

# War and Local Institutions in Sierra Leone

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**Abstract:** Scholars of economic development have argued that war may have adverse impacts on later economic performance by destroying physical capital, disrupting human capital accumulation, and damaging institutions. We study the aftermath of the brutal 1991-2002 Sierra Leone civil war. One notable aspect of this project is the availability of extensive household data on conflict experiences and local institutions (broadly defined) for Sierra Leone. We first find that a mere three years after the end of the civil war there are no lingering impacts of war violence on local socioeconomic conditions. We also find that measures of local community mobilization and collective action – including the number of village meetings and the voter registration rate – are significantly *higher* in areas that experienced more war violence, conditional on prewar and geographic controls. In other words, if anything areas where there was greater violence against civilians during the recent war have arguably better local collective action outcomes in the postwar period. These findings obviously speak to the remarkable resilience of ordinary Sierra Leoneans. They also echo the claims of other observers of Sierra Leone who argue that the war generated far-reaching institutional and social changes, including increased political awareness and mobilization.

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## **1. Introduction**

Scholars of economic development have argued that wars can have adverse impacts on later economic performance. War destroys physical capital and infrastructure and disrupts human capital accumulation. War may also damage institutions by creating political instability, destroying the social fabric and endangering civil liberties. Jean Drèze forcefully argues that “[w]ars or rather militarism is the major obstacle to development in the contemporary world” (Drèze 2000: 1171), and the World Bank has made similar claims about wars’ lingering negative impact on economic development: “[t]he legacy effects of civil war are usually so adverse that they cannot reasonably be viewed as social progress. ... [Civil war] has been development in reverse” (World Bank 2003: 32).

Understanding war’s impact on economic development is particularly important for Sub-Saharan Africa, where two-thirds of all nations suffered from armed conflict during the 1980s or 1990s (Miguel et al. 2004). The proliferation of armed conflict in the world’s poorest region raises the question of what role conflict may be playing in Africa’s disappointing recent economic performance.

The net long run effects of war are ambiguous, though, from the point of view of economic theory. To the extent that war impacts are limited to the destruction of capital, the neoclassical model predicts rapid postwar economic growth converging back to steady state growth. Several recent papers that study war impacts – including in Japan (Davis and Weinstein 2002), Germany (Brakman et al. 2004), and Vietnam (Miguel and Roland 2005) – find few if any persistent local impacts of U.S. bombing, with heavily bombed areas in those countries experiencing rapid recovery to prewar population and economic trends. This is consistent with the neoclassical growth model’s predictions if war’s main consequence is to destroy capital.

But war could also affect long run growth by modifying the scale parameter (“A”) in the neoclassical model’s production function: deterioration of institutions would lead to a new steady state characterized by lower long run consumption levels. Warfare has profound impacts on the individuals and communities that directly experience violence, displacement, and loss of property, and these experiences can plausibly lead to substantial changes in local institutions, social relations, organizational life, collective action and politics. These impacts could conceivably be either positive or negative from the standpoint of promoting economic growth. For example, while Drèze claims that war has adverse political and social consequences, Charles Tilly argues that wars historically promoted state formation and nation building in Europe, ultimately strengthening institutional capacity (Tilly 1975). Unfortunately, the near absence of detailed micro data in conflict and post-conflict societies has limited research progress on these questions.

In this paper, we study the aftermath of the brutal 1991-2002 Sierra Leone civil war. One notable aspect of this project is the availability of extensive household data on conflict experiences and local institutions (broadly defined) for Sierra Leone. To summarize our main findings, we first confirm that a mere three years after the end of the civil war there are no lingering impacts of war violence on local socioeconomic conditions in line with the existing war impact studies. We find that measures of local community mobilization and collective action – including the number of village meetings and the voter registration rate – are statistically significantly *higher* in areas that experienced more war violence against civilians, conditional on extensive prewar and geographic controls. In other words, if anything areas where there was greater violence against civilians during the recent war have arguably better local outcomes. These findings speak to the remarkable resilience of ordinary Sierra Leoneans. These results are

complementary to the other recent studies of war mentioned above, none of which examines local institutional or political economy impacts.

As we discuss in the conclusion, these findings also echo the claims of other scholars of Sierra Leone (including Keen 2005 and Ferme 2001) who also argue that the war increased political awareness and mobilization and generated far-reaching institutional changes. We also discuss the issue of how general these findings are likely to be beyond Sierra Leone.

## **2. The Sierra Leone Civil War**

Sierra Leone was ravaged by a civil war that started in 1991 and lasted until 2002. During the war an estimated 50,000 Sierra Leoneans were killed, over one million were displaced from their homes, and thousands were victims of brutal amputations, rapes, and assaults (Human Rights Watch, 1999).

The war began when rebels from the Revolutionary United Front (RUF) invaded Sierra Leone from the country's eastern Liberian border. The conflict spread quickly, eventually reaching all parts of the country. Although no region was left untouched, there was considerable heterogeneity in war damage across nearby areas, a point we return to below.<sup>1</sup>

The conflict led to major political instability. At the national level, Sierra Leone experienced two coups – in 1992 and 1997 – and saw serious deterioration of discipline within the Sierra Leone Army (SLA). According to most reports, elements of the SLA were colluding with the rebels throughout the war. There were few battles between the army and the rebels, and a faction of the SLA even briefly entered into a formal political alliance with the rebels after the 1997 coup. As a result, the main victims of violence were civilians rather than soldiers. Some of

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<sup>1</sup> Sierra Leone's land area is 71,740 km<sup>2</sup>, slightly larger than the U.S. state of West Virginia (CIA 2006).

the most notable battles were actually between the RUF and foreign troops, most notably the Nigerian soldiers who led a West African force late in the war.

At the local level, the RUF rebels generated political and institutional instability by specifically targeting chiefs – the traditional rulers in rural Sierra Leone – and other community elders for massacres, by burning schools, clinics and courthouses, and by scattering the civilian population. Young RUF recruits were often deliberately sent to attack their own home villages, potentially leaving deep social scars within their families and communities (Keen 2005: 60). Both the RUF and the SLA were widely implicated in the abuse of civilians, through looting, forced labor and recruitment (including of children), sexual violence, and indiscriminate killing (Smith et al 2004).

Yet the violence also led to the creation of new local institutions, as communities throughout the country organized Civil Defense Forces (CDF) to protect themselves from the RUF and SLA. CDF fighters were civilians, often linked to traditional societies (for example, the largest CDF, the *kamajors*, were an extension of traditional Mende hunter groups – Ferme 2001), and they relied primarily on local fundraising for supplies. They were initially admired for their selfless defense of civilians. However, later in the conflict when their power and numbers had grown, some CDF units lost discipline and they too began to abuse civilians and trade in diamonds (Keen 2005: 268).

The role of diamonds in igniting and perpetuating the Sierra Leone conflict has attracted widespread media and scholarly attention. David Keen notes that “[a]ny battles were largely restricted to the areas with the richest diamond deposits” (Keen 2005: 212). Diamonds are small, valuable and easily smuggled, providing both personal profit for militia leaders as well as funding for arms purchases. Because large-scale diamond smuggling was possible only so long

as the country remained in chaos, these diamond profits represented an important incentive for armed groups to perpetuate the war (Keen 2005: 50). All armed groups participated to some extent in diamond smuggling during the conflict.

Another factor thought to have ignited the violence was the state's failure to provide public services and promote economic development in Sierra Leone. Over the two decades preceding the conflict, a one-party state served the interests of a small group of politicians and foreign diamond merchants while basic public services disintegrated (Reno 1995). As a result, by 1990 Sierra Leone had the second lowest human development ranking among all the world's countries (United Nations 1993). According to Richards (1996), the total failure of the state to provide education and generate employment opportunities created a large pool of disenfranchised youth ready to rise up violently against the system.

At the same time, the looting and potential diamond profits associated with being a fighter might have been particularly attractive for youth in areas of the country without either formal schooling or job prospects (Collier and Hoeffler 2004), so it is difficult empirically to determine whether it was mainly "greed" or "grievance" that was key in driving militia recruitment, although in our view both clearly played some role.

In contrast, neither ethnic nor religious divisions played a central role in the conflict. The RUF rebels, who were responsible for an estimated 70% of all documented human rights violations during the conflict, targeted people from every ethnic group, and statistical analysis of these violations shows that no ethnic group was disproportionately represented among RUF victims (Conibere et al 2004), and there is no evidence that civilian abuse was worse when the armed faction and the community were predominantly from different ethnic groups (Humphries and Weinstein 2005: 19).

Following the brutal 1999 rebel attack on Freetown, a large deployment of United Kingdom and United Nations troops finally brought an end to the war. These foreign troops conducted a disarmament campaign and secured a peace treaty in early 2002. Donor and non-governmental organization (NGO) assistance has since played a major role in reconstructing physical infrastructure, resettling internally displaced people, and funding other government expenditures. National elections for a president and members of parliament were held in 2002, and local government elections – the first in over thirty years – in 2004.

### **3. Data and Measurement**

We study local socioeconomic and institutional outcomes in 2004 and 2005, several years after the war ended. The main dataset was collected by the Government of Sierra Leone Institutional Reform and Capacity Building Project (IRCBP) in conjunction with Statistics Sierra Leone. The IRCBP supports the ongoing decentralization process in Sierra Leone, and its national household survey assesses individual attitudes toward and interactions with local government institutions. Sierra Leone has 13 districts, 19 local councils (the new unit of local government administration set up by the reforms) and 153 chiefdoms, the traditional local administrative unit. The IRCBP survey sample was designed to be representative at the local council level, but the large number of household observations (6,300 in all) allows us to create more disaggregated chiefdom level measures. The capital Freetown is excluded from the analysis since it is Sierra Leone's only city and its local institutions and history are quite different from the rest of the country, for example, there are no traditional chiefdoms within the capital.<sup>2</sup>

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<sup>2</sup> Data is missing for Gbonkolenken chiefdom, leaving a final sample of 152 chiefdoms. Median estimated 2001 chiefdom population in the sample is 20,325. All of the datasets are described in further detail in the Data Appendix.

The 2005 IRCBP survey provides novel information on local conflict impacts. The dataset includes responses to five retrospective questions about community and household violence victimization during the conflict (Table 1, panel A). Overall, 47% of respondents reported that people in their community were injured or maimed during the conflict and 68% reported that someone in their community had died in the war. The proportion of respondents who had victims of violence or displacement within their household is lower although still high.

The main conflict victimization index is constructed by taking the chiefdom average of the five conflict experience questions, all of which are highly correlated with each other at the chiefdom level. The data confirms that violence against civilians occurred in every region of the country, with substantial variation in conflict intensity across neighboring chiefdoms (Figure 1). These data focus on violence against civilians rather than battles among troops (or the bombing measures used in other recent studies).

One concern with the IRCBP conflict victimization measure is that it is based on respondents living in the chiefdom today, people who may or may not have lived there during the conflict. However, as we discuss below, the main empirical results are robust to the use of a victimization measure that only uses data from respondents who were living in the chiefdom between 1991 and 2002, partially alleviating these concerns.

The second measure of war-related violence is the 2004 No Peace Without Justice (NPWJ) conflict mapping report (Smith et al. 2004), which compiled all violent incidents reported by human rights organizations and in the media. The measure we use is the number of reported attacks and battles in a chiefdom during the conflict (Table 1, Panel B), and on average there were 9.4 such incidents per chiefdom (Figure 2). This measure is related to, but distinct from, the civilian victimization index, since some troop clashes did not directly involve civilians.



The correlation among the conflict victimization index and the NPWJ attacks and battles measure is moderate at 0.3. For both measures, war violence is scattered widely across the country and neighboring chiefdoms often have very different experiences. Our two measures of war-related violence are broadly analogous to the two types of commonly used crime data, crime victimization data versus official crime reports.

Other data sources provide postwar outcomes or controls. The 2004 Sierra Leone Integrated Household Survey (SLIHS) provides data on household per capita consumption expenditures (Figure 3), school enrollment for children aged 5-18, and child nutritional status (Table 1, Panel C). The impact of conflict on these postwar socio-economic outcomes is examined below.

The 2005 IRCBP survey also contains information on local institutions, broadly defined, including local political outcomes such as the proportion that attended a community meeting (Figure 4) and the proportion of respondents registered to vote in recent elections, community group membership, and self-described trust of community members (Table 1, Panel D). These variables have also figured prominently in the recent social capital literature.

Geographic data and prewar socio-economic variables are included as basic regression controls throughout. The geographic data includes the current number of registered diamond mines and non-diamond mines by chiefdom, as well as chiefdom road and river density. This data is from the Government of Sierra Leone Development Assistance Coordination Office (Table 1, Panel E). Prewar socioeconomic data are available from the 1989 Sierra Leone Household Survey (SLHS). Measures of school enrollment and per capita expenditures in 1989 are defined analogously to the 2004 measures. The SLHS sample includes only 64 chiefdoms, less than half of the full sample. The dataset lacks complete documentation making it impossible

to know how this sample of chiefdoms was selected, and thus somewhat difficult to interpret the expenditure figures and some other variables.

#### **4. Estimation Issues**

The key econometric identification issue is the non-random assignment of war violence to chiefdoms. If regions with worse (or better) trends in local institutional performance were more likely to suffer from violence, for example, this would bias estimated war impacts.

Understanding the location of violence and the sources of variation in violence is thus critical.

One attractive empirical approach would be to control for prewar local institutional characteristics and trends. However, such data is simply unavailable prewar for Sierra Leone, to the best of our knowledge. In the analysis below, we instead focus on specifications that control for chiefdom level geographic characteristics, diamond mines, prewar socioeconomic characteristics, and district fixed effects, all of which are plausibly correlated with local institutions and politics. All specifications allow disturbance terms to be clustered at the district level. Some regressions also control for the number of postwar NGO projects in a chiefdom and certain postwar population characteristics (e.g., average education). The inclusion of these controls partially addresses the possibility that NGO activity or selective migration patterns are the cause of the local war impacts we estimate, rather than conflict experiences per se.

Another important caveat is that the econometric strategy outlined above provides impact estimates based on differences across chiefdoms, but cannot capture the counterfactual of what aggregate national outcomes would have been in the absence of the Sierra Leone war. This issue is important to the extent that the war led to major national institutional and social changes, or if the cross-region spillovers of the war were large, issues that we return to the conclusion. In other

words, the net national effect of the war on institutions could theoretically be negative even in light of the local impacts we estimate.

Keeping in mind these important limitations, the Sierra Leone dataset remains among the most comprehensive micro datasets available from a post-conflict society.

## **5. Empirical results**

### **5.1 Where was the violence in Sierra Leone?**

We first examine the correlation between local characteristics and war violence in Sierra Leone. Consistent with some observers' claims, there is a strong relationship between the number of registered diamond mines in a chiefdom and local war violence as captured by the chiefdom attacks and battles measure (Table 2). In the three specifications where the number of attacks and battles is the dependent variable, each containing different sets of control variables, there is a large, positive and statistically significant relationship between diamond mines and violence (regressions 4-6). Prewar log per capita consumption expenditures are also positively and significantly related to local attacks and battles, further evidence that troop activity focused on areas with lootable resources (regression 6). In contrast, in no specification are either the number of diamond mines or per capita expenditures significantly associated with the civilian violence victimization index (regressions 1-3)<sup>3</sup>. This is our first indication of important differences between these two measures. Road density, distance to Freetown (the capital), and population density are only weakly related to both measures of war violence.

Prewar 1989 school enrollment is negatively related to violence victimization in the specification with prewar socioeconomic controls (regression 3, note that in this specification the

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<sup>3</sup> Humphries and Weinstein (2005: 23) similarly find no strong relationship between diamonds and another measure of civilian abuse. Their measure does not reflect the intensity of soldier activity in the area, which may explain the difference with our attacks and battles measure.

sample falls from 152 to 64 chiefdoms). An increase of one standard deviation, or 19 percentage points, in 1989 school enrollment is associated with a reduction of 0.04 in the conflict index, a moderate impact that is statistically significant at 90% confidence. This school enrollment result echoes Collier and Hoeffler's (2004) cross-country finding that average male secondary school enrollment is negatively related to civil war onset. The exact interpretation of the school enrollment result is not clear-cut, however, since the relationship could both reflect lower recruitment costs for fighters (as argued by Collier and Hoeffler 2004) as well as local grievances against the state and ruling elite (Richards 2003). Recall that RUF rebels often raided their own home areas, which could in part explain why recruitment is correlated with violence for a specific area. It is also possible that local CDF recruitment was more successful in areas where more youth had some schooling, although that remains speculative in the absence of detailed CDF unit data.

## **5.2. War impacts on economic conditions and local institutions**

We first summarize war impacts on postwar socioeconomic outcomes. There are no meaningful lingering negative effects of the war on 2004 consumption expenditure levels using either measure of conflict violence (Table 3). If anything, areas that suffered from more violence victimization have slightly higher postwar consumption conditional on geography, prewar conditions, and district fixed effects, although effects are never statistically significant.

In contrast, the number of diamond mines in the district is robustly positively associated with higher local living standards in all specifications, as is the average local education attainment of adults (in one specification, regression 3), as expected.

In one specification, increased NGO activity appears to be at least partially responsible for the rapid recovery in living standards in war-torn areas (Table 3, regression 3), although this result is not robust to the inclusion of baseline controls (and the resulting reduction in sample size due to the limited coverage of the 1989 household survey, regression 4). Another possible partial explanation for the rapid postwar recovery is improved soil fertility: land was often left fallow in areas that experienced more violence and population displacement, and this could have resulted in temporarily higher postwar yields, partially offsetting any adverse war effects on production. (Recall that the analysis excludes Freetown so the capital is not driving any patterns.)

Turning to the local political economy results, the proportion of households attending a community meeting is statistically significantly higher in areas with higher violence victimization in all four specifications (Table 4). The magnitude of the effect is moderate: an increase of one standard deviation in the conflict victimization index (0.17) is associated with an increase of  $0.17 \times 0.37 = 6$  percentage points in community meeting attendance, using our benchmark specification with district fixed effects (Table 4, regression 2). The positive relationship between conflict victimization and postwar community meeting attendance, conditional on controls, is presented graphically in Figure 5.

In contrast, the number of attacks and battles is in no case statistically significantly related to postwar community meeting attendance (Table 4), nor are most other baseline and geographic controls. The difference between the impact of conflict victimization versus attacks and battles makes sense if the key drivers of local social, political, and institutional changes are the direct violence experiences of civilians and communities.

There are similar results for another measure of local political mobilization: the proportion of individuals registered to vote in the postwar 2002 or 2004 elections. Voter

registration (self-reported in the 2005 IRCBP survey) is significantly higher in areas that experienced more conflict victimization in three of the four main regression specifications and is positive and of similar magnitude in the fourth specification (Table 5). The effect magnitude is moderate, in part due to the very high average voter registration rate.

Two possible identification concerns are that the postwar local community impacts are being driven either by increased postwar NGO activity in certain areas, or if migration (or elevated mortality) substantially changed the composition of individuals in areas that experienced fighting. We partially address these concerns by controlling for the number of postwar NGO projects, and controlling for the average postwar educational attainment of adults by chiefdom, and in no case do these controls change the main results (Table 4 regression 3 and Table 5 regression 3). These issues are discussed further in the robustness subsection below.

We next summarize a range of other socioeconomic and local institutional outcomes, focusing on our benchmark specification using the full sample of 152 chiefdoms and controlling for district fixed effects and the chiefdom geographic controls. We find that neither log per capita consumption expenditures (replicating the earlier result from Table 3), proportion of children enrolled in school, nor child body mass index (BMI) are significantly associated with either conflict victimization or the number of attacks and battles in a chiefdom (Table 6, Panel A).

As noted above, attendance at community meetings and voter registration are significantly positively associated with the conflict victimization index, and we also find that the relationship between the whether or not the community petitioned a government official about a community problem and conflict victimization is also positive statistically significant at 95% confidence (Table 6, row 6). While the number of attacks and battles is not significantly positively correlated with any of these three measures, it is positively associated with

respondents' stated level of trust in the community (Table 6, row 9), although the precise explanation for this last finding is unclear.

Taken together, the positive relationships between war violence and these four distinct measures – attendance at community meetings, voter registration, petitioning a government official, and self-expressed trust – constitutes suggestive evidence that war violence is associated with greater postwar local political mobilization, capacity for collective action, and social capital. This is arguably related to a broader rise in political mobilization in Sierra Leone as a result of the war, manifested for example in the rise of the CDF. These institutions, changes in social norms, and organizational patterns, once forged during war, appear to persist into the postwar period. Descriptive statistics from the IRCBP survey corroborates this view on the transformative power of war: when asked how the war impacted the extent to which their own community was able to work together, 60% of respondents stated that war impacts were positive.

### **5.3 Robustness Checks**

One possible concern is that our results are driven by differential migration induced by the conflict. We carried out two additional analyses to establish that this was not the primary factor behind our results. First, all of the above results are robust to conducting the analysis at the individual level, controlling for individual education (results not shown). We opt to focus on the chiefdom level regressions since the main conflict experience explanatory variables are available at that level of aggregation.

Second, we show that average chiefdom educational attainment postwar is not significantly related to either of the war violence measures (Table 6, Panel C). Thus including controls for chiefdom level education in the regressions in Table 6 does not affect the magnitude

or significance of the coefficient estimates for the conflict measures (results not shown).

Although we cannot rule out that differential migration was induced by the conflict, these checks suggest that our results are not driven by average education differences across chiefdoms.

A second concern is that the wide-spread displacement during the war makes it difficult to identify the precise location of the violent acts reported by victims in the IRCBP survey. To address this concern we constructed an alternative violence measure that restricted the sample to those individuals who resided in their current chiefdom during the civil war. As these individuals have not permanently migrated, it is more likely that the violence they experienced did indeed take place in that chiefdom. The results are robust to using this alternative measure of conflict victimization (results not shown).

A final concern is that postwar events connected with reconstruction affected levels of mobilization and collective action. To address this concern, we focus on the number of NGO projects in each chiefdom, as reported by the Sierra Leone Development Assistance and Coordination Office. It is unclear what exact targeting rule NGO's used to determine where to place their projects in post-war Sierra Leone, but conditional on district fixed effects project placement does not closely match patterns of war violence. Specifically, the number of NGO projects in a chiefdom is not related to either of the war violence measures (Table 6, Panel C). This helps rule out that donor aid or NGO involvement as explanations for our main results.

In a related analysis, we constructed a measure of violence against traditional political authorities to examine whether this is a key mechanism driving the observed increases in political mobilization, for instance if the death of the chief has encouraged new actors to enter local politics. The traditional chiefs, who have held considerable power in Sierra Leone since being installed by the British colonialists (Reno 1995), and they were often targeted by RUF



soldiers because they represented the old repressive system (Richards 2003). We constructed an indicator variable using the NPWJ report data that takes on a value of one if a chief had been killed or forced to leave the chiefdom during the war; there were 14 such reported incidents. This measure was never statistically significantly related to postwar outcomes, however, providing suggestive evidence against the hypothesis. However, the possibility that some violence against chiefs or village headmen went unreported means this result should be interpreted with caution.

Finally, we conducted additional analysis at the individual IRCBP survey respondent level, and this allows us to estimate whether the impact of conflict on local political mobilization (e.g., voter registration) differs between youths (defined as those under age 35 following the Sierra Leone definition) and non-youths. We find no statistically significant differences between these two groups for any of the outcome measures in Table 6 (regressions not shown). Thus the mobilization impacts we estimate appear to reflect effects across age groups in high conflict areas, rather than just among youths, say.

## **6. Discussion**

A number of noteworthy patterns emerge from the analysis. Postwar socioeconomic outcomes in 2004 are not statistically significantly different in areas that suffered more during the conflict. There is also no evidence of lingering adverse effects of the violence on local institutional performance. If anything, several measures of local political mobilization and the capacity for collective action are somewhat better in areas of Sierra Leone that experienced more war violence.

Our finding that war-related violence increased the capacity for local collective action in Sierra Leone echoes a recent result from experimental economics. Conducting experiments in Honduras, Castillo and Carter (2005) find that Dictator Game players share significantly more of their endowment with others in areas that had recently been hard hit by Hurricane Mitch, compared to areas where the hurricane was less destructive. In both their study and ours, local adversity appears to produce greater cooperation across individuals, rather than less.

Speculatively, these changes in local political mobilization could lead to greater postwar political accountability, collective action and ultimately improved public policy in Sierra Leone.<sup>4</sup> Of course, our findings on increased mobilization and collective action do not imply that the impact of the war was positive overall: the aggregate national impact of the fighting on living standards and welfare in Sierra Leone could be negative even in the presence of positive localized effects of the war in certain dimensions.

Our findings on political mobilization and institutional changes resonate with the research of scholars in other disciplines, including with Keen's (2005: 170) claim that the "experience of displacement and to some extent the exposure to aid organizations seems to have produced a heightened political awareness among many ordinary Sierra Leoneans", and among youths in particular. Ferme also discusses the potential to forge something positive out of the horrors of the war: "[Sierra Leoneans] have sometimes turned [social instability] into a creative, though violent, opportunity to refashion themselves vis-a-vis their own institutions" (2002: 228).

The bottom line is that, while the humanitarian costs of civil wars are horrific, their postwar legacies need not be catastrophic. Beyond the Sierra Leone case, several African countries – including Uganda, Mozambique, and Rwanda – that experienced brutal civil wars

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<sup>4</sup> Alternatively increased political mobilization could give rise to small, exclusive coalitions that lobby for narrowly targeted policies that do not benefit the society at large. This type of mobilization could have a negative overall impacts on economic performance (Olson, 1984)

during the 1980s and early 1990s have since experienced very rapid economic growth accompanied by extensive institutional changes. Of course, further empirical work is needed to understand how general these findings are, and in particular to identify the circumstances under which civil wars will leave positive rather than negative institutional and social legacies.

## References

- Brakman, Steven, Harry Garretsen and Marc Schramm. "The Strategic Bombing of Cities in Germany in World War II and its Impact on City Growth", *Journal of Economic Geography*, 2004, 4(1), pp. 1-18.
- Castillo, Marco, and Michael Carter. "Identifying Social Effects with Economic Field Experiments", unpublished manuscript, University of Wisconsin, 2005.
- Central Intelligence Agency. *CIA World Factbook*. Dulles, VA: Brassey's Inc, 2006,
- Collier, Paul and Anke Hoeffler. "Greed and grievance in civil war" *Oxford Economic Papers*, 2004, 56 (4), pp. 563 – 595.
- Conibere, Richard et al. "Statistical Appendix to the Report of Truth and Reconciliation Commission, Report of Sierra Leone" Human Rights Data Analysis Group, 2004, The Benetech Initiative
- Davis, Donald R., and David E. Weinstein. "Bones, Bombs, and Break Points: The Geography of Economic Activity." *American Economic Review*, 2002, 92 (5), pp. 1269-1289.
- Drèze, Jean. "Militarism, Development and Democracy." *Economic and Political Weekly*, 2002, April, pp. 1171-1183.

- Ferme, Mariane C. *The Underneath of Things: Violence, History and the Everyday in Sierra Leone*. Berkeley: The University of California Press, 2001.
- Human Rights Watch. "Sierra Leone: Getting Away with Murder, Mutilation, and Rape." New York: Human Rights Watch, 1999.
- Humphries, Macartan and Jeremy M. Weinstein "Handling and Manhandling Civilians in Civil War: Determinants of the Strategies of Warring Factions", unpublished manuscript, Stanford University, 2005.
- Keen, David. *Conflict and Collusion in Sierra Leone*. London: James Currey; New York: Palgrave, 2005.
- Miguel, Edward A. and Roland, Gerard. "The Long Run Impact of Bombing Vietnam" unpublished manuscript, University of California, Berkeley, 2005.
- Miguel, Edward A., Satyanath, Shankar and Ernest Sergenti. "Economic Shocks and Civil Conflict: An Instrumental Variables Approach." *Journal of Political Economy*, 2004, 114 (4), pp. 725 – 753.
- Olson, Mancur. *The Rise and Decline of Nations*. New Haven: Yale University Press, 1984.
- Reno, William. *Corruption and State Politics in Sierra Leone*. Cambridge and New York: Cambridge University Press, 1995.
- Richards, Paul. *Fighting for the Rainforest: War, Youth and Resources in Sierra Leone*. London: James Currey; Portsmouth, NH: Heinemann for the International African Institute, 1996.
- Richards, Paul. "The Political Economy of Internal Conflict in Sierra Leone." Netherlands Institute of International Relations Working Paper Series: No. 21, 2003.

- Smith, L. Alison, Catherine Gambette, and Thomas Langley. "Conflict Mapping in Sierra Leone: Violations of International Humanitarian Law from 1991 to 2002", Mar. 10, 2004, No Peace Without Justice (NPWJ).
- Tilly, Charles H.. *The Formation of National States in Western Europe*. Princeton NJ: Princeton University Press, 1975.
- United Nations. *Human Development Report 1993*. New York: United Nations Development Program, Oxford University Press, 1993.
- United Nations. *Human Development Report 2004*. New York: United Nations Development Program, Oxford University Press, 2004.
- World Bank. *Breaking the Conflict Trap: Civil War and Development Policy*. Washington, DC: World Bank, 2003.

Table 1: Descriptive Statistics

	Mean	Std dev
Panel A. Conflict Victimization		
Was anyone from this community injured/maimed during the conflict? <sup>a</sup>	0.47	0.21
Did anyone from this community die as a result of the conflict? <sup>a</sup>	0.68	0.22
Did any member of your household die as a result of the conflict? <sup>a</sup>	0.39	0.22
Were any members of your household injured/maimed during the conflict? <sup>a</sup>	0.26	0.15
Were any members of your household made refugees during the conflict? <sup>a</sup>	0.53	0.31
Conflict victimization index ( <i>average of the above variables</i> ) <sup>a</sup>	0.46	0.17
Panel B: Conflict Reporting		
Number of attacks and battles in chiefdom, 1991-2002 <sup>b</sup>	9.41	9.70
Panel C. Postwar Socio-Economic Outcomes		
Log per capita expenditure ( <i>Leones</i> ), 2004 <sup>c</sup>	13.00	0.44
Proportion of children enrolled in school ( <i>ages 5-18</i> ), 2004 <sup>c</sup>	0.64	0.17
BMI for children ( <i>ages 0-5</i> ) <sup>c</sup>	22.15	8.44
Panel D. Local Institutions, Politics, and Social Capital Outcomes		
Proportion attended any community meeting in past year <sup>a</sup>	0.81	0.14
Proportion registered to vote in past two elections <sup>a</sup>	0.97	0.04
Community petitioned a government official or politician <sup>a</sup>	0.63	0.18
Average number of group memberships per HH <sup>a</sup>	3.17	1.13
Proportion of HH that have a member of religious group <sup>a</sup>	0.67	0.22
Proportion of HH with a political group member <sup>a</sup>	0.21	0.15
People in this community can be trusted ( <i>1 = strongly disagree, 5 = strongly agree</i> ) <sup>a</sup>	4.57	0.29
Panel E: Other variables		
Proportion of adults in chiefdom ever been to school, 2004 <sup>a</sup>	0.29	0.16
Number of NGO projects <sup>d</sup>	44.59	42.67
Log per capita expenditure ( <i>Leones</i> ), 1989 <sup>e</sup>	8.00	0.72
Proportion of children enrolled in school ( <i>ages 5-18</i> ), 1989 <sup>e</sup>	0.26	0.19
Number of diamond mines (per chiefdom) <sup>f</sup>	2.59	5.49
Road density ( <i>km of road per sq km of land area</i> ) <sup>f</sup>	0.09	0.06
Log distance to Freetown ( <i>km</i> ) <sup>f</sup>	11.94	0.57
Log population density ( <i>people per sq km</i> ), 1985 <sup>f</sup>	3.75	0.75

**Notes:** The unit of observation is the chiefdom, and chiefdom means are reported where appropriate. Due to survey sampling design, there are 117 observations for the 2004 socio-economic variables (Panel D) and 64 observations for the 1989 socio-economic variables (Panel E). All other variables have 152 observations. Freetown (the capital city) is excluded from the analysis.

**Sources:** <sup>(a)</sup> Institutional Reform and Capacity Building Project, 2005 Household Survey <sup>(b)</sup> No Peace Without Justice Conflict Mapping, 2004 Report <sup>(c)</sup> Sierra Leone Integrated Household Survey, 2003-2004 <sup>(d)</sup> Encyclopedia of Sierra Leone, Sierra Leone Information Systems, 2003 <sup>(e)</sup> Sierra Leone Household Survey, 1989 <sup>(f)</sup> GIS Data, Government of Sierra Leone, 2002.

Table 2: The Location of Conflict in Sierra Leone

Explanatory Variable	Dependent Variable: Conflict victimization index			Dependent Variable: Number of attacks and battles		
	(1)	(2)	(3)	(4)	(5)	(6)
Number of diamond mines	-0.0015 (0.0024)	0.0011 (0.0014)	0.0011 (0.0013)	0.39*** (0.08)	0.33*** (0.08)	0.36*** (0.10)
Road density	0.12 (0.18)	-0.20 (0.16)	0.43 (0.45)	19.5 (10.7)	5.1 (16.3)	-25.1 (33.6)
Log distance to Freetown	0.13*** (0.042)	0.075 (0.037)	0.097 (0.082)	-1.94 (1.79)	0.59 (1.97)	4.64 (5.92)
Log population density, 1985	0.025 (0.026)	-0.0071 (0.0014)	0.069* (0.036)	-0.35 (1.30)	0.22 (1.00)	1.90 (2.72)
Proportion children in school, 1989			-0.21* (0.12)			5.0 (16.2)
Log per capita expenditure, 1989			0.008 (0.031)			3.76* (1.93)
District fixed effects	No	Yes	Yes	No	Yes	Yes

Notes: There are 152 observations (chiefdoms) in (1), (2), (4), and (5), and 64 chiefdoms in (3) and (6). Additional controls in all regressions include number of chiefdom non-diamond mines and river density. In regressions (2), (3), (5) and (6) district fixed effects are included for Tonkolili, Pujehun, Port Loko, Moyamba, Kono, Koinadugu, Kono, Kenema, Kambia, Bonthe, Bombali, and Bo Districts; Western Area Rural District is the omitted district category. Robust standard errors reported. Disturbance terms are allowed to be correlated (clustered) within district in all regressions. Significantly different than zero at \* 90% confidence, \*\* 95% confidence, \*\*\* 99% confidence. The coefficient on log per capita expenditure in column (6) is robust to excluding Western Area Rural from the regression sample.

Table 3: 2004 Household Expenditures and Conflict

Explanatory Variable	Dependent Variable: Log per capita expenditures, 2004			
	(1)	(2)	(3)	(4)
Conflict victimization index	0.55 (0.49)	0.45 (0.40)	0.42 (0.42)	0.51 (0.69)
Number of attacks and battles	-0.0055 (0.0041)	-0.0064 (0.0056)	-0.0068 (0.0053)	-0.0042 (0.012)
Number of diamond mines	0.028*** (0.0033)	0.024*** (0.0042)	0.023*** (0.0055)	0.015* (0.0077)
Road density	0.29 (0.73)	0.79 (0.55)	0.67 (0.57)	0.81 (1.26)
Log distance to Freetown	-0.32** (0.10)	-0.12 (0.12)	-0.078 (0.12)	0.26 (0.28)
Log population density, 1985	-0.096** (0.041)	-0.016 (0.042)	-0.032 (0.038)	-0.069 (0.11)
Proportion of adults with any education, 2004			0.43*** (0.13)	0.0327 (0.32)
Number of NGO projects in chiefdom			0.0066*** (0.0004)	0.0014 (0.0022)
Proportion children in school, 1989				-0.015 (0.40)
Log per capita expenditure, 1989				0.07 (0.11)
Geographic Controls	Yes	Yes	Yes	Yes
District fixed effects	No	Yes	Yes	Yes

Notes: There are 117 observations (chiefdoms) in (1), (2),(3) and 55 chiefdoms in (3). Additional controls in all regressions include number of chiefdom non-diamond mines and river density. In regressions (2),(3) and (4) district fixed effects are included for Tonkolili, Pujehun, Port Loko, Moyamba, Kono, Koinadugu, Kono, Kenema, Kambia, Bonthe, Bombali, and Bo Districts; Western Area Rural District is the omitted district. Robust standard errors reported. Disturbance terms are allowed to be correlated (clustered) within district in all regressions. Significantly different than zero at \* 90% confidence, \*\* 95% confidence, \*\*\* 99% confidence.



Table 4: Community Meetings and Conflict

Explanatory Variable	Dependent Variable: Proportion attending any community meeting, 2004			
	(1)	(2)	(3)	(4)
Conflict victimization index	0.25** (0.096)	0.37*** (0.10)	0.36*** (0.10)	0.21** (0.088)
Number of attacks and battles	-0.0025 (0.0017)	-0.0010 (0.0008)	-0.0008 (0.0008)	-0.0013 (0.0011)
Number of diamond mines	0.0007 (0.0026)	-0.0035 (0.0019)	-0.0024 (0.0022)	0.0013 (0.0042)
Road density	-0.0069 (0.017)	0.046 (0.20)	0.06 (0.21)	0.41 (0.23)
Log distance to Freetown	-0.033 (0.042)	0.029 (0.025)	0.028 (0.025)	0.097 (0.058)
Log population density, 1985	-0.038 (0.022)	-0.036 (0.022)	-0.031 (0.022)	-0.054 (0.023)
Proportion of adults with any education, 2004			-0.0043 (0.11)	-0.12 (0.19)
Number of NGO projects in chiefdom			-0.0005* (0.0002)	-0.0007* (0.0004)
Proportion children in school, 1989				0.043 (0.11)
Log per capita expenditure, 1989				-0.0086 (0.016)
Geographic Controls	Yes	Yes	Yes	Yes
District fixed effects	No	Yes	Yes	Yes

Notes: There are 152 observations (chiefdoms) in (1), (2), (3), and 64 chiefdoms in (4). Additional controls in all regressions include number of chiefdom non-diamond mines and river density. In regressions (2),(3) and (4) district fixed effects are included for Tonkolili, Pujehun, Port Loko, Moyamba, Kono, Koinadugu, Kono, Kenema, Kambia, Bonthe, Bombali, and Bo Districts; Western Area Rural District is the omitted district. Robust standard errors reported. Disturbance terms are allowed to be correlated (clustered) within district in all regressions. Significantly different than zero at \* 90% confidence, \*\* 95% confidence, \*\*\* 99% confidence.

Table 5: Voter Registration and Conflict

Explanatory Variable	Dependent Variable: Proportion registered to vote, 2004			
	(1)	(2)	(3)	(4)
Conflict victimization index	0.039* (0.019)	0.065** (0.027)	0.065** (0.027)	0.052 (0.047)
Number of attacks and battles	-0.0002 (0.0002)	0.0001 (0.0003)	0.0001 (0.0003)	0.0002 (0.0004)
Number of diamond mines	-0.0005 (0.0004)	0.0004 (0.0003)	0.0004 (0.0003)	0.0015 (0.0012)
Road density	-0.045 (0.043)	0.018 (0.029)	0.017 (0.031)	0.029 (0.090)
Log distance to Freetown	0.011 (0.0099)	0.0093 (0.0096)	0.011 (0.39)	0.024 (0.63)
Log population density, 1985	-0.0030 (0.0035)	-0.0005 (0.0027)	-0.0005 (0.0024)	0.0090 (0.0052)
Proportion of adults with any education, 2004			0.0003 (0.0011)	0.017 (0.037)
Number of NGO projects in chiefdom			0.0000 (0.0000)	-0.001 (0.0001)
Proportion children in school, 1989				-0.051 (0.033)
Log per capita expenditure, 1989				-0.0061 (0.0049)
Geographic Controls	Yes	Yes	Yes	Yes
District fixed effects	No	Yes	Yes	Yes

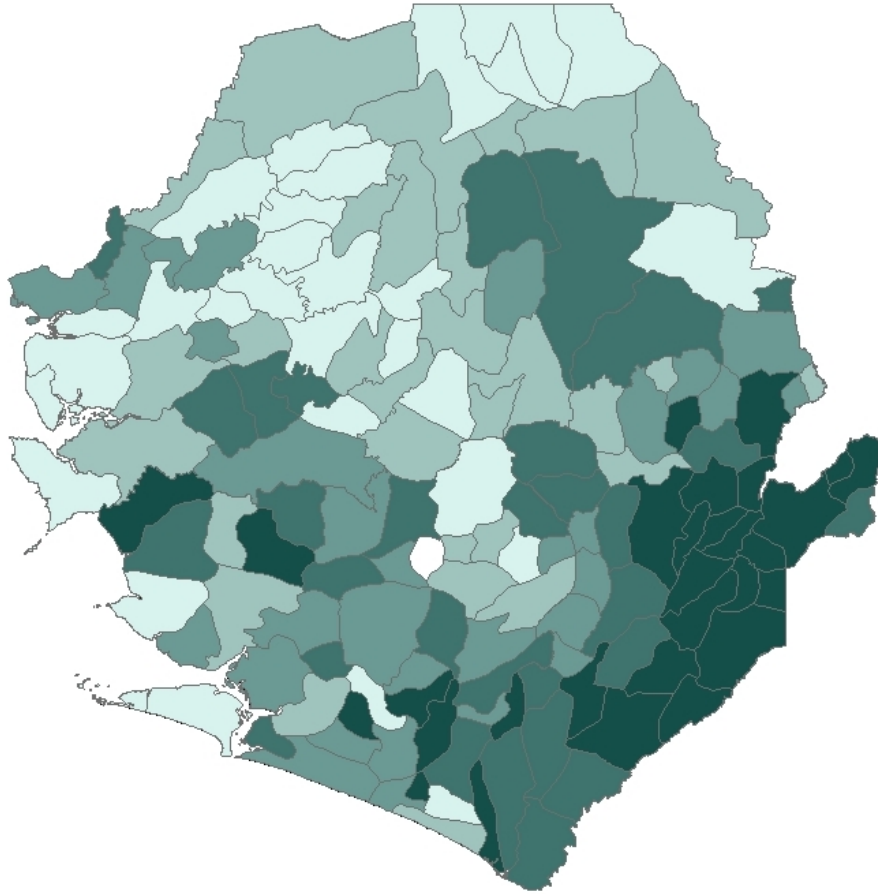
Notes: There are 152 observations (chiefdoms) in (1), (2), (3), and 64 chiefdoms in (4). Additional controls in all regressions include number of chiefdom non-diamond mines and river density. In regressions (2),(3) and (4) district fixed effects are included for Tonkolili, Pujehun, Port Loko, Moyamba, Kono, Koinadugu, Kono, Kenema, Kambia, Bonthe, Bombali, and Bo Districts; Western Area Rural District is the omitted district. Robust standard errors reported. Disturbance terms are allowed to be correlated (clustered) within district in all regressions. Significantly different than zero at \* 90% confidence, \*\* 95% confidence, \*\*\* 99% confidence.

Table 6: Postwar Outcomes and Conflict

Dependent Variable	Explanatory Variables: Coefficient (std. error)	
	Conflict victimization index	Number of attacks and battles
Panel A: Postwar Socio-Economic Outcomes		
1. Log per capita expenditure, 2004	0.45 (0.40)	-0.0064 (0.0056)
2. Proportion children enrolled in school, 2004	0.17 (0.18)	-0.0000 (0.0019)
3. BMI for children, 2004	4.50 (8.90)	-0.0034 (0.057)
Panel B: Institutions, Politics, Social Capital		
4. Proportion attended any community meeting	0.37 <sup>***</sup> (0.10)	-0.0010 (0.0008)
5. Proportion registered to vote	0.065 <sup>**</sup> (0.027)	0.0001 (0.0003)
6. Community petitioned government official, politician	0.366 <sup>**</sup> (0.135)	-0.0018 (0.0014)
7. Average number of group memberships per HH	0.97 (0.68)	-0.0017 (0.0079)
8. Proportion of HH with a political group member	0.030 (0.091)	-0.008 (0.0013)
9. The community can be trusted (1=disagree, 5=agree)	-0.16 (0.20)	0.0055 <sup>**</sup> (0.0022)
Panel C: Adult Education and NGO Projects		
10. Proportion of adults with any education, 2004	0.050 (0.091)	0.0010 (0.0010)
11. NGO projects, 2004	-28.4 (16.9)	0.12 (0.45)

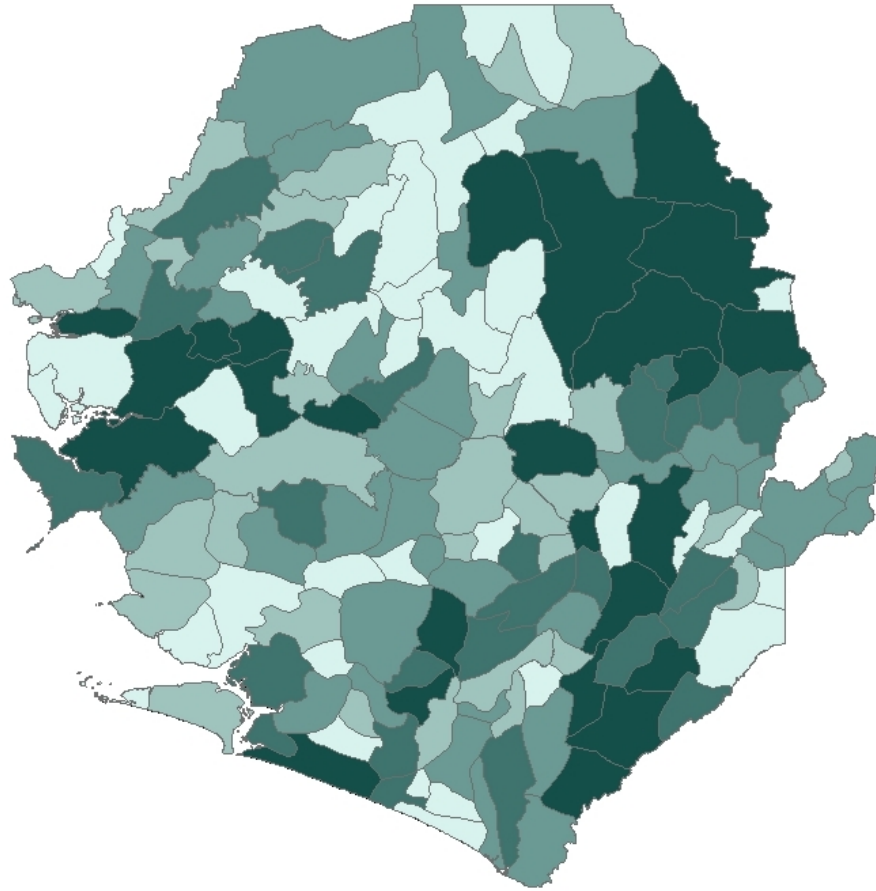
Notes: Each set of two coefficients (and standard errors) in each row is from a separate OLS regression analogous to Table 3, regression 2. Basic controls in all regressions include number of chiefdom diamond and non-diamond mines, river density, road density, log distance to Freetown, and population density in 1985. District fixed effects are included in all regressions, for Tonkolili, Pujehun, Port Loko, Moyamba, Kono, Koinadugu, Kono, Kenema, Kambia, Bonthe, Bombali, and Bo Districts; Western Area Rural District is the omitted district. Regressions do not include the prewar controls. Rows 1-3 include 117 chiefdom observations and Rows 4-8 include 152 observations. Robust standard errors reported. Disturbance terms are allowed to be correlated (clustered) within district in all regressions. Significantly different than zero at \* 90% confidence, \*\* 95% confidence, \*\*\* 99% confidence.

Figure 1: Conflict Victimization Index



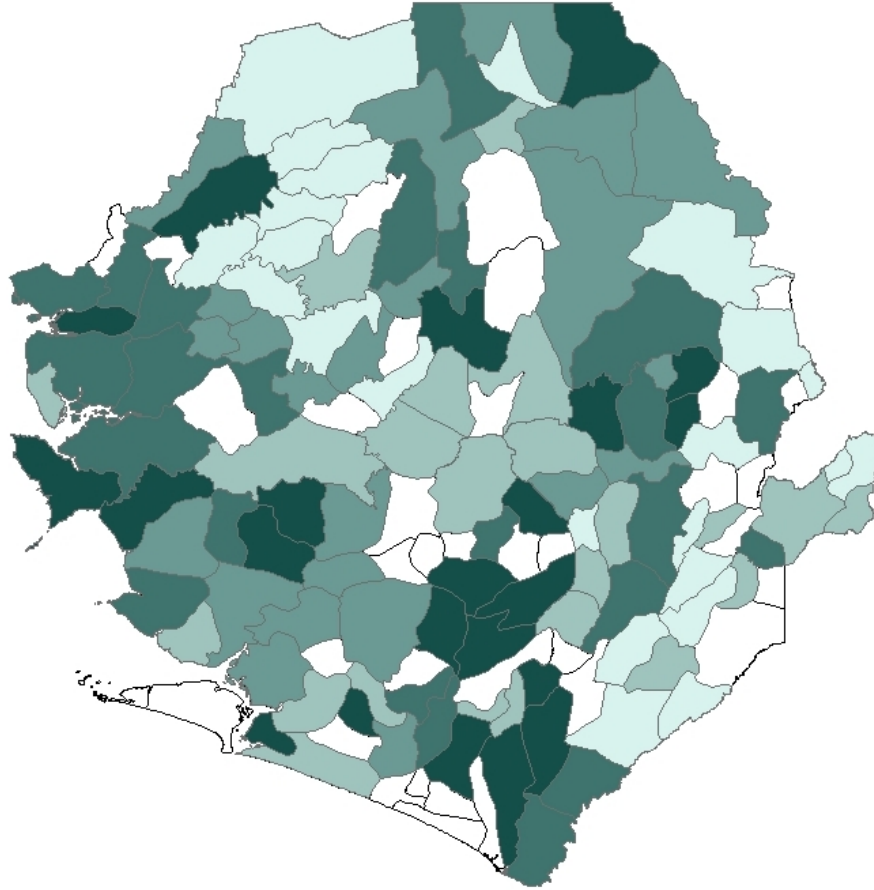
Notes: Chiefdoms are shaded in quintiles according to the value of the conflict index for the chiefdom. Data is missing for Gbonkolenken chiefdom, leaving a sample size of 152 chiefdoms.

Figure 2: Attacks and Battles



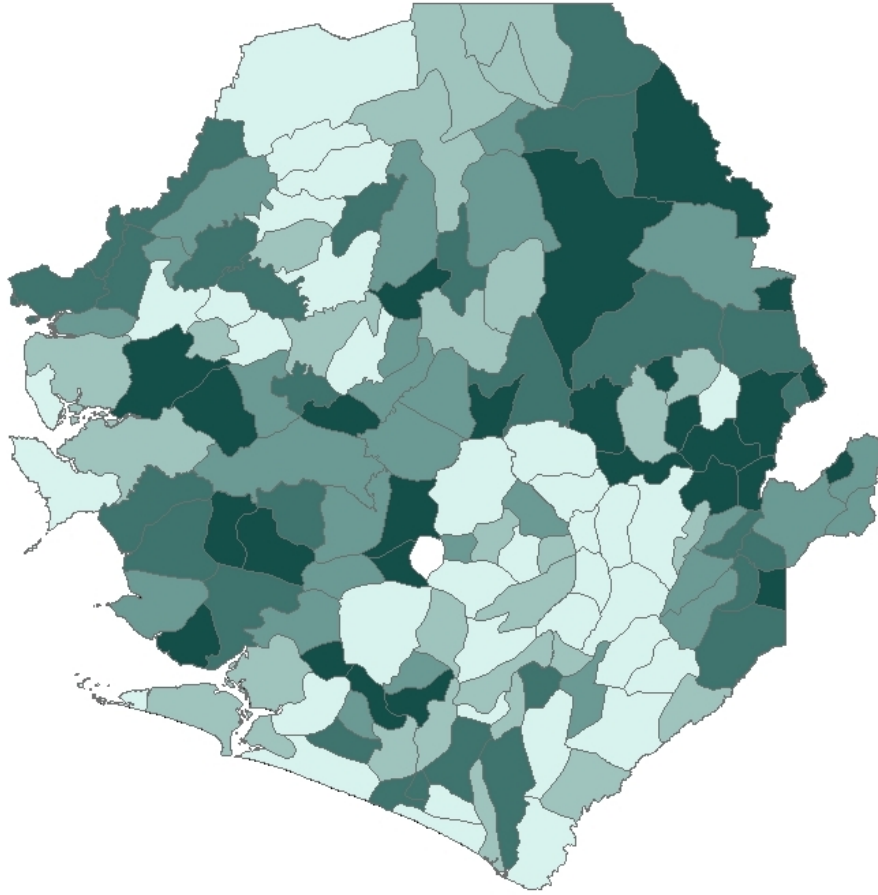
Notes: Chiefdoms are shaded in quintiles according to the number of reported attacks and battles that occurred in that chiefdom. Data is reported for 153 chiefdoms.

Figure 3: Log per capita expenditures, 2004



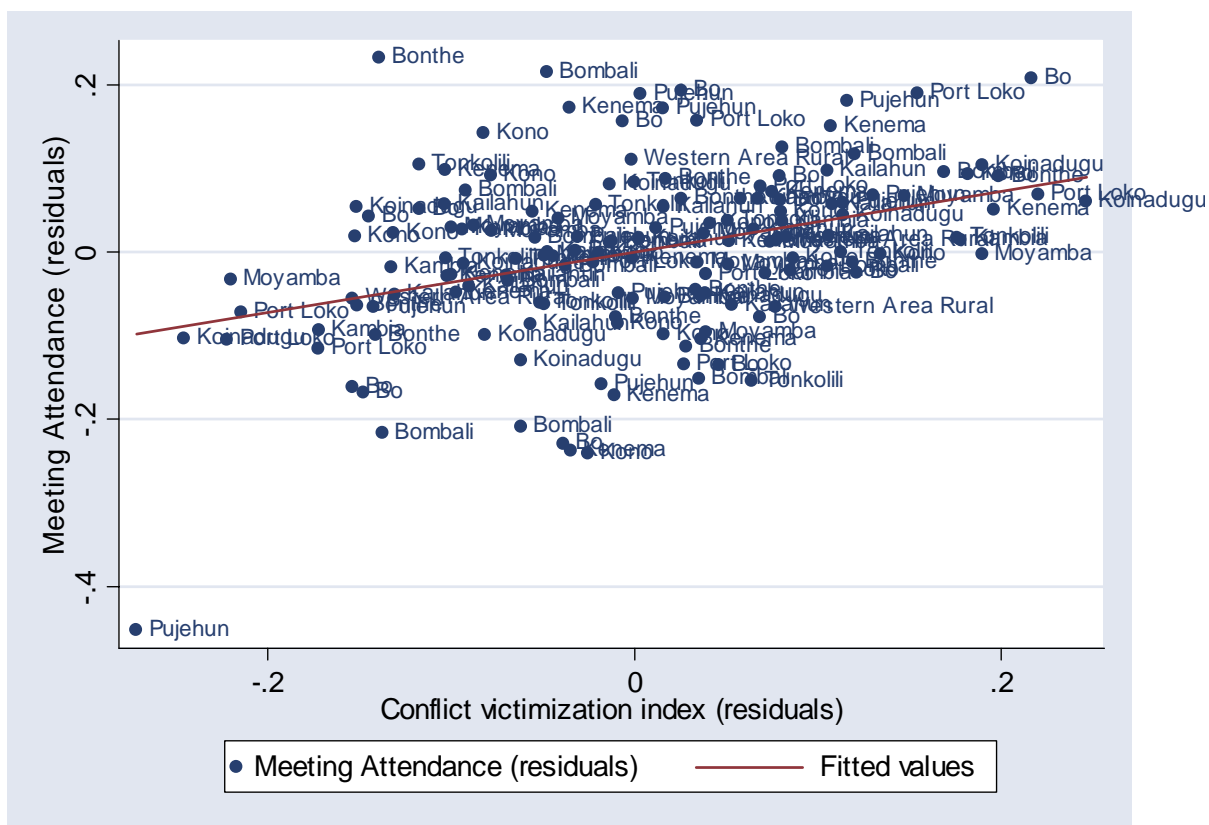
Notes: Chiefdoms are shaded in quartiles according to the proportion of people in the chiefdom estimated to have registered to vote in either the recent national election or the recent local government election. Due to sampling strategy, data is not reported for 36 chiefdoms, leaving a sample size of 117 chiefdoms. The chiefdoms with missing data are left unshaded in the figure.

Figure 4: Attendance at Community Meetings



Notes: Chiefdoms are shaded in quintiles according to the proportion of people in the chiefdom estimated to have attended a community meeting in the past year. Data is missing for Gbonkolenken chiefdom, leaving a sample size of 152 chiefdoms.

Figure 5: Community Meeting Attendance and Conflict Victimization (residuals)



Notes: The residuals for both community meeting attendance and conflict victimization are generated by a regression on the geographic controls, baseline controls, and district fixed effects as in column (2) of Table 4. There are 152 observations (chiefdoms) in the sample. The positive OLS relationship is statistically significant at 95% confidence (p-value < 0.005).



## **Data Appendix**

### **A. Institutional Reform and Capacity and Building Project (IRCBP) Survey, 2005**

The 2005 Institutional Reform and Capacity and Building Project (IRCBP) survey provides measures of conflict victimization and measures of local institutional outcomes. The IRCBP project supports the ongoing decentralization in Sierra Leone, working closely with the newly elected Local Councils to strengthen local government. The IRCBP survey collected information on the provision of public services, attitudes and perceptions of local government, as well as some demographic and socioeconomic variables. The national survey was designed to be representative at the district level, and the large number of observations in each district allows construction of more disaggregated chiefdom level measures.

The conflict victimization index is constructed by taking a simple average of five questions related to civilians' experiences during war: "Was anyone from this community injured or maimed as a result of the conflict?", "Did anyone from this community die as a result of the recent conflict?", "Were any members of your household killed during the war?", "Were any members of your household injured or maimed during the war?", and "Were any members of your household made refugees during the war?" This measure of conflict intensity focuses on civilian victimization, and does not directly capture troop movements or battles.

### **B. 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. No Peace Without Justice 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 recoded 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 are, of the 968 recorded attacks over 95% were committed by RUF rebels and less than two percent were committed by CDF soldiers. The majority of the battles took place between RUF and CDF troops, with a smaller but still substantial number also involving the SLA and ECOMOG (West African forces led by Nigeria).

### **C. Sierra Leone Integrated Household Survey (SLIHS), 2003-2004**

Data on postwar household expenditures, enrollment of children in school, and body mass index for children is available from the 2003-2004 SLIHS survey. The data collection was funded by DFID and the World Bank, with the intent of providing more complete measures of poverty and social outcomes for use in postwar planning. The cleaned data is available from the office of Statistics Sierra Leone. This national survey was designed to be representative at the district level. As with the IRCBP survey, the large number of households in each district allows construction of chiefdom level averages. All of the statistics used in the present analysis are based on the cleaned sample, which included households located in 117 (out of 152) chiefdoms. Due to sampling strategy, no data was collected for the remaining 35 chiefdoms.

### **D. Sierra Leone Household Survey (SLHS), 1989**

The 1989 SLHS household survey is, to the best of our knowledge, the only available household survey data source on prewar conditions outside of Freetown. The household and individual level data is used to construct measures of average log per capita expenditure and also the proportion of children enrolled in school. Regressions that include these variables should be interpreted with caution for two reasons. First, there is minimal existing documentation on the survey, so it is hard to assess data quality. Second, there is a small sample size: it is possible to construct measures for only 64 chiefdoms. Data collection under-sampled chiefdoms near Sierra Leone's national borders, although the precise reasons why are unclear.

### **E. Encyclopedia data, 2004**

The number of non-government organization (NGO) projects located in each chiefdom is reported in the Sierra Leone Encyclopedia, 2004. The Encyclopedia compiles statistics from multiple government and donor agencies in order to facilitate information sharing and more informed policy making. The Encyclopedia is produced and distributed by Sierra Leone Information Systems and the Development Assistance Coordination Office (SLIS/DACO) in Freetown. As part of the Encyclopedia, the WhoWhatWhere Humanitarian Database compiles information on the activities of the international NGOs, large national NGOs, and other donors currently working in Sierra Leone. The measure used in the analysis is the total number of NGO projects across all sectors – including health, agriculture, and education – from 2001 to 2004.

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

Geographic Information Systems (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 to 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 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.