," *American Journal of Political Science*, 2008, *52* (2), 436–455.

Jenkins, Stephen P., "Easy Estimation Methods for Discrete-Time Duration Models," *Oxford Bulletin of Economics and Statistics*, 1995, *57* (1), 129–138.

Kelly, Raymond C., "A Note on Nuer Segmentary Organization," *American Anthropologist*, 1983, *85* (4), 905–906.

_ , *The Nuer Conquest: The Structure and Development of an Expansionist System*, Ann Arbor: University of Michigan Press, 1985.

Kuper, Adam, "Lineage Theory: A Critical Retrospect," *Annual Review of Anthropology*, 1982, *11*, 71–95.

_ , *Anthropology and Anthropologists: The British School in the Twentieth Century 4th Edition*, New York: Routledge, 2014.

Kurimoto, Eisei and Simon Simonse, *Conflict, Age and Power in North East Africa: Age Systems in Transition*, Oxford: James Currey, 1998.

Lewis, Ioan M., *A Pastoral Democracy*, Oxford: Oxford University Press, 1961.

_ , "The Ogaden and the Fragility of Somali Segmentary Nationalism," *African Affairs*, 1989, *88* (353), 573–579.

_ , *Blood and Bone: The Call of Kinship in Somali Society*, Trenton: The Red Sea Press, 1994.

Lienhardt, Godfrey, "The Western Dinka," in John Middleton and David Tait, eds., *Tribes Without Rulers*, London: Routledge Keegan & Paul, 1958, pp. 97–136.

Lowes, Sara, "Kinship Systems, Gender Norms, and Household Bargaining: Evidence from the Matrilineal Belt," 2016. Working paper, Harvard University.

Lowie, Robert H., *Primitive Society*, New York: Liveright, 1921.

Massing, Andreas, *The Economic Anthropology of the Kru*, Frankfurt: Studien zur Kulturkunde, 1980.

McGovern, Michael, *Making War in the Cote d'Ivoire*, Chicago: University of Chicago Press, 2011.

Michalopoulos, Stelios and Elias Papaioannou, "Precolonial Ethnic Institutions and Contemporary African Development," *Econometrica*, 2013, *81* (1), 113–152.

_ **and** _ , "National Institutions and Subnational Development in Africa," *Quarterly Journal of Economics*, 2014, *129* (1), 151–213.

_ **and** _ , "The Long-Run Effects of the Scramble in Africa," *American Economic Review*, 2016, *106* (7), 1802–1848.

Middleton, John and David Tait, "Introduction," in John Middleton and David Tait, eds., *Tribes Without Rulers*, London: Routledge Keegan & Paul, 1958, pp. 1–32.

Miguel, Edward, Shanker Satyanath, and Sebastian Saiegh, "Economic Shocks and Civil Conflict: An Instrumental Variables Approach," *Journal of Political Economy*, 2004, *112* (4), 725–753.

Montalvo, Jose and Marta Reynal-Querol, "Ethnic Polarization, Potential Conflict, and Civil Wars," *American Economic Review*, 2005, *95* (3), 796–816.

Murdock, George Peter, *Africa: Its Peoples and Their Cultural History*, New York: McGraw-Hill Book Company, 1959.

Naidu, Suresh, James A. Robinson, and Lauren Young, "Social Origins of Dictatorship: Theory and Application to Haiti," 2015. Mimeo, Columbia University.

Nisbett, Richard E. and Dov Cohen, *Culture of Honor: The Psychology of Violence in the South*, Boulder: Westview Press, 1996.

Nunn, Nathan, "The Long-Term Effects of Africa's Slave Trades," *Quarterly Journal of Economics*, 2008, *123* (1), 139–176.

_ **and Leonard Wantchekon**, "The Slave Trade and Origins of Mistrust in Africa," *American Economic Review*, 2011, *101* (7), 3221–3252.

_ **and Nancy Qian**, "US Food Aid and Civil Conflict," *American Economic Review*, 2014, *104* (6), 1630–1666.

Oster, Emily, "Unobservable Selection and Coefficient Stability: Theory and Evidence," 2014. Mimeo, University of Chicago Booth School of Business.

Querubín, Pablo, "Family and Politics: Dynastic Persistence in the Philippines," *Quarterly Journal of Political Science*, 2016, *11* (2), 151–181.

Radcliffe-Brown, A. R., "Introduction," in A. R. Radcliffe-Brown and Daryll Forde, eds., *African Systems of Kinship and Marriage*, 1950: Oxford University Press, 1950, pp. 1–60.

Ree, Joppe De and Eleonora Nillesen, "The Impact of Foreign Aid on the Risk of Civil Conflict in Sub-Saharan Africa," *Journal of Development Economics*, 2009, *88* (2), 301–313.

Richards, Audrey I., "Some Types of Family Structure amongs the Central Bantu," in A.R. Radcliffe and Daryll Forde, eds., *African Systems of Kinship and Marriage*, New York: Oxford University Press, 1950.

Richards, Paul, *Fighting for the Rain Forest: War Youth and Resources in Sierra Leone*, New York: Heinemann, 1996.

Robinson, James A., "Social Identity, Inequality and Conflict," *Economics of Governance*, 2001, *2*, 85–99.

Ross, Michael L., "What Do We Know About Natural Resources and Civil War?," *Journal of Peace Research*, 2004, *41* (3), 337–356.

_ , "A Closer Look at Oil, Diamonds and Civil War," *Annual Review of Political Science*, 2006, *9*, 265–300.

Rouch, Jean, *Les Songhay*, Paris: L'Harmattan, 1954.

Sahlins, Marshall D., "The Segmentary Lineage: An Organization of Predatory Expansion," *American Anthropologist*, 1961, *63* (2), 322–345.

_ , *What kinship is–And is Not*, Chicago: University of Chicago Press, 2013.

Salzman, Philip C., "Ideology and Change in Middle Eastern Tribal Societies," *Man*, 1978, *13* (4), 618–637.

_ , *Culture and Conflict in the Middle East*, New York: Prometheus Books, 2007.

Schneider, David M., *A Critique of the Study of Kinship*, Ann Arbor: University of Michigan Press, 1984.

Smith, M.G., "On Segmentary Lineage Systems," *Journal of the Royal Anthropological Institute of Great Britain and Ireland*, 2009, *86* (2), 39–80.

Southall, Aidan, *Alur Society: A Study in Processes and Types of Domination*, Cambridge: W. Heffer and Sons Ltd., 1956.

Stearns, Jason, *Raia Mutomboki: The Flawed Peace Process in the DRC and the Birth of an Armed Franchise*, London: Rift Valley Institute, 2013.

Terretta, Meredith, *Nation of Outlaws, State of Violence: Nationalism, Grassfields Tradition, and State Building in Cameroon*, Athens: Ohio University Press, 2013.

Verdon, Michel, "Where Have All Their Lineages Gone?," *American Anthropologist*, 1982, *84* (3), 566–579.

Weinstein, Jeremy M., *Inside Rebellion: The Politics of Insurgent Violence*, New York: Cambridge University Press, 2006.

Wolf, Jan J. De, "Ecology and Conquest: Critical Notes on Kelly's Model of Nuer Expansion," *Ethnology*, 1990, *29* (4), 341–363.

Wood, Elizabeth, *Insurgent Collective Action and Civil War in El Salvador*, New York: Cambridge University Press, 2003.

Zeman, Phillip M., "Tribalism and Terror: Report from the Field," *Small Wars & Insurgencies*, 2009, *20* (3–4), 681–709.