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**ABSTRACT**

Scholars have pointed to ethnic and other social divisions as a leading cause of economic underdevelopment, due in part to their adverse effects on public good provision and collective action. We investigate this issue in post-war Sierra Leone, one of the world's poorest countries. To address concerns over endogenous local ethnic composition, and in an advance over most existing work, we use an instrumental variables strategy relying on historical ethnic diversity data from the 1963 Sierra Leone Census. We find that local ethnic diversity is not associated with worse local public goods provision across a variety of outcomes, regression specifications, and diversity measures, and that these “zeros” are precisely estimated. We investigate the role that two leading mechanisms proposed in the literature – enforcement of collective action by strong local government authorities, and the existence of a common national identity and language – in generating these perhaps surprising findings.

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## **1. Introduction**

Many scholars have argued that ethnic diversity is an important impediment to economic and political development. Economic growth rates are slower in ethnically diverse societies, and local public goods provision often suffers (Easterly and Levine 1997, Alesina et al. 1999, Alesina et al. 2003, Fearon 2003). The inability to overcome the public good free-rider problem in diverse communities, due to monitoring and enforcement limitations, is the leading explanation proposed for less developed countries (Miguel and Gugerty 2004, Habyarimana et al 2007, 2009). These issues are particularly salient in sub-Saharan Africa, the world's most ethno-linguistically diverse region.

This paper examines the relationship between ethnic diversity and local collective action, public goods, and social capital outcomes in post-war Sierra Leone, using new datasets designed for this purpose. Sierra Leone is among the world's poorest and most ethnically diverse countries, and is recovering from a decade of civil war that displaced millions and caused untold human suffering. Ethnic appeals and divides are salient in national politics in Sierra Leone, making it a reasonable setting to test the thesis that ethnic divisions stifle local public service delivery and economic development.

Both here and in other studies, the endogenous residential sorting of individuals complicates the reliable estimation of ethnic diversity impacts, and a main contribution of this paper is the progress we make in addressing this issue. Recent sorting is likely to be particularly problematic in Sierra Leone, where many fled civil war violence. We first document that there was, in fact, systematic movement of individuals towards areas where their own ethnic group was historically more numerous. These preferences vary strongly as a function of individual characteristics, with, for example, education being associated with more residential movement to diverse areas. This finding underlines the possibility that correlations between ethnic diversity and local public goods outcomes might be biased.

In a methodological advance over most of the empirical ethnic diversity literature, we use historical ethnic composition measures from the 1963 Sierra Leone Population Census as instrumental variables (IV) for current ethnic diversity to address the endogeneity problem created by migration. We find that in

rural areas the historical ethnic diversity measures strongly predict current diversity, with a coefficient estimate of 0.8 in the first stage regression.

Using this IV approach, the paper's main finding is that local ethnic diversity is not associated with worse local public goods or collective action outcomes in Sierra Leone. This holds across a variety of regression specifications, measures of diversity, levels of aggregation, and outcomes that capture local collective action, including road maintenance, community group membership, trust, and school funding and staffing. Some of the outcomes are very important for local economic development. For instance, road maintenance – the clearing of tropical brush that quickly engulfs dirt paths, as well as the construction of road drainage ditches and bridges – is a critical infrastructure investment in rural areas. Without it, trade and contact with the outside world becomes more expensive and less frequent, and in the extreme some villages would be very isolated from their neighbors. We use a mean effects analysis to jointly consider the effect of diversity on groups of related outcomes (e.g., trust measures, school quality measures). We measure these “zero” impacts precisely, and thus with high levels of confidence can rule out that ethnic diversity has even a moderate adverse impact on local outcomes.

The IV approach would not be valid if there had already been systematic residential sorting correlated with local public goods quality by 1963, the year of the historical census data. However, we document the absence of any historical correlation between ethnic diversity and socioeconomic measures (including literacy and formal employment), suggesting that little such sorting had taken place. Our results are also robust to excluding both urban areas and areas in the country's east that benefited from the diamond boom of the 1950s where pre-1963 sorting might have been more of an issue.

These results quantify and reinforce claims by several scholars that, despite the leading role of ethnic appeals in national politics, ethnic divisions have been much less damaging in Sierra Leone than in many of its African neighbors, and in particular were not a leading factor in the recent 1991-2002 civil war. The Revolutionary United Front (RUF) rebels targeted people from all ethnic groups, and statistical analysis of documented human rights violations shows that no ethnic group was disproportionately victimized. There is also no evidence that civilian abuse was worse when armed factions and communities

belonged to different ethnic groups (Humphries and Weinstein 2006). Ethnic grievances were not rallying cries during the war and all major fighting sides were explicitly multi-ethnic (Keen 2005).

Beyond documenting the lack of a relationship between ethnic diversity and local public goods, we also discuss the institutional and historical factors that foster inter-ethnic cooperation. Improving our understanding of how inter-ethnic cooperation emerges could be valuable for other diverse societies. Recent research on other African societies finds that ethnic diversity's impacts depend on local history and context, including both formal institutions and informal social norms. Miguel (2004) finds no diversity impacts on local outcomes in Tanzania, a country whose leadership has consistently sought to bridge ethnic divisions by promoting a common language (Swahili) and abolishing traditional tribal chiefs, but does find adverse diversity impacts in neighboring Kenya, where post-independence leaders have exacerbated ethnic divisions for political gain. Posner (2004) examines two ethnic groups that straddle the Zambia-Malawi border, and finds that national political rivalry between them translates into worse local relations in Malawi, in contrast to Zambia, where they are not on opposing political sides.<sup>1</sup>

In contrast to the relatively successful Tanzanian and Zambian cases, a leading explanation for Sierra Leone's relatively good inter-ethnic cooperation is the presence of strong traditional local authorities that help overcome the classic free-rider problem in local public goods provision. One persistent consequence of Britain's colonial system of "decentralized despotism" (Mamdani 1996) in Sierra Leone was the empowerment of Paramount Chiefs, elected from and by tribal "ruling families". Chiefs collect local taxes, diamond mining and logging royalties and market fees, and serve as the final arbiter in local courts. These Chiefs, who effectively have lifetime tenure, together with an entire

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<sup>1</sup> In a recent contribution, Dunning and Harrison (2010) argue that cross-cutting "joking cousinage" institutions limit ethnic salience in Mali. These cousinage institutions are not found among Sierra Leone's main ethnic groups, although they do exist in Kuranko areas in the north (Jackson 1974). Baldwin and Huber (2010) argue that between-group economic inequality is the key driver of adverse ethnic diversity impacts observed across countries.

hierarchy of village chiefs and village elders that they head, continue to dominate local politics, and have the authority to punish free-riders through fines, public embarrassment, and corporal punishment.<sup>2</sup>

There is also a broader historical context which may help explain the relative lack of tensions among Sierra Leone's main ethnic groups. At the time of the founding of the Sierra Leone colony in the late 18<sup>th</sup> century and through much of the 19<sup>th</sup> century, Krio (Creoles), former slaves who returned to Africa to settle Freetown, enjoyed a relatively privileged political and economic position due to their facility with English and special links with the British even though they were numerically small. Before independence, the key political division in Sierra Leone was Krio vs. non-Krio, but because of growing tensions between the Krio and "up country" ethnic groups, the British progressively limited their political power. After independence, the fact that the country's long-serving dictator Siaka Stevens belonged to a small ethnic group (Limba), rather than one of the country's two dominant groups (Mende and Temne), may have helped to further limit the politicization of ethnicity between the largest groups.

The Krio people gave Sierra Leone their language, also called Krio, which is a dialect of English that has been influenced by Portuguese, Arabic, Yoruba and many African languages as a legacy of the slave trade. Serving as a national lingua franca for decades, Krio is currently spoken (usually as a second language) by nearly all Sierra Leoneans, and is increasingly taught in schools. In many other African countries the lingua franca is the former colonial language, usually English or French. While Krio has a base in English, it is unique to Sierra Leone and widely spoken even by those with no schooling. While the existence of a common national language is clearly insufficient to guarantee social stability – as the African cases of Rwanda and Somalia poignantly illustrate – Krio's ubiquity in Sierra Leone may (through historical accident) help promote the consolidation of a common national identity that transcends tribe (Ngugi 2009), as with Swahili in post-independence Tanzania.

While ethnic diversity does not impede local collective action, and ethnic divisions did not feature prominently in the civil war, it would be wrong to conclude that ethnic identity is unimportant in

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<sup>2</sup> Ostrom (1990) is seminal work on how communities overcome free-riding to achieve collective action.

contemporary Sierra Leonean society. Our migration findings show that Sierra Leoneans strongly prefer to move to areas where their own ethnic group is numerous, perhaps to benefit from ethnic job networks, informal insurance, or patronage from co-ethnic chiefs. Casey (2009) also finds that ethnicity remains salient in national politics. The two major political parties, SLPP and the APC (discussed below) have strong, long-standing ethnic ties, the SLPP being connected to the Mende and other ethnic groups in the South and the APC to the Temne and other northern groups. To illustrate, in the 2007 Parliamentary elections the APC won 36 of 39 seats in North while the SLPP (and its splinter party, the PMDC) swept 24 of 25 seats in the South. But there are limits to ethnic voting in Sierra Leone: while voters strongly prefer the party linked to their own group, Casey uses exit poll data to show that they are much more willing to cross ethnic-party lines in local elections, where they have better information about candidates. Moreover, the APC was able to win the 2007 national elections in part because the Mende splinter PMDC party aligned itself with the APC in the presidential run-off rather than their SLPP co-ethnics. Unlike in Tanzania, where nation-building reforms were accompanied by a dismantling of the entire system of chiefs, in Sierra Leone chieftancy institutions remain powerful. The continued prominence of tribal chiefs in Sierra Leone also arguably makes it more likely that ethnic divisions will at some point re-emerge.

The rest of the paper is organized as follows. Section 2 provides background on economic development and ethnicity in Sierra Leone. Section 3 presents results on ethnic-based migration patterns, and discusses our historical instrumental variable approach. Section 4 describes the estimation strategy and the data, and section 5 presents the main empirical results. Section 6 weighs the contrasting mechanisms that might explain our main results, and the final section concludes.

## **2. Background on Economic Development and Ethnicity Sierra Leone**

Viewed from multiple perspectives, Sierra Leone is among the world's poorest countries. According to the United National Development Program's 2007-2008 Human Development Report, Sierra Leone's human development index in 2005 was 0.336, the lowest score in the world at 177<sup>th</sup> out of 177 countries with data. Per capita GDP (adjusted for purchasing power parity) is US\$806. Life expectancy at birth is a

tragic 41.8 years, ranking Sierra Leone 173<sup>rd</sup> out of 177 countries. Adult literacy is just 34.8%, and while there has been progress in school enrollment after the civil war, gross secondary school enrollment was only 32% in 2007. Nearly half of the population lacked access to an improved water source (such as a borehole well, protected spring, or piping) in 2004. While the recent 1991-2002 civil war is undoubtedly a contributing factor, Sierra Leone already had the second lowest human development index in the world before the war began (UNDP 1993). In fact, the country's disappointing economic performance, together with ubiquitous government corruption, arguably contributed to the outbreak and duration of the war.

Sierra Leone is also one of the world's most diverse countries. The household module of the 2004 Population Census identifies eighteen major ethnic groups. The Mende and Temne are numerically dominant, occupying shares of 32.2% and 31.8%, respectively, while the Limba, Kono, and Kuranko are the next largest groups, at 8.3%, 4.4%, and 4.1%, respectively. Other groups occupy a substantially smaller share, including the Krio, whose population share fell to only 1.4% by 2004. Data from the 1963 Census demonstrates the stability of national ethnic composition over time (Appendix Table A1).

These groups are characterized by distinct customs, rituals, and history, and, most importantly, language. With the exception of Krio, an English dialect, the other languages are members of the Niger-Congo language family. Within this family, the most salient distinction is between the Mande languages – including Mende, Kono, Kuranko, Susu, Loko, Madingo, Yalunka, and Vai – and the Atlantic-Congo languages, including Temne, Limba, Sherbro, Fullah, Kissi, and Krim. These groups are mutually unintelligible to each other, and much further apart linguistically, for example, than English and German.<sup>3</sup>

The 2004 Census contains ethnicity shares at the chiefdom level. Chiefdom boundaries have been relatively unchanged since independence, and the chiefdom is still the geographic unit by which most Sierra Leoneans self-identify their origins, as well as the administrative level at which traditional authorities are organized. There are 149 chiefdoms in the country, and the median chiefdom population is roughly 22,000. Denote ethnicity shares by  $\pi_{ik} = N_{ik}/N_i$ , where  $N_{ik}$  is the number of individuals of

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<sup>3</sup> See for example the World Language Tree of Lexical Similarity (2009).



ethnicity  $k$  living in chiefdom (or EA)  $i$  and  $N_i = \sum_k N_{ik}$  is the total chiefdom population. Using these shares, the standard ethnolinguistic fractionalization measure (which is closely related to a Herfindahl index)

is  $ELF_i = 1 - \sum_{k=1}^K \pi_{ik}^2$ .  $ELF_i$  captures the probability that two individuals randomly chosen from the

population belong to different groups.<sup>4</sup> We also create ethnicity shares at the enumeration area (EA) level.

In rural areas, an EA is equivalent to a medium sized village or a small village and surrounding hamlets.<sup>5</sup>

There are approximately 9,600 EAs in Sierra Leone, with an average population of 483.

The mean of chiefdom ELF in our sample is 0.264 (standard deviation 0.196). Figure 1 presents non-parametric estimates of the distribution of  $ELF_i$  across chiefdoms (panel A) and EAs (panel B). It should be clear from these figures that ethnic diversity is, on average, greater at the chiefdom than at the village level. Across EAs, most of the mass of  $ELF_i$  is in the left tail, while the distribution across chiefdoms is more diffuse. This is consistent with the view that much of the rural population in Sierra Leone is settled in remote and relatively homogeneous communities (the average share of the dominant ethnic group in rural EAs is 88%). Nevertheless, there is considerable variation in ELF even within rural communities, with the average share of the dominant group falling to 63% in the most diverse quartile of EAs.<sup>6</sup> Figure 2 panels A and B map chiefdom ethnic diversity currently and historically, respectively. Visual inspection indicates that diverse areas were likely to remain diverse between 1963 and 2004, a result we confirm in a regression below. Moreover, diverse chiefdoms are found throughout the country.

Questions on religious identification were unfortunately not collected in either the 1963 or 2004 censuses, so we use nationally representative household survey data from the 2005 and 2007 National

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<sup>4</sup> Using Montalvo and Reynal-Querol's (2005) preferred ethnic polarization measure in place of  $ELF_i$  does not change the main result of no ethnic impacts below (not shown).

<sup>5</sup> Sixty-three percent of rural EAs contain only one locality (village), and 90 percent contain three or less.

<sup>6</sup> Note that diversity across EAs is not driven by differences between EAs with one vs. multiple localities. The EA level ELF measures do not change appreciably for EAs that contain a single locality (not shown).

Public Services (NPS) surveys to construct religious diversity measures. We consider the proportion of respondents in each chiefdom who practice the country's two major religions, Islam and Christianity, ignoring their internal subdivisions. Sierra Leone is predominantly Muslim, at 76.8%, but Christianity is also widely practiced (22.4%), with other religions making up the remaining 1%. The mean of chiefdom religious fractionalization is 0.229 (standard deviation 0.179, Appendix Figure A1).

### 3. Migration and the Persistence of Local Ethnic Composition

In this section, we use data from the nationally representative 2007 National Public Services (NPS) household survey to study individual internal migration decisions during and following the war. Many Sierra Leoneans place a high value on living in chiefdoms that were historically settled by members of their own ethnic group, and this preference for residential homogeneity varies across population subgroups, as discussed below. This systematic sorting as a function of local ethnic composition necessitates the use of the instrumental variables strategy presented in section 3.2.

#### 3.1 Revealed Preferences for Ethnic Sorting

The 2007 NPS survey collected information on both respondents' their current and 1990 chiefdom of residence. To understand why individuals moved, we estimate a discrete choice conditional logit model, which can be derived from the following random utility model. Let  $i = 1, \dots, N$  index individuals and  $j = 1, \dots, J$  chiefdoms. We model the indirect utility individual  $i$  obtains from living in chiefdom  $j$  as:

$$(1) \quad V_{ij} = X_{ij}'\beta - \alpha D_{ij} + \varepsilon_{ij}$$

Here,  $X_{ij}$  denotes a  $(K \times 1)$  vector of characteristics for chiefdom  $j$ , including certain characteristics of individual  $i$  interacted with chiefdom values. For example, one component of this vector is the ethnolinguistic fractionalization in chiefdom  $j$ , and another is this value interacted with individual  $i$ 's educational attainment; other specifications focus on the co-ethnic residential share and its interaction with education. It is through these interactions that the discrete choice model captures preference heterogeneity. The variable  $D_{ij}$  denotes the distance between the centroids of individual  $i$ 's home

chiefdom and chiefdom  $j$ . If  $D_{ij}$  is thought of as the “price” individual  $i$  pays to move to chiefdom  $j$ , we can interpret the ratio  $-\beta_k/\alpha$  as the willingness to pay for a one unit increase in characteristic  $X_{kij}$  in terms of kilometers moved. Individual  $i$  chooses to live in chiefdom  $j$  if  $V_{ij} > V_{ij'}$  for all other chiefdoms  $j'$ .

Given these standard assumptions, the probability that individual  $i$  chooses chiefdom  $j$ , denoted  $P_{ij}$ , is:

$$(2) \quad P_{ij} = \frac{\exp\{X_{ij}'\beta - \alpha D_{ij}\}}{\sum_{k=1}^J \exp\{X_{ik}'\beta - \alpha D_{ik}\}}$$

We estimate the model with weighted maximum likelihood to address the choice-based sampling issue.<sup>7</sup>

Of the 5,488 individuals in the sample, 26.5% had moved to a different chiefdom since 1990, and among those who had moved, nearly two-thirds (62.2%) moved to a different district (there are 19 districts in all); Appendix Table A2 presents descriptive statistics. The average distance between the centroids of the 1990 and 2007 chiefdoms of residence for movers was 74.3 kilometers. Information was not collected on migration patterns during the war; we only observe retrospective data on the chiefdom of residence before the war started and the post-war chiefdom of residence in 2007. However, we do know whether anyone from the respondent’s 1990 household was made a refugee: 23.2% of our sample had 1990 household members who temporarily fled Sierra Leone, often to refugee camps in Guinea.

We do not include 2004 chiefdom ethnicity shares when estimating equation 2 because they are endogenous to war and post-war migration choices. Instead, we include chiefdom level ethnicity data from the 1963 Population Census for a predetermined measure (and use this data again below in the construction of historical ethnicity instrumental variables). Table 1 shows the main conditional logit results. All columns include distance  $D_{ij}$  and either the co-ethnic population share in 1963 (columns 1-2) or the 1963 chiefdom *ELF* score (columns 3-4) as the key explanatory variable. Greater distance between

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<sup>7</sup> Because the survey was designed as a stratified random sample (based on current location), the sample is choice-based. Under the assumption that migration between 2004 and 2007 was negligible, which is plausible since most postwar resettlement occurred by 2004, weighted maximum likelihood resolves the issue (see Manski and Lerman, 1977 and Appendix A).

chiefdoms is associated with a lower propensity to move, as expected, and there is a significant positive preference for living in areas traditionally dominated by one's own ethnic group. In column 1, the ratio of these two coefficient estimates implies that individuals are on average willing to travel an additional 10.1 kilometers to live in a chiefdom with a 10 percentage point greater share of her/his own ethnic group. The coefficient estimate on chiefdom *ELF* is also statistically significant (column 3) conditional on other factors (including remoteness from cities as well as population size and density), suggesting a positive preference for diversity, though this is smaller than the preference for a higher co-ethnic share.<sup>8</sup> Sierra Leoneans on average also show a strong preference for moving to chiefdoms with historically larger populations, and a dislike for moving to remote areas or to areas not well connected by roads.<sup>9</sup> Controls for the number of attacks and battles experienced in chiefdom *j* during the war, and the presence of mining operations do not change the estimated willingness to pay for residence with co-ethnics.

We next explore differential willingness to pay for ethnic homogeneity for people who have "some education" and those who have none (column 2 and 4); recall that the median Sierra Leonean adult has zero years of schooling. Educated individuals are less responsive to moving distance and care much less about living in chiefdoms with greater shares of their own ethnic group. The ratio of these two coefficient estimates implies that educated individuals are only willing to travel an additional 8.6 kilometers to live in a chiefdom with 10 percentage point greater share of her/his own ethnic group. This finding suggests that education dampens co-ethnic residential preferences. More educated people are more likely to move to ethnically diverse areas, and this finding underlines the potential for bias in simple OLS estimates. For example, if those with higher education are more likely to move to diverse areas and also exhibit greater participation in collective action, then the OLS coefficient estimate on ethnic diversity could be biased.

Individuals who directly experienced violence during the war find moving greater distances more

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<sup>8</sup> Note that this diversity result holds whether or not the local co-ethnic population share is controlled for.

<sup>9</sup> Beyond Freetown, other towns include the other large cities in Sierra Leone, namely, Makeni, Bo, Kenema, and Koidu, as well as smaller towns such as the district capitals, Kabala and Kailahun Town.

costly, prefer living with co-ethnics and dislike ethnic diversity compared to the average Sierra Leonean (columns 2 and 4).<sup>10</sup> Individuals from chiefly “ruling” families have a somewhat greater aversion to moving further distances away from their home area, which is sensible since their influence rarely extends beyond chiefdom borders, and appear to have stronger co-ethnic residential preferences than others.

### **3.2 Using Historical Data to Identify the Impact of Ethnic Diversity**

In the absence of random assignment of people to locations, the systematic sorting of individuals from particular ethnic groups, or with certain (unobserved) tastes for public goods, into more or less diverse areas could potentially introduce omitted variables bias into cross-sectional estimates of the impact of diversity on local collective action. Recent sorting, during and after Sierra Leone’s 1991-2002 civil war, is a particular concern for our empirical work. Hundreds of thousands abandoned their homes, fleeing violence, and some spent years in refugee camps, while others sought out regions of the country protected from RUF attacks. As discussed above, while 73.5% returned to their 1990 home chiefdom by 2007, those that did not were different on both observable and unobservable characteristics than those that did. This could bias simple OLS estimates of the effect of diversity in a direction that is difficult to sign.

In the ideal thought experiment, the impact of ethnic diversity on local outcomes would be credibly estimated if individuals were first randomly allocated to jurisdictions and then worked together to provide local public goods. In this subsection, we argue that a close historical parallel occurs in areas with stable ethnic land settlement, where the causes of the current residential patterns – in rural west Africa, the slave raids, wars droughts, famines, and epidemics that took place in the 18<sup>th</sup> century if not earlier – are largely

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<sup>10</sup> A number of different interpretations of this result are possible. For example, those who found it more costly to move in the face of approaching violence may have been more likely to experience it directly, or the effects of experiencing violence (e.g., maiming) may have made it harder for them to move and more reliant on local (including ethnically-based) networks. As discussed above, there is no evidence that civil war violence was ethnically targeted, nor do we see civil war violence leading to less local collective action in higher ELF communities in the next section.

uncorrelated with modern-day socioeconomic factors that might affect public goods provision. In particular, we focus on specifications where current local (chiefdom or enumeration area) ethnic diversity is instrumented using historical local diversity measures from the 1963 Population Census. The IV exclusion restriction is that historical ethnic diversity affects only current residential diversity and is not correlated with any unobserved local factors that might change the costs of, or preferences for, providing local public goods. While even longer historical lags, i.e., census data before 1963, would have made the case even stronger, there is unfortunately no comprehensive national population data for earlier periods.

In Sierra Leone, most historical ethnic boundaries were shaped during the period of the Atlantic slave trade, as raiding tribes settled in conquered areas and drove weaker groups deeper into the forest. The Mane, progenitors of the Mende ethnic group, arrived after the collapse of the Mali empire and first settled in today's Sierra Leone in 1545 (Oliver and Atmore, 2001). Throughout the 16<sup>th</sup> and 17<sup>th</sup> centuries, Mane tribes invaded and conquered the ethnic groups that already lived there, reshaping ethnic boundaries and taking prisoners, either to be kept as domestic slaves or for sale to European slave traders.

In a separate historical episode, the Fulbe of Futa Jallon formed a powerful Muslim state in what is now eastern Guinea (which borders Sierra Leone) in 1726, and declared *jihad* against the neighboring tribes. Their state conducted regular slave raids throughout the rest of the 18<sup>th</sup> century, putting pressure on groups to move and resettle, especially into Sierra Leone's northern districts. By the time the first British and freed slaves arrived in Freetown in 1787, most of the current ethnic borders had already been drawn. The decline of the external slave trade during the late 19<sup>th</sup> century, combined with an increased British military and administrative presence in the Protectorate by century's end, partially restrained wars between ethnic groups and helped to preserve largely stable ethnic borders.

The fact that historical ethnic settlement patterns were driven by slave raiding and warfare centuries ago makes it far less likely that local diversity is correlated with omitted factors that would affect current public goods, relative to more recent migration. However, there remain at least five plausible violations of the exclusion restriction – i.e., ways in which historical ethnic diversity might still influence current local public goods provision other than through current ethnic diversity – that merit consideration. For one,

individuals may have different preferences for diversity than society as a whole, relocate based on these preferences, and then pass down to their descendants a higher than average preference for cross-ethnic cooperation. For this mechanism to undermine the validity of our instrument, however, there would need to have been considerable relocation based on ethnic cooperation preferences prior to 1963 and very high persistence in these preferences across generations, which seems implausible.<sup>11</sup>

Similarly, if more educated individuals have greater taste for diversity and for providing public goods, and if these characteristics are passed down through the generations, this could also undermine the validity of our IV strategy. Yet this is not a major concern because only 2.8% of individuals in rural Sierra Leone were literate in 1963, and thus ancestors' education is not a strong predictor of current education. Moreover, there are no significant correlations between literacy and ethnic diversity in 1963.<sup>12</sup>

A third potential concern with the IV strategy would be if current levels of public goods were directly determined by historical investments, as would be the case, for instance, in the United States, where many present-day libraries and schools were built in the early 1900s. In rural Sierra Leone, however, this is unlikely to matter. The vast majority of public goods investments were made after 1963 – there were virtually no rural schools in 1963, for example, as is illustrated in the abysmally low literacy rate – and many of our key public goods measures have very high depreciation rates; road clearing and maintenance, for instance, typically lasts only a few months in Sierra Leone's dense tropical rainforests.

Fourth, historically strong chiefs may have been more successful at encouraging (or forcing) assimilation of slaves and other "strangers" into adopting the ethnic identity of the dominant local group,

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<sup>11</sup> For example, if one's grandfather had a 1 s.d. higher preference for cooperation than the average and moved to a more diverse area as a result, and there was partial mean reversion such that each generation's preferences were half way between their parents and the national average, then preferences for inter-ethnic cooperation in the grandchild's generation would be only be 0.25 s.d. higher than average.

<sup>12</sup> See Appendix Table A3. Note that although the coefficient estimate is nearly significant at the 90% level, the magnitude remains small and falls closer to zero if a handful of outliers are omitted (not shown).

as Posner (2005) argues occurred in Zambia in the early 20<sup>th</sup> century. However, to the extent that strong rulers did promote ethnic assimilation, this would bias us towards finding a negative relationship between local diversity and public goods, but despite any such bias we do not find negative impacts below.

Finally, if certain economic activities (such as trading or mining) require greater inter-ethnic cooperation and also produce higher levels of income, and the geographic distribution of these activities persists over time, this could undermine the validity of our instrumental variable. However, there is no correlation between formal sector employment and chiefdom ethnic diversity in 1963 (see Appendix Table A3), indicating little sorting along these lines in colonial times, as well as arguing against the view that richer areas saw more ethnic assimilation. The census indicates that the vast majority of households in rural Sierra Leone were engaged in the same economic activities in 1963, namely subsistence farming of rice and cassava. Yet because of this concern, we exclude all urban areas throughout the analysis, and as a robustness check also exclude the diamond mining areas in the country's east (Kono district), which experienced an economic boom in 1940s and 1950s, attracting migrants from throughout Sierra Leone.

The lack of statistically significant relationships between observable socioeconomic characteristics, namely literacy and formal employment, with local ethnic diversity in the 1963 census, together with the historical evidence on the determination of ethnic boundaries during invasions and slave raids during the 16<sup>th</sup> to 19<sup>th</sup> centuries, both help alleviate concerns about bias caused by endogenous historical sorting.

Table 2 presents the first stage regressions of 2004 ethnic diversity on the historical measures, and finds remarkably strong correlations both at the chiefdom level (panel A) and the enumeration area level (for the NPS sample in panel B, although note that the historical measures can only be disaggregated to the chiefdom level). In the key result, the coefficient estimate on 1963 chiefdom ethnolinguistic fractionalization is 0.797 (standard error 0.089, column 1, Panel A), for a t-statistic of 9. Historical ethnic shares (and squared shares) for the two largest ethnic groups are also included as instruments for current ethnic shares to capture possible differences in average public goods preferences across groups (columns 2-5). Judging by the  $R^2$  values, 1963 ethnic diversity variables explain the lion's share of the chiefdom-level variation in current ethnicity measures. Chiefdom level historical diversity measures also predict EA



diversity, as ethnic groups are not perfectly segregated within villages, and chiefdom diversity is partly reflected at the village-level. The coefficient estimate is 0.429 (s.e. 0.110 – table 2, panel B, column 1). This allows us to employ historical chiefdom measures to IV for current EA diversity below. Graphical representations are depicted in Figure 3, plotting the residuals from the regression of ELF in 2004 on the 1963 ethnic share controls (on the y-axis) versus the residuals from regressing 1963 ELF on the same ethnic share variables (x-axis). The line corresponds to the coefficient on 1963 ELF in Table 2, column 1.

#### 4. Estimation and data

We next describe our regression specifications (section 4.1) and the data used in the analysis (section 4.2).

##### 4.1 Regression Specifications

Let  $k = 1, \dots, K$  index the collective action outcome variables  $Y_k$ , and let  $j$  index observations (usually at the chiefdom or enumeration-area level). For each outcome, we first estimate the OLS regression:

$$(3) \quad Y_{jk} = \alpha_k + \beta_k ELF_j + X_j' \delta_k + S_j' \gamma_k + \varepsilon_{jk}$$

where  $ELF_j$  is the chiefdom ethnolinguistic fractionalization measure and  $X_j$  is a vector of average socioeconomic and demographic controls for households in locality  $j$ .  $S_j$  is a vector denoting the ethnicity shares (and squared shares) of Mendes and Temnes in chiefdom  $j$ , and  $\varepsilon_{jk}$  is the error term. Vigdor (2002) argues that including ethnicity group shares is essential for the correct interpretation of the diversity coefficient estimate  $\beta_k$ . We also interact  $ELF_j$  with some characteristics  $X_j$  to explore heterogeneous impacts. When the outcome is measured by EA, disturbance terms are clustered by chiefdom.

In the IV specifications, current  $ELF$  and ethnic shares (and squared shares) are instrumented with their historical 1963 values. We interpret the resulting IV-2SLS estimates as capturing the local average treatment effect (LATE) of ethnic diversity on outcomes among the chiefdoms that had stable ethnicity patterns over 1963-2004. Because we have a strong first stage relationship (Table 2), we argue that this sub-group of ethnically stable chiefdoms is large and important. However, it is worth emphasizing that the IV strategy does not allow us to estimate diversity impacts in areas that experienced large changes in

diversity over the period; examining the impact of diversity in these areas is also potentially of interest but is not a topic we can study with this identification strategy.

The specifications below report results with both the chiefdom and the enumeration area as the unit of analysis. One reason to focus on chiefdoms is that the 1963 census data are not available at a more disaggregated geographic level. Moreover, the chiefdom is also a relevant political unit of analysis given the continued power of Paramount Chiefs in rural Sierra Leone. Paramount Chiefs, and the section and village chiefs below them, have a particularly prominent role in organizing local collective activities, and are well known and respected among citizens. For some quantitative evidence of this, in 2007 NPS data, 82% of household respondents could correctly name their local Paramount Chief while only 44% were able to identify their Local Council representative or representative in the national parliament.

Individuals were also much more likely to have visited the chiefdom headquarters than they were to have visited the local council headquarters; self-expressed trust for chiefs (at 43%) is much higher than trust for elected local councilors (29%); and respondents are much more likely to think that chiefs are responsive to local needs (62%) than local councilors. Yet we also examine diversity impacts at the EA level because many of the outcomes we examine, such as local road maintenance, are organized primarily on a village by village basis. Different aggregation choices do not affect the main results.

We investigate ethnic diversity impacts on a number of closely related outcomes, and create summary impact measures using a mean effects analysis, following Katz, Kling, and Liebman (2007). The groupings of related outcome variables are denoted by  $Y_k$ ,  $k = 1, \dots, K$ . We then standardize each outcome by subtracting the mean and dividing by the standard deviation of the outcome variable among below-median *ELF* areas (a low diversity “control” group of sorts). The standardized outcome variables are denoted  $Y_k^*$ . With these, we form  $Y^* = \sum_k Y_k^* / K$ , a single index of outcomes, and we regress this index on *ELF* as in equation 3. The coefficient on *ELF* in this regression is the mean effect size.

In terms of the sample, we drop all observations from Sierra Leone’s six largest urban areas – Freetown, Bo Town, Kenema Town, Makeni, Bonthe Town, and Koidu – which together make up the

vast majority of the country's urban population.<sup>13</sup> The nature of local collection action and public goods provision is qualitatively different in urban and rural areas – for instance, as a legacy of its settlement history, there are no chiefs in Freetown – and for reasons of comparability we thus focus on rural areas, where the majority of the Sierra Leone population lives. As a robustness check, we also exclude chiefdoms in Kono district, the country's diamond mining center.

#### **4.2 Local Measures of Public Goods, Collective Action, Social Capital and School Quality**

The 2005 and 2007 National Public Services (NPS) Surveys are nationally representative surveys that asked over 6,000 respondents questions about access to and satisfaction with public services.<sup>14</sup> The survey also contains questions designed to measure social capital, broadly defined. We create four broad categories of outcome variables; descriptive statistics see Appendix Table A4.

The first grouping for the mean effects analysis is what we call *local collective action*. These outcomes include: road maintenance, known in Sierra Leone as “road brushing”, a locally organized activity to keep bush paths between villages passable, which is a critical public good especially in remote villages; participation in communal labor or other community projects (such as school construction); and attendance at community meetings, events where people voice concerns and make decisions about other local activities. These variables all capture some aspect of the effectiveness of local efforts to provide public goods. The local representative of the chiefdom authority often monitors these activities and has the power to fine non-participants (in road brushing, for instance), so we first look for diversity effects across chiefdoms (Table 3). Average participation in road brushing (by men) and in community meetings

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<sup>13</sup> We omit one chiefdom (Kakua in Bo District), much of which is a neighborhood of Bo Town, one of Sierra Leone's largest cities. This leaves a main analysis sample of 146 chiefdoms.

<sup>14</sup> NPS data collection was designed so that half are administered to female respondents and half to male respondents, usually the head of household or her/his spouse. The surveys were originally intended to form a panel, but because of insufficient funding for respondent tracking, the matching rate is relatively low, and thus the data are treated as a repeated cross-section.

over the last month was quite high at around 40%, though there is wide variation across chiefdoms.

The second category of outcomes is *group membership*, including: community self-help groups, such as women's associations, youth groups, and religious groups; as well as trade unions, school management groups, and credit groups. The latter may facilitate agricultural investment and boost farm productivity. Decisions to join these groups are made by individuals, and their choices plausibly reflect the degree of cooperation within a community. Most chiefdoms show high rates of community group participation at over 80% membership in at least one group, though average participation in credit groups and school groups was lower and more variable.

The third category is the *control of community disputes*. Respondents were asked questions about whether they were the victim of theft, physical attack, or were involved in land disputes. Obviously, in this case, in contrast to the previous two categories, higher values reflect worse local outcomes. In 2005, the average incidence of theft was quite high (27%), but by 2007 it had fallen substantially (though this may be due in part to a change in question wording across the two survey rounds). Physical attacks and land disputes were relatively infrequent. Traditional chiefs and their local representatives (e.g., village headmen) have explicit authority over public safety, and they also oversee the local courts which punish these offenses. The capability and performance of chiefly authorities may thus directly affect the control of community disputes. Chiefdom level diversity measures are also relevant as some disputes occur between neighboring EAs which may be dominated by different ethnic groups (e.g. disputes over cattle).

The fourth and final category is *trust*. Respondents were asked about the extent to which they trusted people in their community, as well as outsiders, local officials (chiefs and local councilors), and Members of Parliament in Freetown. Perhaps unsurprisingly, self-reported trust is much higher for members of respondents' own communities than for outsiders (at 91% versus 48%, respectively, in 2005). Trust for government officials is lower on average and falls noticeably between 2005 and 2007. Some of this decline may be explained by the end of the "honeymoon" period enjoyed by leaders in the immediate

aftermath of the war but some is also the result of a change in question wording between survey rounds.<sup>15</sup>

While the public goods measures we just described – road maintenance, communal labor, village meeting attendance, and crime control – are plausibly thought of as truly local, school quality is the result of a combination of village, chiefdom, local council, and central government decisions, as well as non-governmental organization (NGO) investments. For instance, the building of schools and hiring of teaching staff are typically the responsibility of the Ministry of Education in Freetown and national reconstruction agencies, and thus are mainly determined by national policy or political concerns rather than by local collective action alone. Yet many communities provide some direct financial support for school construction and teacher salaries—often paying for additional teachers, and even building some community schools. Successful community organization can also impact the quality of public education through more indirect routes like lobbying the central government or attracting NGO support. Ethnic cooperation may also work through the provider side—i.e., if teachers show up to work more frequently when working in an area dominated by their own group.

School quality data was collected in the 2005 School Monitoring Survey. Enumerators made unannounced visits to a nationally representative sample of 338 schools and collected information on the quality of school buildings, the number of classes taught, whether teachers were present on that day, and the availability of supplies for instruction. We employ data from the 281 schools not in Freetown or other large towns; descriptive statistics are in Appendix Table A5.

School outcomes were organized into three broad categories. The first set of school quality outcomes is *instructional supplies*. Enumerators recorded the number of desks, chairs, blackboards, and textbooks in use at the time of their visit. Together with school enrollment data, these allow us to

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<sup>15</sup> Wording changed for several questions between the 2005 to 2007 rounds, including the time period for the community meeting participation questions (i.e., annual versus monthly), trust questions, and control of community dispute questions. While the means of these variables change across rounds, it is still appropriate to group them together in the mean effect analysis since all variables are first normalized.

construct a variety of per student input measures. Most supplies are either provided directly by central government or paid for through a small non-salary grant the central government sends to local schools (the so-called school fee subsidy). Communities can affect school supplies by effectively overseeing the school fee subsidy and ensuring it is spent properly on education (rather than being diverted or stolen), and by raising additional local funds, although this additional fundraising is limited in most communities.

The second category is *teaching quality* measures. Enumerators arrived unannounced at the primary schools and noted teacher absence; almost 40% of teachers were not present during these surprise visits, a remarkably high rate. If teachers were present, they also observed teacher classroom behavior upon arrival at the school (i.e., were they teaching, grading, sitting idly, chatting with other teachers, or talking on the phone, etc.), which allows us to compute the proportion of teachers who were actually working when the unannounced visit was made. On average, conditional on being present 80% of teachers were actually working when the enumerators arrived at a school.

The third category is *facilities quality*. Enumerators collected information on whether the school had a functioning toilet, electricity, and water supply, and whether the roof, floor, and walls of the school were made with sturdy building materials (e.g., concrete) rather than mud or thatch. Once again communities can raise additional funds locally to build or repair a school. Usually, however, communities only raise money to build temporary classroom structures when the central government has not yet built a permanent structure. The vast majority of schools in our sample are government built structures, so this category is plausibly one where local collective action is less important in practice.

## **5. Impacts of Ethnic Diversity on Local Public Goods, Social Capital, Disputes and Schools**

We first present estimates of the relationship between ethnic diversity and participation in road maintenance (brushing) across chiefdoms (Table 3). The first three columns contain OLS estimates, while the second three use the historical instrumental variables based on 1963 population census data. In column 1, we regress road brushing on  $ELF_j$  (and ethnicity share controls). The coefficient estimate on  $ELF_j$  is small and positive but not statistically significant. In column 2, we add controls for civil war

conflict experiences and other socioeconomic and demographic controls. Most controls have little impact on estimated diversity effects, with the exception of the proportion of residents with some education, which is strongly positively correlated with road brushing, and the extent of civil war violence exposure, which is also positively related to road brushing in the chiefdom level analysis, echoing the perhaps surprising positive war impact findings in Bellows and Miguel (2009). Column 3 estimates interactions between ethnic diversity and war exposure, and finds that diversity effects are no different in areas that experienced worse war-related violence. The coefficients on *ELF<sub>j</sub>* do not change substantially in the IV specifications (Table 3, columns 3-6), although some point estimates become slightly negative. Overall, ethnic diversity does not have a statistically significant impact on participation in road maintenance, one of the most important, time consuming and truly local public goods in rural Sierra Leone. Figure 4 presents these findings graphically, and Appendix Tables A6 and A7 show that the main findings are robust to different units of analysis (enumeration area and individuals, respectively).

We next assess whether the failure to find significant diversity effects is due to a lack of statistical power. One way to explore this question is to determine the magnitude any diversity impact would need to have for us to detect it as statistically distinguishable from zero. Again consider road maintenance. From the IV specification with full controls in column 5 of Table 3, the estimated ethnic diversity effect on road maintenance participation is -0.083 with a standard error of 0.192. With 95% confidence, then, the true effect of diversity lies in the interval [-0.459, 0.293]. If we perform the thought experiment of increasing ELF by one standard deviation (or roughly 0.2), the confidence interval implies that a change in road maintenance would lie inside [-0.09, 0.06] with 95% probability. Road maintenance participation has a standard deviation of 0.21, so we can reject the null hypothesis that a one standard deviation increase in diversity affects road maintenance by more than  $\pm 0.3-0.5$  s.d., a moderate effect magnitude.

Table 4 reports mean effect estimates for the four groups of local outcomes – collective action, group membership, control of disputes, and trust – using both OLS and IV specifications, across different levels of aggregation (chiefdom-level in panel A and enumeration-area in panel B), as well as reporting

the mean effect estimates for the three groups of school outcomes in panel A at the chiefdom-level (the sample does not allow estimation at the EA level). As with road brushing, the estimates remain close to zero for all four categories and almost none are significant at traditional confidence levels. Statistical precision falls in the IV specifications at the EA level, as expected given the weaker first stage (Table 2, Panel B).<sup>16</sup> The mean effects analysis for school supplies, the quality of teaching, and the quality of school buildings all tell a similar story: there are no significant effects of ethnic diversity in OLS or IV specifications, with or without controls (Panel A), and the “zero” estimates are precisely estimated.

Figure 5 reports 95% confidence intervals on the ethnic diversity effect estimates across all the variables that go into the mean effects indexes, with all variables standardized (to be mean zero and standard deviation one) to facilitate comparison. In all cases, we report confidence intervals based on IV specifications with the full set of controls (comparable to column 5 in Table 3). The confidence intervals for all outcomes intersect the vertical zero line, indicating that estimated diversity effects are not statistically significant. Moreover, the estimated zeros are again reasonably precise. Following the same exercise as above, the 95% confidence on the standardized effect size of a one standard deviation increase in ELF are:  $[-0.44\sigma, 0.37\sigma]$  for the collective action mean effect,  $[-0.28\sigma, 0.33\sigma]$  for the group membership mean effect,  $[-0.15\sigma, 0.41\sigma]$  for the disputes mean effect, and  $[-0.09\sigma, 0.20\sigma]$  for the trust measures. We view these as quite tightly estimated zero effects, such that even the moderate impacts falling outside these intervals can be ruled out with 95% confidence.

As a robustness check, we exclude the main diamond mining areas in the country’s east (Kono district), and once again find no statistically significant ethnic diversity impacts on any of the four main mean effects categories (not shown). In a further robustness check, we created another diversity measure capturing the extent to which ethnic groups differ by language family rather than ethnic group. Recall from section 2.2 that the most salient distinction is between groups speaking Mande languages (e.g., Mende and others) versus Atlantic-Congo languages (Temne, Limba and others). We thus create a

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<sup>16</sup> In unreported results, we did not find evidence of different effects in multiple-locality EAs (not shown).



fractionalization index that captures the probability that two randomly sampled individuals speak languages from different families, and regressed our local public goods measures on this index. In a mean effects analysis (Appendix Table A8), some estimates are statistically significant in the enumeration area OLS results, but they are neither robust to including demographic controls, nor to the preferable IV approach, or analysis at the chiefdom-level.<sup>17</sup>

Another important dimension of social identity in Sierra Leone is religion. Unfortunately, the 1963 Census does not allow us to construct measures of historical religious diversity, so we rely on OLS estimates. There is no evidence of adverse effects of religious diversity on local collective action: for collective action, group membership and control of disputes, the point estimates on the religious diversity measure mean effects are negative but not statistically significant (Appendix Table A9).

## **6. Explaining the weak relationship between diversity and local outcomes in Sierra Leone**

In this section, we first discuss historical factors that affected the ethnic and economic cleavages in Sierra Leone, before turning to other factors, including the role of Krio as a lingua franca, that might serve to promote cooperation between groups (sections 6.1 and 6.2). Finally, we discuss the legacy of Britain's support for chiefs in section 6.3, which simultaneously preserve the salience of ethnicity while also promoting local collective action in the presence of ethnic divisions, although we do not find evidence that strong chiefs help promote local collective action in section 6.4.

### **6.1 Overview of Colonial History**

One key difference between Sierra Leone and many other African countries is that the “favored” ethnic group during early colonialism, the Krio, were not truly indigenous. The Krio ethnic group are descendents of freed slaves who settled Freetown starting in the late 18<sup>th</sup> century. They were a powerful ethnic group during the 19<sup>th</sup> and first half of the 20<sup>th</sup> century but have since shrunk to demographic (and

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<sup>17</sup> Using the language-family diversity measure in the school quality regressions did not lead to significantly different results from those that use our initial ELF measure (not shown).

political) insignificance. Thus as Sierra Leone made its transition to independence in 1961, the primary source of political conflict shifted. As stated by Kandeh (1992), “the salience of the Creole [Krio]-protectorate cleavage was eclipsed after independence by the rivalry between the Mendes of the south and Temnes of the north.” The implications of this on Sierra Leone’s political culture are many, and we argue it has plausibly helped shape inter-ethnic relations to the present day.

*The Krio in the Colonial and Protectorate Period, 1787-1961*

In 1787, with funding from English philanthropists including Granville Sharp, former slaves arrived at the peninsula of Freetown, now known as Sierra Leone’s Western Area, negotiating purchases of land from local chiefs.<sup>18</sup> For a brief period, the Creoles, or Krio as they became known, governed themselves, but after attacks on the initial settlement by Temne warriors, Sharp needed to solicit additional funds to defend and repopulate the settlement. To do so, he aligned himself with commercial interests and in 1791 his investors formed the Sierra Leone Company, whose mission was to “substitute legitimate commerce between Africa and Great Britain for the slave trade” (Spitzer, 1974: 10). Under the company’s 1800 Charter, directors could appoint government officials in Freetown. When the company went bankrupt in 1808, its lands were taken over by the British government and Sierra Leone became a British Colony.<sup>19</sup>

At that time, the colony of Sierra Leone referred only to the country’s western peninsula. The rest of what is now Sierra Leone was never formally colonized but was instead annexed as a Protectorate in 1896 (see Figure 2). Residents of Freetown experienced direct British rule, which allowed many Krios to rise to positions of considerable authority in the colonial government, most notably on Sierra Leone’s Legislative Council.<sup>20</sup> In contrast, in the Protectorate native Sierra Leoneans experienced indirect rule, a system that promoted chiefs loyal to the British, and institutionalized – and in many cases augmented –

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<sup>18</sup> For a narrative account of the settling of the colony by freed slaves, including many who gained their freedom by fighting with the British during the American Revolution, see Schama (2006).

<sup>19</sup> This historical account closely follows Collier (1970) and Spitzer (1974).

<sup>20</sup> See Kandeh (1992) and Wyse (1989) for a discussion of this point.

their autocratic power over their subjects, exacerbating inequality and reinforcing social divisions. The divergence in the governmental structures of the Colony and the Protectorate was reflected in vast social differences between Freetown residents – who were Christians, often literate in English, and saw themselves as defenders of Western civilization – and those who lived “up-country”. According to Kandeh (1992:83), “protectorate Africans were commonly referred to by Creoles and colonial authorities as aborigines, natives, savages, naked barbarians, and many other kindred epithets”.<sup>21</sup> Thus it may not be surprising that when both Mende and Temne chiefs revolted in 1898 during the so-called “Hut Tax Wars”, they targeted Krio traders and settlers as well as British officials.<sup>22</sup>

One consequence of the violence experienced during the “Hut Tax Wars” was a growing British realization of the widespread animosity between the Krio and the numerically much larger ethnic groups in the interior, and as a result the British began to limit Krio political influence. Before the 1898 uprising, Krios had been appointed to positions of power throughout the Protectorate, serving as “African Assistant District Commissioners” in many districts. However, because of growing ethnic tensions, they were not well received up-country; one colonial official at the time noted that “Freetown Creoles were worse than useless as Administrative Officers in the Sierra Leone Protectorate where they were both hated and despised” (Wyse 1989: 27). Relations between the Krio and the British, too, began to deteriorate. In 1917, it became official policy to remove Krios from their limited positions of authority in the Protectorate, and during this period Wyse (1989) finds instances in which talented Krio were overlooked for local professional positions in the clergy and medicine in favor of less qualified British whites.

By 1924, the British allowed representatives from the Protectorate to have seats on the Sierra Leone Legislative Council. Three Paramount chiefs (two Mende and one Temne) were initially appointed to the

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<sup>21</sup> Spitzer (1974) presents draws on newspaper articles, speeches, and books from Krio scholars of the day to document the pervasive racism exhibited by Freetown Krios towards their “up-country” brethren.

<sup>22</sup> There were multiple origins of the “Hut Tax Wars” including both the imposition of an unpopular new tax in the Protectorate, as well as sharper limits on the internal slave trade; see Grace (1975).

Council, an event that provoked Krio outrage. Moreover, after the large railway strike of 1926, which was driven by Krio labor organizing, the Colonial Governor dissolved the Freetown City Council, the most important vehicle for Krio political interests (Wyse 1989). The Krio objected to the growing strength of other ethnic groups in the colonial government well into the 1950s, but by then their influence had waned.

While ethnic divisions in sub-Saharan Africa have often been exacerbated by colonialism – the political rise of the favored minority Tutsi in Rwanda being perhaps the most notorious example – in Sierra Leone, the British took steps to curb Krio political power, at least temporarily preventing the dominance of one ethnic group over others. The country’s two largest ethnic groups, the Mende and Temne that today dominate Sierra Leone numerically and politically, spent the colonial period united in their opposition to Krio dominance rather than battling each other for supremacy.<sup>23</sup>

One of the principal legacies of Sierra Leone’s settlement by former slaves, and its long history as a slave trading outpost, is the language now called Krio, which is now believed to be spoken (mainly as a second language) by 95% of the population (Oyetade and Luke 2008). While its exact origins are uncertain<sup>24</sup>, the popularity of the Krio language throughout Sierra Leone is clear. Speakers of the leading

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<sup>23</sup> The political marginalization of the Krio is a striking contrast to the supremacy of their analogs in Liberia, the Americo-Liberians. Liberia was never colonized, but in 1822, the capital Monrovia was settled by former U.S. slaves. These individuals and their descendants dominated Liberian politics until they were overthrown in 1980. Recent political violence in Liberia is the result, at least in part, of ethnic resentments between Americo-Liberian elites and “up-country” tribes, divisions that were dampened in Sierra Leone by British policies marginalizing the Krio.

<sup>24</sup> One theory, advanced by Schama (2006), is that Krio evolved from the language used by native (non-Krio) Sierra Leoneans to communicate with slave traders in the 16th and 17th centuries: “A pidgin English, much coloured with pidgin Portuguese, had been a lingua franca on the coast for at least a century since the slavers had first leased Bance Island” (Schama 2006: 202). Oyetade and Luke (2008) argue instead that it is most closely related to the language spoken by Jamaican Maroons (descendants of

indigenous ethnic languages have adopted Krio, and Krio has had a major impact on spoken Mende and Temne as well as other languages. The widespread knowledge of Krio in Sierra Leone – despite the fact that the vast majority of adults in the country have no formal schooling – facilitates trade, communication and potentially cooperation across ethnic lines, as well as a common feeling of national identity.

The high degree of interethnic marriage in Sierra Leone, especially in urban areas (Davies, 2002), may also be an indication of favorable ethnic relations and historical interaction, while also potentially promoting inter-ethnic cooperation in the next generation. While large-scale statistical evidence on inter-marriage is limited, it is reinforced by suggestive genetic evidence. Jackson et al. (2005) study the nucleotide sequences of mitochondrial DNA in different ethnic groups and find no statistically significant differences between the sequences found in the Mende, Temne, and Loko groups (although there were some significant differences between these groups and the Limba). The lack of a detectable genetic difference between the country's two largest groups, the Mende and Temne, is especially noteworthy.<sup>25</sup>

## **6.2 Politics and civil war in post-independence Sierra Leone, 1961-present**

The major political parties in post-independence Sierra Leone have always had clear ethnic ties (Casey 2009). The first two prime ministers, brothers Milton Margai (prime minister 1961-64) and Albert Margai (1964-67), were leaders of the Sierra Leone People's Party (SLPP) and members of the Mende ethnic group that dominates southern Sierra Leone. Albert Margai was a notoriously corrupt leader who, in attempting to intimidate opposition candidates from the largely northern African People's Congress (APC) in 1967 parliamentary elections, began to weaken the country's nascent democratic institutions.

The election winner, Siaka Stevens, an ethnic Limba (a northern group), survived a subsequent coup attempt organized by pro-Margai officers, and went on to dismantle all remaining democratic checks

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escaped slaves), and was transplanted to Freetown when they resettled there. A related theory is that Krio evolved as a language through which Freetown's disparate ethnic groups could communicate.

<sup>25</sup> Tishkoff et al. (2009) contains a detailed discussion of genetic diversity both within and across African populations, and documents the genetic signatures that characterize many African groups.

and balances. Sierra Leone became a one-party state in 1978, and Stevens is widely accused of plundering the country's resources for his own personal gain, while providing few public services (Reno 1995). Stevens handed over power to his weak successor Joseph Momoh (another Limba) in 1985.

Sierra Leone's civil war started in 1991 and lasted until 2002. An estimated 50,000 people were killed, over half of the population was displaced from their homes, and thousands were victims of assaults, rapes and amputations (Human Rights Watch 1999). Partially as a result of widespread discontentment with government corruption and ineffectiveness, a small group of rebels entering the country from Liberia in 1991 were successful in gaining recruits. As their numbers swelled in 1992, these rebels, known as the Revolutionary United Front (RUF), spread the armed conflict throughout the country. Some scholars claim that the RUF's initial motivations were partly idealistic, and that they promoted an egalitarian non-ethnic national identity within the group (Richards 1996). Another important factor in the RUF's rise was access to diamond wealth. Mining diamonds in Sierra Leone requires no machinery or technology since these alluvial stones sit close to the surface in dried riverbeds, and thus any group that controlled a diamond-rich area could extract and sell diamonds for considerable profits.

One feature of the war that has drawn attention was the frequent cooperation between the rebels and the Sierra Leone Army (SLA). These two groups often coordinated their movements to avoid direct battles, and at times worked out mutually beneficial profit-sharing arrangements in diamond areas. As a result, civilians were the main victims of the violence. For protection against RUF and SLA terror, many communities eventually organized local fighting groups that became known collectively as the Civil Defense Forces (CDF). CDF fighters were overwhelmingly civilians and relied primarily on local fundraising for supplies. While there were numerous manifestations throughout the country, the CDF's command and organization was often linked to traditional chiefs and secret religious societies.

Following the brutal 1999 rebel attack on Freetown, a deployment of United Kingdom and United Nations troops finally brought the war to an end. These foreign troops conducted a disarmament campaign and secured a peace treaty in early 2002. Donor and NGO assistance has since played a major role in reconstructing physical infrastructure, and resettling internally displaced people (almost all of

whom had returned home by 2003). While an SLPP president ruled from 1996 through 2007, the APC candidate won the 2007 presidential election. While it is still too soon to know if stability has returned for good, the peaceful alternation of power suggests that democratic consolidation is occurring.

### **6.3 The Legacies of Colonial “Decentralized Despotism” and Slavery**

British rule led to the strengthening of traditional chiefly authorities. These rulers had the explicit backing of British military might against any local challengers, dramatically bolstering their political standing relative to the pre-colonial period, provided they remained loyal to their British overlords. This authority translated into unchecked power and growing wealth for chiefs around Africa, and Sierra Leonean chiefs are perhaps the epitome of this tendency (Mamdani 1996).

Paramount Chiefs in colonial Sierra Leone were the local executive, legislative and judicial authority. They had the power to fine, imprison, banish, and even kill, and their network of section chiefs and (male) elders stretched into every village in the country. Chiefs were also prominent in the domestic slave trade, which flourished in Sierra Leone legally until the late 1920s, and informally for decades afterwards. Powerful chiefs owned dozens of slaves, allowing them to plant vast tracts of farmland. Even after the formal end of slavery, Chiefs were able to press local youth to “donate” labor to their large farms. Chiefs also laid early claim to much of Sierra Leone’s diamond wealth, which was being discovered mid-century, and to this day claim royalties on local diamond finds.

One of the more intriguing hypotheses about the origins of civil war in Sierra Leone is that the conflict had its roots in the legacy of the internal slave trade led by chiefs. Being one of the best natural harbors on Africa’s western coastline, Freetown was for centuries a major Atlantic slave trade outpost, and Sierra Leone was long affected by slave raids tied to it. Although the Atlantic trade largely ended by the mid-19<sup>th</sup> century, local warlords continued carrying out slave raids in the region until the turn of the 20<sup>th</sup> century, especially in the Mano River area marking today’s Sierra Leone-Libera border.

The British colonial government’s Protectorate Ordinance of 1896 attempted (at least nominally) to limit the internal slave trade, leading to outrage and formal protests among chiefs. This dissent soon gave way to violence in the Hut Tax War, and as a result, the colonial authorities in practice backed off their

attempts to contain domestic slavery, hoping that the institution would eventually fade away. The institution lasted several more decades before it was finally outlawed in 1927. Yet Grace (1975) argues that, in practice, the formal legal ban on domestic slavery did little to change the social hierarchy and economic inequalities that existed between former masters and subjects. Richards (2005) similarly argues that much of the inequality in rural Sierra Leone today is a persistent effect of domestic slavery in the early 20<sup>th</sup> century, and views the Sierra Leone civil war as a sort of belated slave revolt, one in which the descendants of slaves took up arms against the descendants of their masters. Perhaps as a result, the RUF explicitly targeted Chiefs for assassination during the civil war (Bellows and Miguel 2009).

While the role of domestic slavery in the origins of the war is somewhat controversial, the arbitrary and undemocratic nature of the Chieftom system, and the lack of voice for young men in particular, are widely held to have played a role in fueling the social discontent that contributed to the RUF uprising. There was, as a result, some public discussion after the civil war about major reforms to chieftancy institutions, but there have not been any meaningful changes since 2002. As discussed above, our survey data indicate that chiefs remain by far the most influential local authorities in rural Sierra Leone today.

#### **6.4 Empirical Evidence on the Role of “Strong” Chiefs**

A leading explanation for why ethnic diversity may not undermine public goods provision in rural Sierra Leone is the presence of a strong third-party enforcer, the traditional chiefly authorities. Habyarimana et al (2007) find evidence in the lab for the importance of third-party enforcement in sustaining public goods provision in a Ugandan sample, echoing Fehr and Gächter (2000). In Sierra Leone, Chiefs have explicit responsibility for enforcing participation in public goods provision and can levy fines on free-riders. They also have responsibility for dealing with theft and disputes, which in turn can influence levels of trust.

In 2008, we surveyed every Paramount Chief in Sierra Leone, and collected information on age, tenure in office, and education. This allows us to use several different proxies for the political strength of chiefs in our analysis, both as stand-alone regressors and in interaction with ethnic diversity. Table 5 reports the mean effects results (for the same four NPS categories as above, in panels A-D) for chieftom ELF, Paramount Chief tenure (years since the last election), whether or not the chief was an “interim”



ruler in 2008 (ruling only until the position could be filled on a permanent bases through the traditional selection process)<sup>26</sup>, and the interactions between ELF and Chief tenure, and ELF and interim status, on local public goods provision. Overall, we find no significant relationship with either Paramount Chief tenure or interim status and local collective action, or their interactions with ELF, for any of the four sets of local outcomes. We similarly investigated the relationship between village chief characteristics and outcomes at the EA level, and also fail to find any significant relationships (not shown).

These findings undercut the third-party enforcement theories advanced by Habyarimana et al (2007), but two major caveats are worth keeping in mind. First, the proxies for Chief strength (tenure in office, interim status, and education) may be missing important dimensions of political influence, and this mismeasurement of actual influence could lead to attenuation bias towards zero. Second, to the extent that nearly all Sierra Leone chiefs – even the weakest ones – have sufficient authority to punish free-riders in ethnically diverse areas, chief strength impacts would not be apparent in the cross-section. That said, the findings in Table 5 suggest that the other factors discussed above, including historical inter-ethnic ties and a ubiquitous common language (Krio), are likely to be more important than “strong chiefs” in limiting the negative impacts of ethnic diversity on local outcomes in Sierra Leone.

## **7. Conclusion**

Sierra Leone is one of Africa’s poorest countries and was devastated by over a decade of civil war. It does not, however, fit the stereotype of a country torn apart by tribal hatred, where different ethnic groups are unable to cooperate to provide public goods. When war came, it did not divide the country along ethnic (or religious) lines, and we show in this paper that ethnically diverse communities have levels of collective action and trust that are statistically indistinguishable from homogeneous communities. The local collective action outcomes that we study – road maintenance, communal labor, self-help groups, control of crime and school infrastructure – are important determinants of rural Sierra Leone households’

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<sup>26</sup> This information was collected from the local government ministry’s official database of ruling chiefs.

well-being and local development and thus worthy objects of study.

The results hold when we address endogenous residential sorting by instrumenting for current ethnic fractionalization levels with historical levels, and restricting the sample to rural areas with stable ethnic composition since the colonial period. The civil war generated considerable migration and enables us to carefully examine the process of residential sorting. Our analysis of migration decisions demonstrates that many Sierra Leoneans have a strong preference to relocate to areas where co-ethnics also live. Importantly, the strength of co-ethnic residential preferences varies across individuals: educated people show more residential sorting towards ethnically diverse areas. To the extent that people with more education also have greater engagement in collective action (as our data suggest), this endogenous sorting could bias OLS estimates of the relationship between ethnic diversity and local collective action, confirming the usefulness of our novel IV approach.

The evidence that ethnicity plays a central role in migration decisions is an example of how Sierra Leone is far from being a post-ethnic society. The puzzle, therefore, is how ethnic identity can play such an important factor in decisions such as where to live and how to vote, but was not a leading factor in the conduct of the civil war nor the provision of local public goods. A positive interpretation is that it is possible to preserve strong ethnic identities and still achieve inter-ethnic cooperation, perhaps because the common bonds of language and national identity are stronger than the centripetal pull of tribe. We discuss how historical factors may have contributed to this result, for example through the spread of a lingua franca (Krio) that is unique to Sierra Leone yet not the first language of either of the country's two largest and most politically powerful ethnic groups (the Mende and Temne). Another potentially important factor is the colonial legacy of cooperation between these two groups against a common foe, the once-dominant Krio settler community who are now numerically and politically inconsequential. Genetic similarity and extensive historical intermarriage may also help solidify cross-group affinity.

The alternative, and perhaps less sanguine, explanation is that rural Sierra Leone achieves relatively high levels of collective action despite ethnic fractionalization because of the vice-like grip of traditional chiefs, who regulate collective action in rural areas and levy heavily fines those who do not take part. Yet

we do not find that proxies for Chief strength affect local public goods, casting doubt on the importance of this potential mechanism.

Scholars have now identified several African cases where high levels of ethnic diversity do not impede successful local collective action. By learning from such cases, we hope to generate insight into how to address ethnic divisions in other societies where they remain a concern. In this regard, the story that emerges from Sierra Leone is different in important respects from others described in the literature. Like Tanzanians, Sierra Leoneans are bound together by a common national language that they strongly feel is theirs, yet the two countries differ fundamentally in their local and national institutions and how these interact. In contrast to Tanzania, the high level of interethnic cooperation in Sierra Leone is not the result of a “modernizing” approach that dismantled chieftdom authorities and replaced them with elected local institutions. Unlike in Zambia, successful local collective action across diverse ethnic groups is maintained in Sierra Leone even when the groups are rivals for political power on the national stage.

While it is difficult – and potentially unwise – to draw general conclusions about how to achieve inter-ethnic cooperation in a continent as diverse as Africa, Sierra Leone provides evidence that ethnic differences can be highly salient in some aspects of life and yet not undermine local public goods provision, an encouraging message for other diverse societies. It also provides a stark counterexample to the view that underdevelopment in Africa is inextricably connected to tribal conflict. Looking forward, it is still possible that the post-war transition to democracy, with tightly contested recent national elections fought largely along ethnic lines, will increasingly exacerbate ethnic tensions in Sierra Leone (consistent with the findings in Eifert, et al 2010), perhaps gradually undermining the cooperation documented in this paper. More optimistically, the strong local inter-ethnic cooperation that we document may continue to provide a robust bulwark against the exploitation of ethnic divisions by national politicians.

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## Tables and Figures

Table 1: Migration across chiefdoms (1990 to 2007) and ethnic composition (conditional logit)

	(1)	(2)	(3)	(4)
Distance between chiefdoms	-0.021 (0.001) <sup>***</sup>	-0.013 (0.003) <sup>***</sup>	-0.024 (0.001) <sup>***</sup>	-0.014 (0.003) <sup>***</sup>
Co-ethnic population share	2.184 (0.107) <sup>***</sup>	2.225 (0.260) <sup>***</sup>		
Ethnolinguistic fractionalization (ELF)			1.504 (0.092) <sup>***</sup>	2.277 (0.274) <sup>***</sup>
Any education X Distance		0.009 (0.003) <sup>***</sup>		0.009 (0.003) <sup>***</sup>
Any education X Co-ethnic		-1.597 (0.220) <sup>***</sup>		
Any education X ELF				2.498 (0.240) <sup>***</sup>
Experienced war violence X Distance		-0.056 (0.008) <sup>***</sup>		-0.063 (0.009) <sup>***</sup>
Experienced war violence X Co-ethnic		1.959 (0.585) <sup>***</sup>		
Experienced war violence X ELF				-4.995 (0.731) <sup>***</sup>
Ruling family member X Distance		0.003 (0.002) <sup>***</sup>		0.003 (0.003)
Ruling family member X Co-ethnic		0.392 (0.246) <sup>**</sup>		
Ruling family member X ELF				-0.519 (0.272) <sup>*</sup>
Chiefdom population (1985)	11.615 (0.258) <sup>***</sup>	11.886 (0.258) <sup>***</sup>	9.675 (0.268) <sup>***</sup>	9.016 (0.272) <sup>***</sup>
Chiefdom population Density (1985)	-0.009 (0.001) <sup>***</sup>	-0.009 (0.001) <sup>***</sup>	-0.008 (0.001) <sup>***</sup>	-0.007 (0.001) <sup>***</sup>
Distance to a road	-0.053 (0.007) <sup>***</sup>	-0.049 (0.007) <sup>***</sup>	-0.040 (0.006) <sup>***</sup>	0.224 (0.006) <sup>***</sup>
Distance to a city	-0.813 (0.020) <sup>***</sup>	-0.833 (0.021) <sup>***</sup>	-0.652 (0.018) <sup>***</sup>	-0.654 (0.006) <sup>***</sup>
Attacks and battles in the civil war	0.015 (0.002) <sup>***</sup>	0.014 (0.002) <sup>***</sup>	0.016 (0.002) <sup>***</sup>	0.014 (0.003) <sup>***</sup>
Any Mining in chiefdom	-0.012 (0.004) <sup>***</sup>	-0.014 (0.004) <sup>***</sup>	-0.025 (0.003) <sup>***</sup>	-0.025 (0.003) <sup>***</sup>
Log Pseudolikelihood	-1.314	-1.213	-1.366	-1.238
Pseudo R <sup>2</sup>	0.772	0.789	0.763	0.785
Number of Individuals	5488	5488	5488	5488
Number of chiefdoms/locations	154	154	154	154

Notes: Estimation computed on a conditional logit model using weighted maximum likelihood, which addresses the endogenous stratification problem (see Appendix A). \*/\*\*/\*\* denotes significantly different from zero at 90/95/99% confidence. Distances are measured in km between centroids. Chiefdom population is measured in thousands. “Any education” is an indicator variable for any schooling.

Table 2: First Stage Regressions  
Panel A: Chiefdom-level analysis

	Dependent variable (from 2004 Population Census)				
	ELF	% Mende	% Temne	(% Mende) <sup>2</sup>	(% Temne) <sup>2</sup>
Ethnolinguistic fractionalization (ELF) (1963)	0.797 (0.089) <sup>***</sup>	-0.064 (0.077)	0.091 (0.050) <sup>*</sup>	-0.011 (0.085)	0.050 (0.028) <sup>*</sup>
% Mende (1963)	-0.817 (0.199) <sup>***</sup>	2.081 (0.191) <sup>***</sup>	-0.297 (0.088) <sup>***</sup>	1.436 (0.254) <sup>***</sup>	-0.151 (0.053) <sup>***</sup>
% Temne (1963)	0.161 (0.192)	-0.169 (0.148)	1.055 (0.104) <sup>***</sup>	-0.302 (0.203)	0.223 (0.088) <sup>**</sup>
(% Mende) <sup>2</sup> (1963)	0.807 (0.232) <sup>***</sup>	-1.204 (0.231) <sup>***</sup>	0.315 (0.099) <sup>***</sup>	-0.566 (0.300) <sup>*</sup>	0.165 (0.059) <sup>***</sup>
(% Temne) <sup>2</sup> (1963)	-0.261 (0.214)	0.152 (0.167)	-0.052 (0.112)	0.313 (0.226) <sup>*</sup>	0.788 (0.091) <sup>***</sup>
N (chiefdoms)	146	146	146	146	146
R <sup>2</sup>	0.668	0.940	0.985	0.886	0.987

Panel B: Enumeration area-level analysis (NPS EAs only)

	Dependent variable (from 2004 Population Census)				
	ELF	% Mende	% Temne	(% Mende) <sup>2</sup>	(% Temne) <sup>2</sup>
Ethnolinguistic fractionalization (ELF) (1963)	0.429 (0.110) <sup>***</sup>	-0.028 (0.060)	0.117 (0.064) <sup>*</sup>	0.006 (0.064)	0.076 (0.051)
% Mende (1963)	-0.139 (0.184)	2.033 (0.161) <sup>***</sup>	-0.286 (0.129) <sup>**</sup>	1.607 (0.187) <sup>***</sup>	-0.269 (0.106) <sup>**</sup>
% Temne (1963)	0.094 (0.217)	-0.193 (0.134)	0.941 (0.211) <sup>***</sup>	-0.311 (0.156) <sup>**</sup>	0.544 (0.198) <sup>***</sup>
(% Mende) <sup>2</sup> (1963)	0.157 (0.208)	-1.127 (0.185) <sup>***</sup>	0.324 (0.141) <sup>**</sup>	-0.723 (0.212) <sup>***</sup>	0.298 (0.117) <sup>**</sup>
(% Temne) <sup>2</sup> (1963)	-0.086 (0.241)	0.187 (0.150)	0.090 (0.229)	0.318 (0.173) <sup>*</sup>	0.454 (0.214) <sup>**</sup>
N (EAs)	444	444	444	444	444
R <sup>2</sup>	0.179	0.917	0.894	0.866	0.879

Note: OLS regressions, robust standard errors in parentheses. Dependent variables in column header. \*/\*\*/\*\* denotes significantly different from zero at 90/95/99% confidence.



Table 3: Ethnic diversity and road maintenance (brushing) across chiefdoms

	OLS regressions			IV regressions		
	(1)	(2)	(3)	(4)	(5)	(6)
Ethnolinguistic fractionalization (ELF)	0.050 (0.159)	0.052 (0.146)	0.041 (0.179)	0.032 (0.218)	-0.083 (0.192)	-0.224 (0.330)
Civil war victimization index		0.289 (0.098) <sup>***</sup>	0.283 (0.112) <sup>**</sup>		0.338 (0.096) <sup>***</sup>	0.291 (0.123) <sup>***</sup>
Female respondent share		-0.509 (0.313)	-0.509 (0.314)		-0.464 (0.309)	-0.457 (0.305)
Youth (age 16-35) respondent share		-0.154 (0.216)	-0.153 (0.218)		-0.081 (0.205)	-0.070 (0.210)
Middle aged (age 36-50) respondent share		-0.310 (0.193)	-0.308 (0.199)		-0.251 (0.188)	-0.226 (0.203)
Muslim share		0.169 (0.074) <sup>**</sup>	0.169 (0.074) <sup>**</sup>		0.159 (0.074) <sup>**</sup>	0.158 (0.075) <sup>**</sup>
Any education share		0.481 (0.165) <sup>***</sup>	0.474 (0.186) <sup>**</sup>		0.473 (0.173) <sup>***</sup>	0.402 (0.187) <sup>**</sup>
Average socioeconomic status index		-0.263 (0.202)	-0.264 (0.202)		-0.301 (0.211)	-0.298 (0.212)
Community leader respondent share		0.172 (0.120)	0.172 (0.121)		0.171 (0.119)	0.166 (0.123)
Civil war victimization index X ELF			0.040 (0.384)			0.378 (0.586)
N (chiefdoms)	146	146	146	146	146	146
R <sup>2</sup>	0.016	0.208	0.208	0.007	0.181	0.175

Notes: Robust standard errors in parentheses. \*\*\*/\*\* denotes significantly different from zero at 90/95/99% confidence. Shares for Mende, Temne, and their squares are included in the specification but coefficient estimates are not shown. The instrumental variables are listed in Table 2. All regressions are estimated with survey weights, where each chiefdom observation is weighted by the inverse of its sampling probability.

Table 4: Ethnic diversity and local outcomes: mean effects analysis

## Panel A: Chiefdom-level analysis

	OLS Regressions		IV Regressions	
	(1)	(2)	(3)	(4)
Collective Action mean effect	0.221 (0.682)	0.165 (0.630)	-0.175 (1.025)	-0.525 (0.850)
Group Membership mean effect	0.458 (0.515)	0.256 (0.334)	0.124 (0.780)	-0.395 (0.429)
Disputes mean effect	0.494 (0.575)	0.461 (0.558)	0.646 (0.708)	0.647 (0.691)
Trust mean effect	0.474 (0.356)	0.228 (0.341)	0.274 (0.361)	-0.146 (0.348)
School Supplies mean effect	-0.441 (0.452)	-0.078 (0.483)	-0.638 (0.603)	-0.219 (0.642)
Teaching Quality mean effect	0.499 (0.302)	0.423 (0.321)	0.192 (0.372)	0.084 (0.401)
School Building Quality mean	0.135 (0.440)	-0.250 (0.410)	0.109 (0.527)	-0.326 (0.505)
Regression controls	No	Yes	No	Yes
Number of Chiefdoms	146	146	146	146

## Panel B: Enumeration-area analysis

	OLS Regressions		IV Regressions	
	(1)	(2)	(3)	(4)
Collective Action mean effect	0.346 (0.373)	0.050 (0.397)	0.784 (1.193)	0.312 (1.226)
Group Membership mean effect	0.469 (0.320)	-0.032 (0.228)	0.718 (0.921)	-0.570 (0.698)
Disputes mean effect	0.790 (0.387)**	0.471 (0.345)	0.931 (1.043)	0.566 (1.070)
Trust mean effect	0.043 (0.187)	-0.139 (0.196)	0.075 (0.616)	-0.415 (0.682)
Regression controls	No	Yes	No	Yes
Number of Chiefdoms	444	444	444	444

Notes: Each entry is the coefficient estimate on ethnolinguistic fractionalization (ELF) from a separate regression. Standard errors in parentheses. \*/\*\*/\*\* denotes significantly different from zero at 90/95/99% confidence. See Appendix C for details on the mean effects analysis. The instrumental variables are listed in Table 2. The regression controls are like those in Table 3, columns 2 (OLS) and 5 (IV). All regressions are estimated with survey weights, where each observation is weighted by the inverse of its sampling probability.

The components of the “Collective Action” category are participation in road brushing, community labor, and community meetings. The components of the “Group Membership” category are member of any community group, a credit group, and a school group. The components of the “Disputes” category are the incidence of any local assault dispute, land dispute, or dispute involving theft. The components of the “Trust” category include trust of people in own community, people outside community, local councilors, and the central government. Descriptive statistics for these outcomes are in Appendix Table A2. The components of the “School supplies” category are the average number of desks per student, chairs per student, benches per student, blackboards per student, and textbooks per student. The components of the “Teaching Quality” category are the teacher / student ratio, the percentage of teachers present during surprise visit, and the percentage of teachers actually working during surprise visit. The components of the “School Building Quality” category are the percentage of schools with toilets, with electricity, with piped water, and with sturdy buildings. Descriptive statistics are presented in Appendix Table A3.

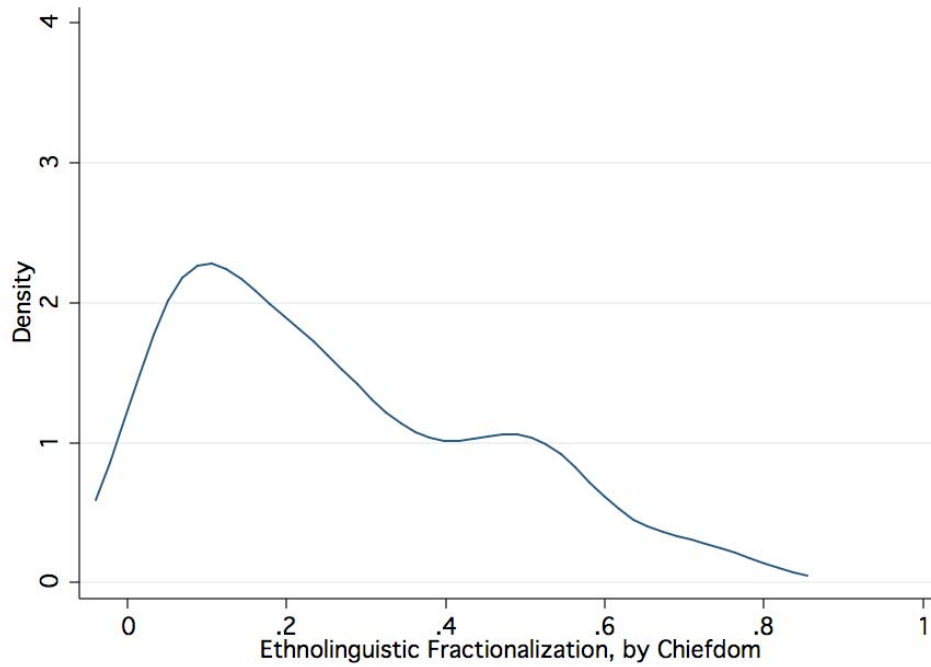
Table 5: Paramount chief characteristics and chiefdom ethnic diversity

	(1)	(2)	(3)
Panel A: Dep. var: Collective Action mean effect			
Ethnolinguistic fractionalization (ELF)	-0.525 (0.850)	-0.792 (0.942)	-0.175 (0.899)
Paramount Chief Tenure (in years)		-0.011 (0.015)	
ELF X Paramount Chief Tenure		0.055 (0.045)	
Interim Paramount Chief			0.208 (0.266)
ELF X Interim Paramount Chief			-0.967 (0.878)
Panel B: Dep. Var.: Group Membership mean effect			
Ethnolinguistic fractionalization (ELF)	-0.395 (0.429)	-0.671 (0.492)	-0.054 (0.418)
Paramount Chief Tenure (in years)		-0.020 (0.009)*	
ELF X Paramount Chief Tenure		0.041 (0.026)	
Interim Paramount Chief			0.282 (0.162)
ELF X Interim Paramount Chief			-0.798 (0.511)
Panel C: Dep. Var.: Disputes mean effect			
Ethnolinguistic fractionalization (ELF)	0.647 (0.691)	1.089 (0.715)	0.865 (0.681)
Paramount Chief Tenure (in years)		0.012 (0.013)	
ELF X Paramount Chief Tenure		-0.067 (0.039)	
Interim Paramount Chief			0.292 (0.223)
ELF X Interim Paramount Chief			-0.304 (0.793)
Panel D: Dep. Var.: Trust mean effect			
Ethnolinguistic fractionalization (ELF)	-0.146 (0.348)	-0.348 (0.407)	0.122 (0.360)
Paramount Chief Tenure (in years)		-0.017 (0.011)	
ELF X Paramount Chief Tenure		0.029 (0.033)	
Interim Paramount Chief			0.263 (0.156)
ELF X Interim Paramount Chief			-0.514 (0.457)

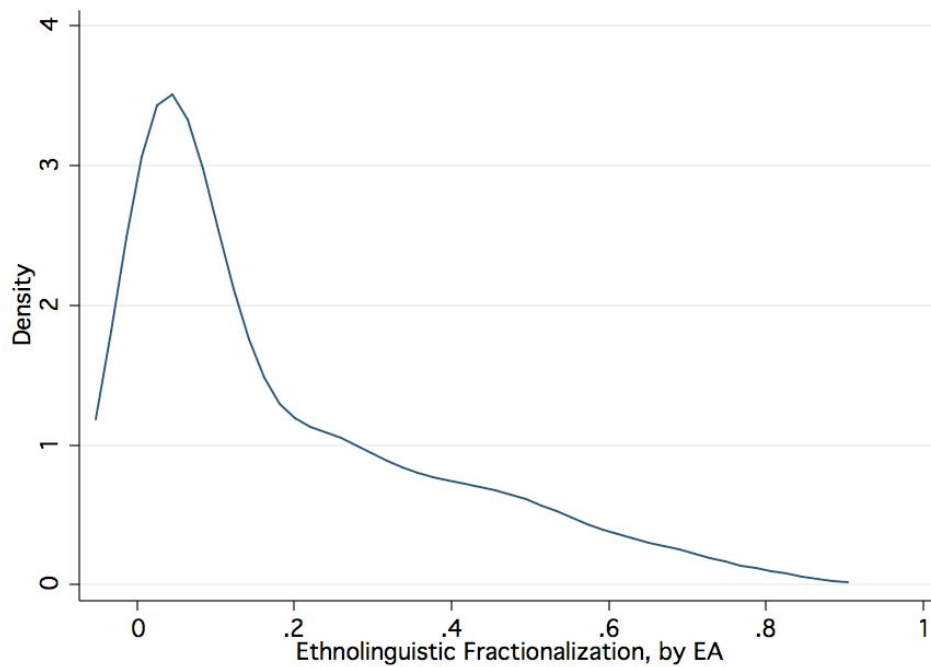
Notes: Standard errors in parentheses. \*\*\*/\*\*\* denotes significantly different from zero at 90/95/99% confidence. See Appendix C for details on the mean effects analysis. All columns are IV specifications, and the instrumental variables are listed in Table 2. Regression controls like those in Table 3, column 5 (IV) are included in all specifications. N = 146 chiefdoms for all specifications. All regressions are estimated with survey weights, where each chiefdom observation is weighted by the inverse of its sampling probability.

The components of the “Collective Action”, “Group Membership”, “Disputes”, and “Trust” categories and the descriptive statistics are in Appendix Table A4. The summary statistics for the Paramount Chief characteristics are presented in Appendix Table A10.

Figure 1: Ethno-linguistic fractionalization in Sierra Leone (non-parametric densities)  
Panel A: Across chiefdoms

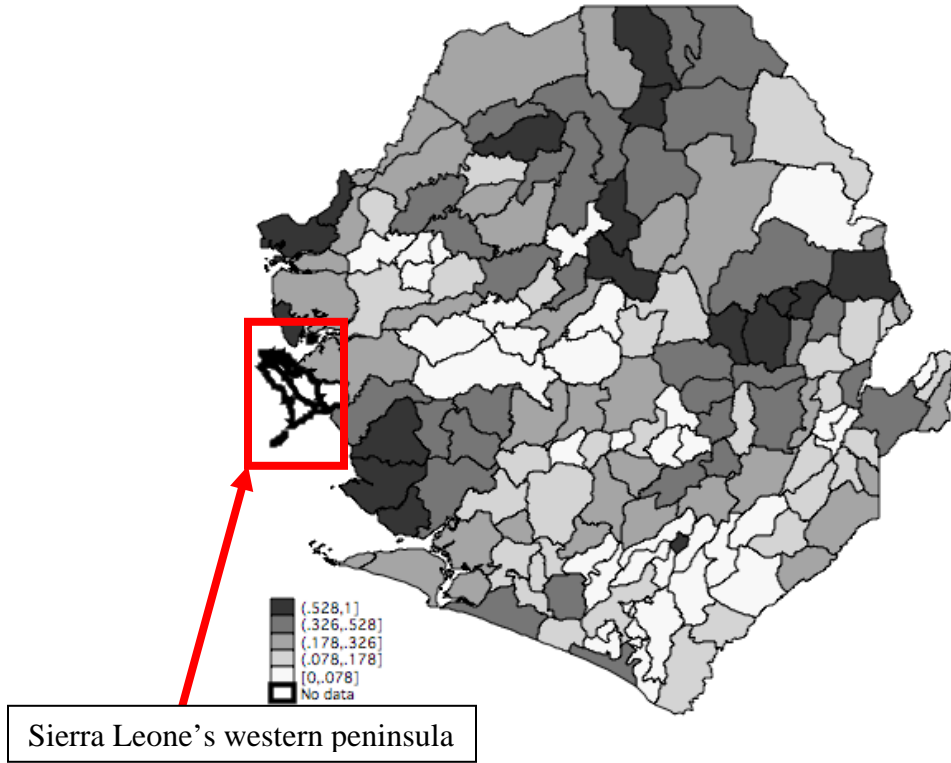


Panel B: Across enumerations areas

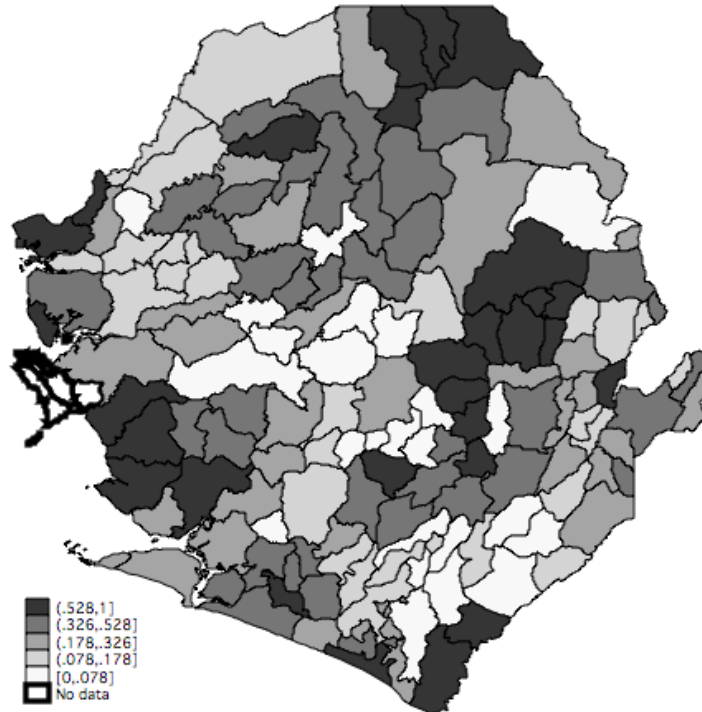


Notes: The data source for both panels is the 2004 Population Census. Both use a Gaussian kernel with bandwidth set to minimize integrated mean squared error. The mean of ELF across chiefdoms (panel A) is 0.264, with a standard deviation of 0.196. The mean of ELF across EAs (panel B) is 0.185, with a standard deviation of 0.199.

Figure 2: Ethnic Diversity by Chiefdom  
Panel A: 2004 Census

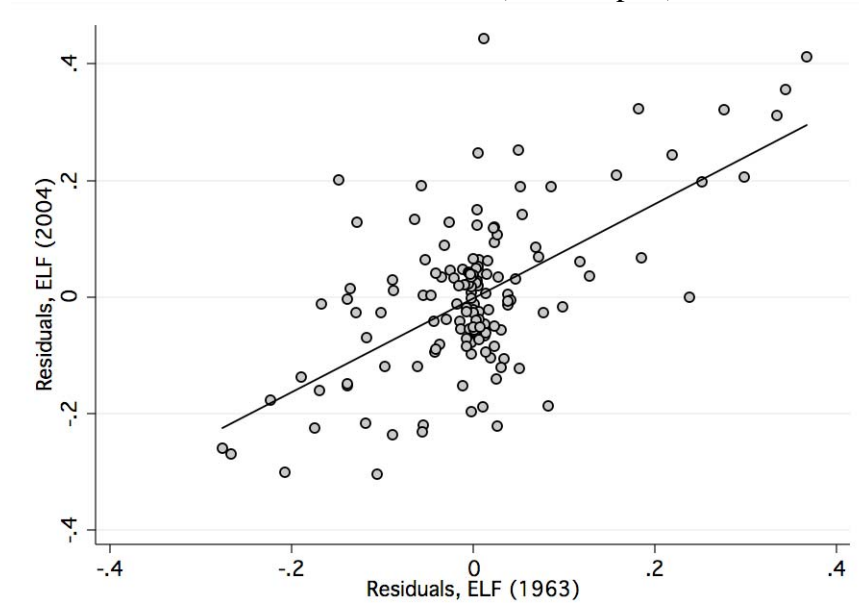


Panel B: 1963 Census



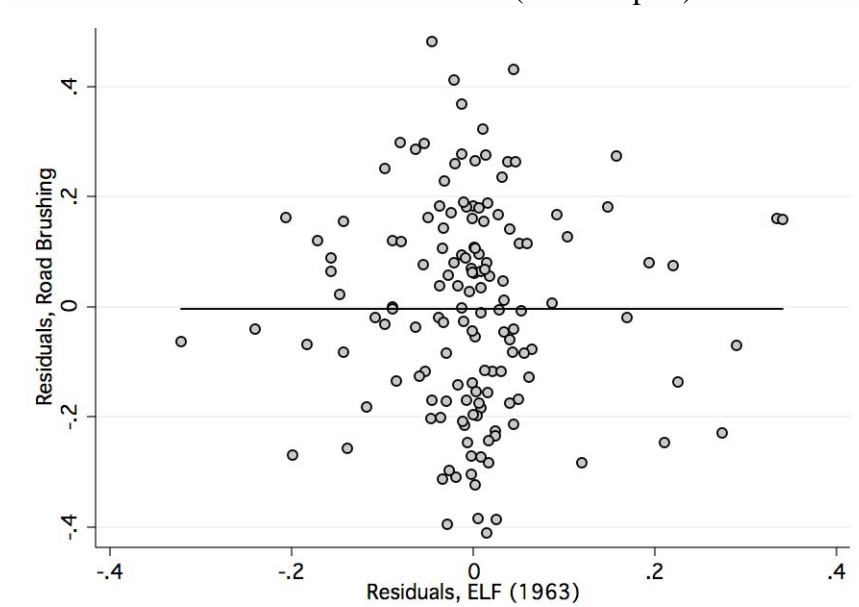
Notes: The mean of ELF across chiefdoms in 2004 (Panel A) is 0.264, with a standard deviation of 0.195. and in 1963 (Panel B) is 0.304, with a standard deviation of 0.205.

Figure 3: Chiefdom ethno-linguistic fractionalization in 2004 versus ethno-linguistic fractionalization 1963 (residual plot)



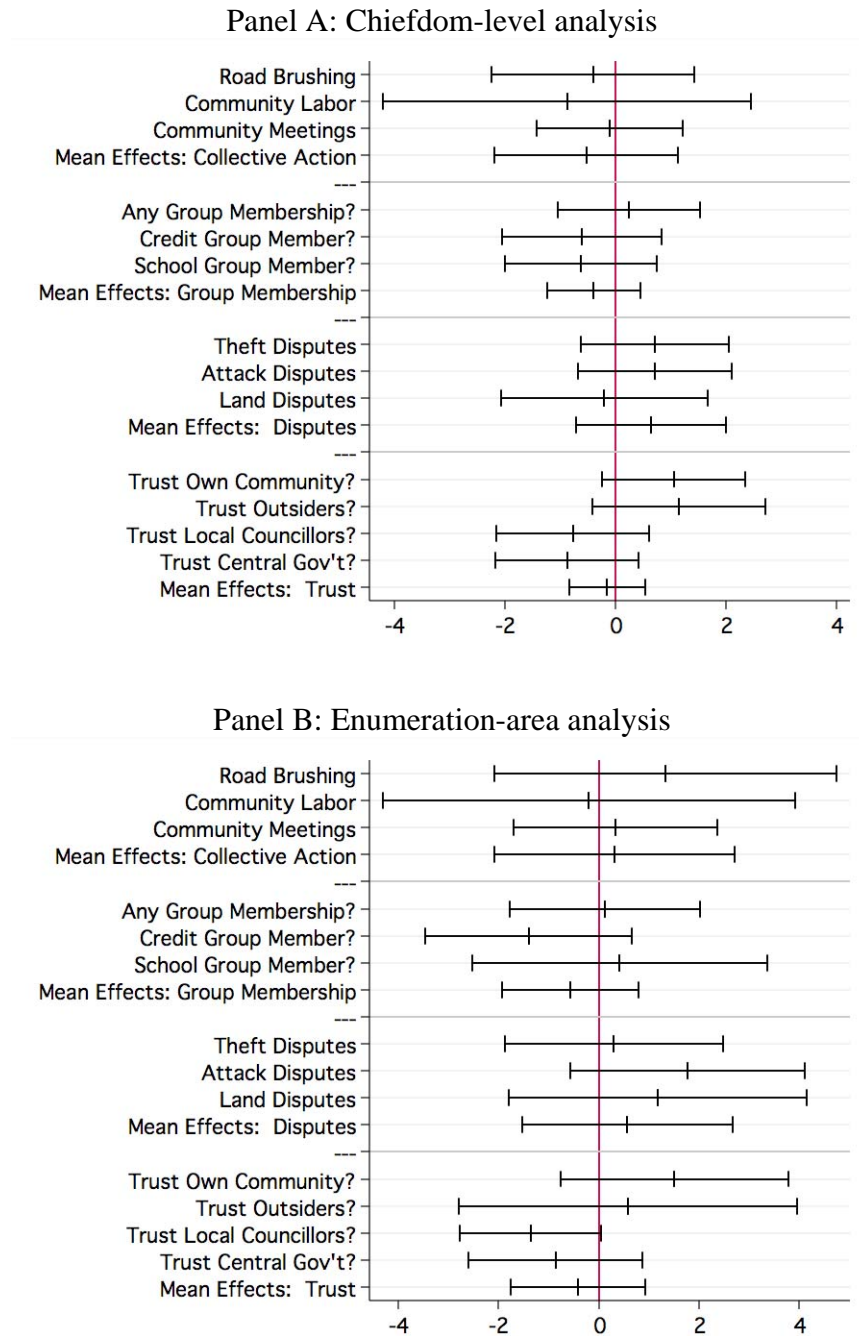
Notes: This figure is a residual-on-residual plot, a graphical representation of our first stage. The y-axis displays residuals from a regression of 2004 ELF on 1963 ethnic share controls. The x-axis plots residuals from a regression of 1963 ELF on 1963 ethnic share controls. The regression fit corresponds to Table 2, column 1 (panel A).

Figure 4: Chiefdom road maintenance participation in 2007 versus ethno-linguistic fractionalization in 1963 (residual plot)



Notes: This figure is a residual-on-residual plot, a graphical representation of the reduced form. The y-axis displays residuals from a regression of road maintenance on 1963 ethnic share controls and other controls from Table 3, column 5. The x-axis plots residuals from a regression of 1963 ELF on 1963 ethnic share controls and other controls from Table 3, column 5.

Figure 5: Point Estimates and 95% Confidence Intervals for the Effects of Ethnic Diversity on Local Outcomes, Pooled 2005 and 2007



Notes: Dependent variables were standardized before regressions to make confidence intervals more comparable. Individual estimates and confidence intervals taken from IV specifications with full controls, analogous to Table 3, column 5. Mean effects are produced in Table 4, Column 4. All regressions are estimated with survey weights, where each chiefdom (or enumeration area) observation is weighted by the inverse of its sampling probability.

**SUPPLEMENTARY ONLINE APPENDIX (NOT INTENDED FOR PUBLICATION)**

**Appendix Table A1: Ethnic Population Shares in Sierra Leone**

Ethnic group (tribe)	1963 census	2004 census
Mende	0.309	0.322
Temne	0.298	0.318
Limba	0.084	0.083
Kono	0.048	0.044
Kuranko	0.037	0.041
Sherbro	0.034	0.023
Fullah	0.031	0.037
Susu	0.031	0.029
Lokko	0.030	0.026
Kissi	0.022	0.025
Madingo	0.023	0.024
Krio	0.019	0.014
Yalunka	0.007	0.007
Krim	0.004	0.002
Vai	0.003	0.001
Other	0.021	0.006

Notes: Sources are 1963 Population Census and 2004 Population Census, respectively.

**Appendix Table A2: Additional descriptive statistics for migration analysis (individual sample)**

	N	Mean (SD)
Moved between chiefdoms/locations (1990 to 2007)	5488	0.265 (0.442)
Moved between districts (1990 to 2007)	5488	0.165 (0.371)
Distance moved (in kilometers)	5488	19.717 (48.365)
Distance moved (in kilometers), if moved	1457	74.267 (69.002)
Any education	5488	0.372 (0.483)
Ruling family member	5488	0.262 (0.440)
Any member of 1990 HH made a refugee (left country)?	5488	0.232 (0.422)

Notes: Source NPS 2007 Survey.

**Appendix Table A3: Ethnic Diversity Regressions, 1963**

	Dependent variable: ELF (from 1963 Population Census)
% of population literate (1963)	1.523 (0.936)
% of population formally employed (1963)	-0.207 (0.144)
N (chiefdoms)	142
R <sup>2</sup>	0.028

Note: OLS regressions, robust standard errors in parentheses. Dependent variables in column header. \*\*\*/\*\*\* denotes significantly different from zero at 90/95/99% confidence. The estimated constant term is not shown.



Appendix Table A4: Descriptive statistics for local outcomes, 2005 and 2007 NPS surveys

	2005 NPS	2007 NPS
<i>Collective Action</i>	Mean (SD)	Mean (SD)
Participation in road brushing	.	0.396 (0.209)
Participation in community labor (farm, school)	.	0.185 (0.145)
Participation in community meetings	0.766 (0.143)	0.422 (0.214)
<i>Group Membership</i>		
Member of any community group	0.873 (0.151)	0.811 (0.125)
Member of a credit group	0.159 (0.131)	0.159 (0.107)
Member of a school group	0.209 (0.160)	0.220 (0.154)
<i>Control of Disputes</i>		
Any local assault disputes	0.021 (0.037)	0.044 (0.060)
Any local land disputes	.	0.038 (0.049)
Any local dispute involving theft	0.271 (0.169)	0.053 (0.060)
<i>Trust</i>		
Trust of people in own community (index)	0.906 (0.098)	0.780 (0.178)
Trust of people outside community (index)	0.479 (0.187)	0.386 (0.175)
Trust of local councilors (index)	0.641 (0.165)	0.285 (0.163)
Trust of the central government (index)	0.630 (0.169)	0.346 (0.189)
<i>Regression controls</i>		
Youth (ages 16-35) respondent share	0.415 (0.118)	0.353 (0.114)
Middle aged (ages 36-50) respondent share	0.340 (0.121)	0.375 (0.122)
Female respondent share	0.491 (0.025)	0.494 (0.065)
Muslim	0.798 (0.232)	0.785 (0.236)
Any education share	0.264 (0.142)	0.230 (0.132)
Community leader respondent share	0.509 (0.183)	0.493 (0.152)
Average socioeconomic status index	0.205 (0.074)	0.223 (0.092)
Civil war victimization index	0.406 (0.182)	0.429 (0.161)

Notes: Source 2005 and 2007 NPS Surveys. N=146 chiefdoms. Standard deviations in parentheses. The Civil war victimization index is the average across three indicators: “Were any members of your HH killed?”, “Were any members of your HH injured/maimed?”, and “Were any members of your HH made refugees?”. The Ethnic minority share refers to being a minority in that chiefdom. The Average socioeconomic status is an index composed of having a wage paying job, durables ownership, and the household water source.

There were some important changes in question wording across the 2005 and 2007 survey rounds that can explain changes in survey response patterns over time. The “Participation in community meetings” question was asked for the past one year in 2005, and for the past month in 2007, and this likely explains the higher mean attendance rate reported in 2005. The 2005 control of disputes questions were significantly more detailed (in separately prompting for specific types of theft, i.e., of livestock, household items, etc.) than the 2007 questions, and this likely explains the higher survey means in 2005. The wording of the trust questions also changed between 2005 and 2007, with the 2005 questions having a more set of possible responses (ranging from 1 to 5) and the 2007 questions restricted to an indicator variable. While the means of these variables change considerably across rounds, it is still appropriate to group these variables together in the mean effect analysis, since all variables are demeaned and normalized.

Appendix Table A5: Descriptive statistics for school quality outcomes

	2005 School Survey
<i>School Supplies</i>	
	Mean (SD)
Average number of desks per student	0.306 (0.286)
Average number of chairs per student	0.184 (0.412)
Average number of benches per student	0.297 (0.248)
Average number of blackboards per student	0.044 (0.036)
Average number of textbooks per student	0.899 (1.028)
<i>Teaching Quality</i>	
Teacher / student ratio	0.035 (0.033)
Percentage of teachers present during surprise visit	0.608 (0.251)
Percentage of teachers actually working during surprise visit (conditional on being present at school)	0.799 (0.252)
<i>School building quality</i>	
Percentage of schools with toilets	0.632 (0.484)
Percentage of schools with electricity	0.006 (0.076)
Percentage of schools with piped water	0.092 (0.290)
Percentage of schools with sturdy buildings	0.410 (0.455)

Notes: Source 2005 Primary School Surveys. Standard deviations in parentheses. N = 146 chiefdoms.

Appendix Table A6: Ethnic diversity and road maintenance (brushing) across enumeration areas

	OLS regressions			IV regressions		
	(1)	(2)	(3)	(4)	(5)	(6)
Ethnolinguistic fractionalization (ELF)	0.075 (0.122)	-0.033 (0.132)	-0.030 (0.247)	0.457 (0.435)	0.317 (0.414)	1.972 (4.857)
Civil war victimization index		0.169 (0.082)**	0.170 (0.096)*		0.140 (0.084)*	0.539 (1.093)
Female respondent share		-0.247 (0.110)**	-0.247 (0.110)**		-0.253 (0.105)**	-0.232 (0.115)*
Youth (ages 16-35) respondent share		0.184 (0.090)**	0.184 (0.089)**		0.174 (0.089)*	0.159 (0.109)
Middle aged (ages 36-50) respondent share		0.014 (0.090)	0.014 (0.090)		0.004 (0.092)	-0.018 (0.108)
Muslim share		0.040 (0.055)	0.040 (0.055)		0.004 (0.063)	-0.034 (0.147)
Any education share		0.100 (0.089)	0.100 (0.089)		0.056 (0.126)	0.048 (0.155)
Average socioeconomic status index		0.012 (0.102)	0.012 (0.103)		-0.019 (0.108)	-0.022 (0.127)
Community leader respondent share		0.211 (0.058)**	0.211 (0.058)**		0.210 (0.058)**	0.230 (0.092)**
Civil war victimization index X ELF			-0.006 (0.397)			-2.550 (6.948)
N (EA's)	444	444	444	441	441	441
R <sup>2</sup>	0.018	0.099	0.099	0.000	0.077	0.000

Notes: Robust standard errors in parentheses, clustered at the chiefdom level. \*/\*\*/\*\* denotes significantly different from zero at 90/95/99% confidence. Shares for Mende, Temne, and their squares are included in the specification but coefficient estimates are not shown. The instrumental variables are listed in Table 2. All regressions are estimated with survey weights, where each enumeration-area observation is weighted by the inverse of its sampling probability.

Appendix Table A7: Ethnic diversity and road brushing (maintenance), individual-level analysis

	OLS regressions			IV regressions		
	(1)	(2)	(3)	(4)	(5)	(6)
Ethnolinguistic fractionalization (ELF)	0.077 (0.122)	-0.016 (0.131)	-0.018 (0.244)	0.461 (0.434)	0.221 (0.398)	0.923 (4.290)
Civil war victimization index, household		0.176 (0.080)**	0.176 (0.097)*		0.150 (0.084)	0.324 (0.992)
Female respondent		-0.200 (0.017)***	-0.200 (0.017)***		-0.201 (0.017)***	-0.201 (0.016)***
Youth (ages 16-35) respondent		0.153 (0.020)***	0.153 (0.020)***		0.152 (0.020)***	0.152 (0.021)***
Middle aged (ages 36-50) respondent		0.093 (0.018)***	0.093 (0.018)***		0.092 (0.018)***	0.091 (0.019)***
Muslim respondent		0.019 (0.027)	0.019 (0.027)		0.010 (0.030)	0.004 (0.047)
Any education indicator		0.030 (0.023)	0.030 (0.023)		0.026 (0.026)	0.026 (0.027)
Socioeconomic status index, household		0.049 (0.048)	0.049 (0.048)		0.038 (0.061)	0.035 (0.074)
Community leader indicator (respondent)		0.088 (0.019)***	0.088 (0.019)***		0.088 (0.019)***	0.090 (0.023)***
Civil war victimization index X ELF			0.003 (0.407)			-1.100 (6.257)
N (individuals)	4414	4318	4318	4386	4318	4318
R <sup>2</sup>	0.00	0.08	0.08	0.00	0.07	0.07

Notes: Robust standard errors in parentheses. \*/\*\*/\*\* denotes significantly different from zero at 90/95/99% confidence. Chiefdom population shares for Mende, Temne, and their squares are included in the specification but coefficient estimates are not shown. The instrumental variables are listed in Table 2.

Appendix Table A8: Language family diversity and local outcomes, mean effects analysis  
 Panel A: Chiefdom-level analysis

	OLS Regressions		IV Regressions	
	(1)	(2)	(3)	(4)
Collective Action mean effect	-0.300 (0.432)	-0.172 (0.368)	-0.432 (0.535)	-0.252 (0.530)
Group Membership mean effect	0.589 (0.305)*	0.847 (0.208)**	0.018 (0.401)	0.415 (0.322)
Disputes mean effect	0.128 (0.470)	0.209 (0.466)	0.452 (0.510)	0.579 (0.464)
Trust mean effect	-0.203 (0.366)	-0.185 (0.373)	-0.886 (0.374)*	-0.944 (0.357)**
Regression controls	No	Yes	No	Yes
Number of Chiefdoms	146	146	146	146

Panel B: Enumeration-area analysis

	OLS Regressions		IV Regressions	
	(1)	(2)	(3)	(4)
Collective Action mean effect	-0.235 (0.306)	-0.274 (0.306)	0.970 (1.878)	0.538 (1.640)
Group Membership mean effect	0.706 (0.239)**	0.534 (0.187)**	0.905 (1.014)	1.631 (1.033)
Disputes mean effect	0.932 (0.276)**	0.574 (0.278)**	-0.232 (1.511)	0.470 (0.784)
Trust mean effect	-0.559 (0.156)**	-0.494 (0.170)**	-2.277 (1.124)	-1.930 (0.846)**
Regression controls	No	Yes	No	Yes
Number of Chiefdoms	444	444	445	445

Notes: Each entry is the coefficient estimate on language family fractionalization from a separate regression. Standard errors in parentheses. \*/\*\*/\*\* denotes significantly different from zero at 90/95/99% confidence. See Appendix C for details on the mean effects analysis. The instrumental variables are listed in Table 2. The regression controls are like those in Table 5, columns 2 (OLS) and 5 (IV). All regressions are estimated with survey weights, where each chiefdom (or enumeration area) observation is weighted by the inverse of its sampling probability.

The components of the “Collective Action” category are participation in road brushing, participation in community labor, and participation in community meetings. The components of the “Group Membership” category are member of any community group, member of a credit group, and member of a school group. The components of the “Disputes” category are the incidence of any local assault dispute, any local land disputes, or any local dispute involving theft. The components of the “Trust” category include trust of people in own community (index), trust of people outside community (index), trust of local councilors (index), and trust of the central government (index). Descriptive statistics for each of these outcomes are presented in Appendix Table A4.

Appendix Table A9: Religious diversity and local outcomes, mean effects analysis  
 Panel A: Chiefdom-level analysis

	OLS Regressions	
	(1)	(2)
Collective Action mean effect	0.046 (0.768)	0.091 (0.661)
Group Membership mean effect	0.334 (0.497)	0.324 (0.320)
Disputes mean effect	-0.312 (0.383)	-0.296 (0.367)
Trust mean effect	-0.190 (0.276)	-0.152 (0.270)
Regression controls	No	Yes
Number of Chiefdoms	146	146

Panel B: Enumeration-area analysis

	OLS Regressions	
	(1)	(2)
Collective Action mean effect	-0.004 (0.466)	-0.098 (0.449)
Group Membership mean effect	-0.012 (0.335)	-0.158 (0.276)
Disputes mean effect	-0.159 (0.345)	-0.345 (0.326)
Trust mean effect	-0.436 (0.298)	-0.324 (0.275)
Regression controls	No	Yes
Number of Chiefdoms	444	444

Notes: Each entry is the coefficient estimate on religious fractionalization from a separate regression. Standard errors in parentheses. \*/\*\*/\*\* denotes significantly different from zero at 90/95/99% confidence. See Appendix C for details on the mean effects analysis. The regression controls are like those in Table 5, column 2 (OLS). All regressions are estimated with survey weights, where each chiefdom (or enumeration area) observation is weighted by the inverse of its sampling probability.

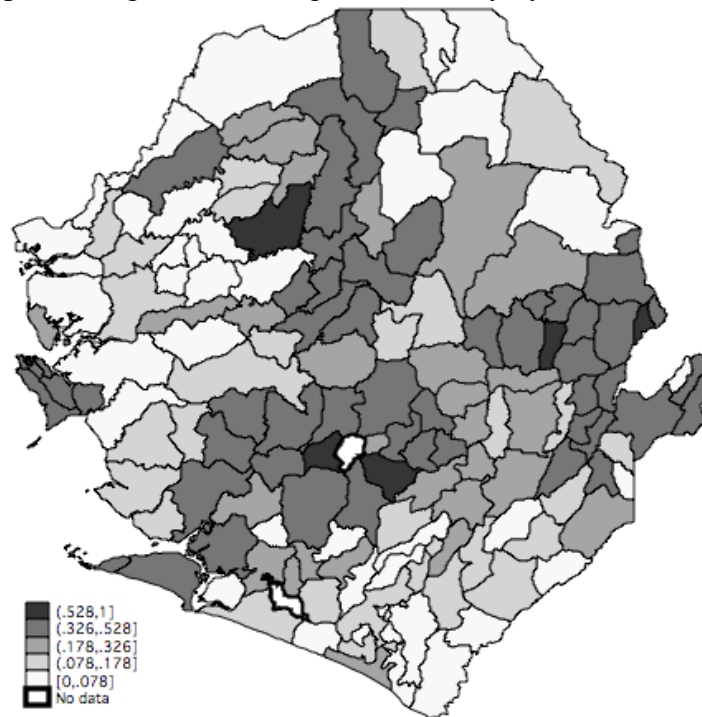
The components of the “Collective Action” category are participation in road brushing, participation in community labor, and participation in community meetings. The components of the “Group Membership” category are member of any community group, member of a credit group, and member of a school group. The components of the “Disputes” category are the incidence of any local assault dispute, any local land disputes, or any local dispute involving theft. The components of the “Trust” category include trust of people in own community (index), trust of people outside community (index), trust of local councilors (index), and trust of the central government (index). Descriptive statistics for each of these outcomes are presented in Appendix Table A4.

Appendix Table A10: Descriptive statistics for chief strength measures

	Mean (SD)
Age	60.6 (9.44)
Any education indicator	0.79 (0.41)
Number of years in office	10.59 (9.49)
Membership on the National Council of Paramount Chiefs	0.66 (0.48)
Number of years since last Paramount Chief election	18.91 (14.49)
Interim Paramount Chief	0.33 (0.47)

Notes: Source: 2008 Chief and Local Councilors Survey. Standard deviations in parentheses. N = 146 chiefdoms.

Appendix Figure A1: Religious Diversity by Chiefdom, 2004



Notes: The mean of religious diversity across chiefdoms is 0.229, with a standard deviation of 0.179.

## Appendix A: Discrete Choice Models with Choice-Based Sampling and Survey Weights

Manski and Lerman (1977) discuss the estimation of discrete choice models with choice-based sampling and endogenous stratification. One approach is to use a weighted maximum likelihood estimator, with weights corresponding to the ratio of population strata probabilities to sample strata probabilities. Another approach is just to maximize the same likelihood function while including a full set of alternative specific constants, but because we included choice variables that are constant across choices, we could not implement this approach. Table 1 reports results using the weighted maximum likelihood procedure.

The NPS surveys, while nationally representative, were designed to oversample smaller chiefdoms, so all regressions reported do use weights to make the sample more reflective of the national population. The sampling probability of each enumeration area (EA) was taken directly from the survey design; EAs were randomly sampled within each district local council area. Hence, the probability that an EA was sampled is just the number of EAs selected per local council area divided by the total number of EAs in that local council area. To obtain the chiefdom-level sample weights, we can compute the probability that chiefdom  $j$  was not sampled as follows:

$$1 - H_j = \prod_{e=1}^{N_j} (1 - \Pr(EA_e \text{ sampled}))$$

where we use the fact that the probability that all EAs were not selected within a chiefdom can be written as the product of the probabilities that each EA was not selected, by independence. Solving the above equation for  $H$  yields the chiefdom sampling probability. The NPS 2007 has observations on 6,345 individuals, but 408 observations were dropped due to missing information on 1990 residence and 449 because of other missing covariates, leaving an estimation sample of 5,488 individuals. There are 149 chiefdoms and the dataset contains the full set of pairwise combinations of chiefdoms and individuals (817,712 observations). In equation 1, the error term  $\varepsilon_{ij}$  is distributed i.i.d. extreme value (type 1).

## Appendix B: Mapping 1963 Chiefdoms to 2004 Chiefdoms

The mapping between chiefdoms in 1963 and 2004 was generally quite straightforward, as almost all chiefdoms had the same geographic boundaries and did not change their names over the period. Therefore, the construction of 1963 ethnicity shares for chiefdoms as they were defined in 2004 was not problematic. However, there were a few instances in which this was not the case:

- Chiefdoms that unified between 1963 and 2004
  - The 1963 census documents separate what is now Jawie Chiefdom, Kailahun district (Chiefdom ID 1102) into Jawi Lower Chiefdom and Jawi Upper Chiefdom.
- Chiefdoms that split apart between 1963 and 2004
  - Panga Kabonde Chiefdom, Pujehun District, was split into Panga Kabonde Chiefdom (3404) and Sowa Chiefdom (3411).
  - Pejewa Chiefdom, Kailahun district, was split into Kpeje West Chiefdom (1107) and Kpeje Bongre Chiefdom (1106).
  - Marampa Masimera Chiefdom, Port Loko district, was split into Marampa Chiefdom (2408) and Masimera Chiefdom (2409).
  - T.M.S. Dibia Chiefdom, Port Loko district, was split into T.M.S. Chiefdom (2411) and Dibia Chiefdom (2403).

For chiefdoms that unified between 1963 and 2004, ethnicity shares were calculated using totals from both areas. For example, we calculated the 1963 ethnicity shares of Jawie chiefdom as the ethnicity shares using totals from Jawi Lower and Jawi Upper Chiefdoms. For chiefdoms that split apart between 1963 and 2004, the 1963 ethnicity shares of the “offspring” chiefdoms were calculated to be equal to the shares of the “parent” chiefdom in 1963.

## Appendix C: Mean Effects Analysis

Katz, Kling, and Leibman (2007) discuss two distinct approaches for testing hypotheses about the effect



of one covariate on a group of outcomes. All results presented in this paper follow the approach outlined below in which mean effects are constructed from a single index regression. Another way to compute a mean effect size is to jointly estimate regressions of the form in equation 3 for all dependent variables in a grouping using a stacked OLS system (or a SUR system). This allows for separate covariate adjustment for each dependent variable, unlike the procedure outlined in the text. The results are unchanged with the alternative procedure (not shown).

The approach taken in the text is to first form groupings of related outcome variables, denoted by  $Y_k$ ,  $k = 1, \dots, K$  (e.g. measures of local collective action). We then standardize each of the outcome variables by subtracting the mean and dividing the standard deviation of the outcome variable for below median *ELF* areas, our quasi control group. Call each of these standardized outcome variables  $Y_k^*$ . With these, we form a single index,

$$Y^* = \sum_k Y_k^*,$$

and we regress this on *ELF* and controls, as in equation 3. The coefficient on *ELF* in this regression is the mean effect size. This regression can be computed using OLS, with robust standard errors which are clustered when appropriate, as well as using IV methods. This approach is intuitive and is easy to implement computationally.

## **Appendix D: Data Appendix**

### **National Public Services Surveys, 2005 and 2007**

The 2005 and 2007 surveys conducted by the Institutional Reform and Capacity Building Project (IRCBP) provide individual level measures of conflict victimization and measures of local institutional outcomes. The surveys were designed to be nationally representative and representative at the district level, although not necessarily at the lower levels of disaggregation that we analyze. Data is missing for Gbonkolenken chiefdom, which leaves 151 chiefdoms and a total of 539 enumeration areas in all. The sample size is 5,278 households in 2005 and 5,193 households in 2007.

### **Sierra Leone School Monitoring Survey, 2005**

This survey was conducted by IRCBP as part of their ongoing evaluation of local public service provision in Sierra Leone. The school monitoring survey featured two unannounced visits, in which the enumerators collected information on the number of teachers present, the number of children in school, whether the school was open, etc. In addition to this surprise component, enumerators also asked detailed questions regarding schools finances and operations. A total of 288 schools were surveyed, and we use chiefdom averages. There are 104 (out of a total 149) chiefdoms that have school data.

### **Sierra Leone Household Census, 1963 and 2004**

Sierra Leone Household Censuses in 1963 and 2004 were designed to count all individuals in Sierra Leone. For the 1963 data, we digitized data on total population by ethnicity, literacy rates and proportion of population with formal sector employment. We are grateful to Statistics Sierra Leone for their cooperation in sharing the data.

### **Sierra Leone Chief and Local Councilors Survey, 2008**

This survey was conducted by IRCBP, and surveyed all Paramount Chiefs and all elected Local Councilors in Sierra Leone, gathering information on their demographic and socioeconomic characteristics, as well as a range of their political and social views.

**No Peace Without Justice (NPWJ) Report, 2004** A measure of conflict intensity that focuses on troops and soldiers is provided by the number of attacks and battles in each chiefdom. This measure was coded from the No Peace Without Justice (NPWJ) conflict mapping report. NPWJ is a non-profit organization that works to promote an effective international criminal justice system and to support accountability

mechanisms for war crimes. The conflict mapping report seeks to record all violations of humanitarian law that occurred over the entire conflict period. The ‘factual analysis’ section of the report is organized chronologically by district, and it reports the chiefdom where each incident occurred, allowing for the construction of chiefdom level war violence measures. The report is available online at: <http://www.npwj.org>.

The measure used in our analysis is the number of attacks and battles that occurred within each chiefdom. An *attack* is defined to be an incident in which an armed group came into a village briefly, burned houses, raped or killed residents. It is common for attacks to be part of a larger military campaign and thus for human rights violations to be committed on a large scale (e.g. “during these attacks RUF forces burnt down fifty houses, killed nine people, abducted an unknown number of people and amputated a man’s hand with an axe” p. 189). A *battle* is defined to be a confrontation between two armed groups (e.g. “On 25 February, the RUF made a successful counter-attack at the rutile mining site, dislodging the SLA forces based there.” p. 430). Battles need not directly involve violence against civilians, although they sometimes do. There were 1,995 violent incidents recorded in the NPWJ report, and 1,363 of these incidents were classified as either an attack or a battle. To give the reader some sense of who the perpetrators of violence against civilians are, of the 968 recorded attacks over 95% were committed by RUF rebels and less than two percent by CDF. The majority of the battles took place between RUF and CDF troops.

### **Geographic Information Systems (GIS) Data**

GIS data provides measures of resources and infrastructure in Sierra Leone. This data is managed and produced by Sierra Leone Information Systems and the Development Assistance Coordination Office (SLIS/DACO) in Freetown. GIS coordinates of all government registered industrial mining sites were combined with firm descriptions from site licenses to determine the location of all registered diamond mining sites. Non-diamond industrial mining plots, including rutile, bauxite, silver, gold, and ‘assorted minerals’, are also observed and included as controls in our regression analysis. Because of unregistered and illegal mining, these measures of mining activity may understate the true extent of diamond mining in Sierra Leone. However, since the civil war ended, the government of Sierra Leone has made a concerted effort to document and register all of the mining in the country, as these resources are a major source of government revenue. GIS data was also used to construct measures of road density, river density, distance of the chiefdom to Freetown, and the land area of each chiefdom.