Armed Conflict, Household Victimization, and Child Health in Côte d'Ivoire[±]

Camelia Minoiu
International Monetary Fund
IMF Institute

Olga N. Shemyakina[±±]
Georgia Institute of Technology
School of Economics

Abstract

We examine the causal impact of the 2002-2007 civil conflict in Côte d'Ivoire on children's health using household surveys collected before, during, and after the conflict, and information on the exact location and date of conflict events. Our identification strategy relies on exploiting both temporal and spatial variation across birth cohorts to measure children's exposure to the conflict. We find that children from regions more affected by the conflict suffered significant health setbacks compared with children from less affected regions. We further examine possible war impact mechanisms using rich survey data on households' experience of war. Our results suggest that conflict-induced economic losses, health impairment, displacement, and other forms of victimization are important channels through which armed conflict negatively impacts child health.

Keywords: human capital, child health, conflict, height-for-age, sub-Saharan Africa
JEL classification: I12, J13, O12

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Corresponding author: Olga Shemyakina, School of Economics, Georgia Institute of Technology, Atlanta, GA, 30332–0615, USA, olga.shemyakina@econ.gatech.edu, (323) 229 3180.

I. Introduction

The process of human capital accumulation, a key driver of long-run growth, is often derailed when countries experience large negative shocks such as natural disasters, social strife and armed conflict, adverse terms of trade movements, and economic downturns. Almost one third of developing countries have experienced civil warfare and violence during 2000-2008.[1] Studies on the aggregate impact of conflict show that affected countries and populations adjust relatively fast and often return to their pre-conflict growth trajectories (Davis and Weinstein, 2002; Brakman et al., 2004; Miguel and Roland, 2011). However, children and young adults are particularly vulnerable to negative shocks as they can lose years of investment in their human capital, as documented by a growing body of research on the micro-level consequences of conflict (e.g., Akbulut-Yuksel, 2009; Bundervoet et al., 2009; Blattman and Annan, 2010; Akresh et al., 2011; Chamarbagwala and Morán, 2011; Shemyakina, 2011; Swee, 2011; Leon, forthcoming; Mansour and Rees, forthcoming). Some of these shocks, especially when experienced during early childhood, have been shown to have lasting effects on later-life outcomes that are difficult to reverse.

In this paper we estimate the causal impact of armed conflict as an adverse shock to child health in a developing country. Recent studies establish a robust negative association between armed conflict and child health (Bundervoet et al., 2009; Akresh et al. 2011; Baez, 2011; Akresh et al., forthcoming, Mansour and Rees, forthcoming). However, few have been able to pin down the channels through which conflict impacts child health. We make four main contributions to this literature. First, we use data collected before, during, and after the conflict to estimate the impact of the conflict. Second, based on unique post-conflict survey data on war-related experiences, we construct household-level measures of conflict-induced victimization that allow

[1] Based on data from Marshall (2010).

us to explore distinct mechanisms by which conflict impacts child health. Third, we compare the effect of a regional measure of conflict as a covariate shock with that of household-level victimization on child health. We are thus able to identify the impact of victimization as an idiosyncratic shock in addition to the impact of the covariate shock.[2] Fourth, we contribute to the literature on gender bias in the face of negative shocks by examining gender differentials in the estimated impact.

The shock under scrutiny is the 2002-2007 conflict in Côte d'Ivoire and the outcome of interest is children's height-for-age z-score, a commonly used indicator of long-run child nutritional status and health (Martorell and Habicht, 1986). Our identification strategy relies on exploiting both temporal and spatial variation across birth cohorts in exposure to the conflict. Large health setbacks are observed for children from conflict regions and victimized households within these regions. Height-for-age z-scores are on average 0.414 standard deviations lower for children living in conflict regions compared to same-age children outside conflict regions. The stature deficit is more pronounced for boys and children exposed to conflict for longer periods of time. All our results are conditional on survivorship and on individuals remaining in the country.

While the absence of longitudinal data does not allow us to examine the well-being of the same households before and after the war, we exploit cross-sectional variation in self-reported household-level victimization levels to pin down the channels through which the conflict affects individuals. Among the shocks we examine, economic losses have the largest negative impact on child health. The effect of all types of victimization—economic losses, health impairment, displacement, and being directly subjected to violence—is stronger for migrant households. This

[2] Our aim in this study is to quantify the impact of the conflict and to explore its transmission channels. We do not examine household coping strategies in the face of the shock.

finding suggests that displacement coupled with different forms of direct victimhood is an important transmission channel for the shock. The negative impact of victimization is stronger for children living in conflict regions, suggesting that the effect of the idiosyncratic shocks is amplified in regions affected by the covariate shock.

While most studies use data collected after the conflict, we are able to control for pre-conflict health differentials using data collected prior to the conflict as well. The three surveys we use are the 2002 and 2008 Household Living Standards Surveys (HLSS) and the 2006 Multiple Indicator Cluster Survey (MICS3) for Côte d'Ivoire.[3] The 2008 post-conflict survey provides rich information on household experiences during the war, which we use to construct measures of idiosyncratic exposure to the war. The covariate shock is captured with an indicator variable for conflict-affected areas identified using data on the exact dates and locations of conflict events from the Armed Conflict Location and Events Dataset (ACLED) (Raleigh et al., 2010).

In baseline regressions we control for household head, mother and child fixed effects, and province-specific time trends. We supplement these with a battery of robustness checks regarding changes in sample composition, migration, selective fertility and mortality. We find that our results are robust to these tests. The results also hold for a range of sub-samples and using an alternative control group. We also apply a placebo test to survey data from an earlier period to address the concern that conflict locations may be non-random. Finally, we look for correlations between self-reported victimization and observables to investigate whether victimized households are a select sample targeted for violence. Again, we find that our results hold up and conclude that we can credibly attribute the identified effects to the armed conflict.

[3] See the Data Appendix for more information.

The remainder of the paper is organized as follows. In Section II we relate our study to previous work and describe the historical context of the Ivorian conflict. Section III presents the data, the estimation strategy, our baseline results, and the robustness checks. In Section IV we discuss and provide evidence on conflict impact mechanisms. In Section V we discuss additional interpretations of the results and conclude. Auxiliary results are available in an online appendix.[4]

II. Literature Review and Historical Background

II.1. Previous Studies

Our paper contributes to a large literature that stresses the importance of early childhood conditions for human capital accumulation and adult outcomes (see Currie, 2009; Almond and Currie, 2011 for surveys). For developing countries, Strauss and Thomas (1998) document a positive relationship between height and education, employment, and wages. Glewwe et al. (2001) and Alderman et al. (2006) show that poor nutrition negatively affects school performance and thereby decreases life-time income. Looking at the factors that influence child health, Baird et al. (2011) assemble survey data from 59 developing economies and show that short-term economic fluctuations increase child mortality and that female infants face the highest risk.

Further, our results contribute to a recent literature that provides evidence of a negative link between armed conflict and child health.[5] For example, Akresh et al. (forthcoming) examine

[4] Auxiliary results are available in an online appendix on www.camelia-minoiu.com/civ-onlineappendix.pdf. (Tables and figures in the appendix are labeled in the text "A" for Appendix).

[5] A distinct literature examines the consequences of armed conflict on the health of young adults. For instance, Agüero and Deolalikar (2012) show that while the negative impact of the Rwandan genocide decreases with age at exposure in a sample of women, the effects are stronger for women who were adolescents during the genocide.

the consequences of the Ethiopian-Eritrean war on the height of young children in Eritrea and find that children exposed to the war are shorter by 0.42 standard deviations than the reference population. Bundervoet et al. (2009) estimate an average impact of the Burundian war of 0.35 to 0.53 standard deviations, while Akresh et al. (2011) estimate a slightly larger coefficient of 0.64 standard deviations for children exposed to the pre-1994 Rwandan war. Our baseline estimates of the average effect of conflict on the war-affected cohort are in the same ballpark as the literature at slightly above 0.4 standard deviations compared to the reference population. Our contribution is to use rich information on different types of conflict-induced victimization in order to pin down the mechanisms that explain the findings of this literature.

We also add to the literature on human capital and economic development in West African countries. Some of the studies on Côte d'Ivoire focus on health in comparative perspective and thus provide a useful backdrop for our results.[6] Strauss (1990) shows that in 1985 stunting rates in rural Côte d'Ivoire were half the African average, but twenty times larger than in the United States. Cogneau and Rouanet (2009) examine pre- and post-colonial stature and find that health improvements during the colonial period occurred due to fast urbanization and improvements in cocoa production. Other studies focus on macroeconomic shocks. Thomas et al. (1996) quantify the effects of the 1980s adjustment policies in Côte d'Ivoire on child and adult health. Across a range of measures they find that the health of children and adults was negatively affected by macroeconomic adjustment, in particular due to an increase in relative food prices and reduced availability and quality of health infrastructure. Larger negative effects

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Domingues (2010) finds that the impact of the protracted Mozambican war on height is stronger for women exposed to the war earlier in life.

[6] Jensen (2000) examines investments in child education and health in the face of weather shocks to agricultural income in Côte d'Ivoire and finds adverse effects on enrollment and short-run measures of nutritional status.

are documented for males, children and adults, a result that is echoed in our study. Cogneau and Jedwab (2012) use the 1990 reduction in administered cocoa producer prices as an exogenous shock to farmer welfare and compare child health and education outcomes before and after the event. They find that human capital investments are procylical and that there is greater bias against young girls during times of economic stress.

II.2. Spatial and Temporal Intensity of the 2002-2007 Ivorian Conflict

Côte d'Ivoire, the world's leading exporter of cocoa, enjoyed a long period of political stability and economic development following its declaration of independence in 1960. With an average real GDP growth rate of 4.4 percent during 1965-1990, Côte d'Ivoire became an economic powerhouse in West Africa and an attractive destination for foreign investment and migrant workers from neighboring countries.[7] Political unrest followed the death of long-standing President Felix Houphouet-Boigny in 1993 and a number of coups d'état took place during the 1990s. A military coup in December 1999 caused a deep sociopolitical crisis.

The root causes of the 2002-2007 Ivorian conflict can be traced back to widespread discontent over land ownership and nationality laws (in particular, eligibility rules for individuals running for office),[8] and voting rights affecting the large population of foreign origin living on the territory of Côte d'Ivoire.[9] As tensions flared, the armed conflict began in September 2002

[7] By end-1998, more than a quarter of the population consisted of foreign workers, more than a half of which were of Burkinabe origin.

[8] The 2000 constitution stipulated that presidential candidates be born in Côte d'Ivoire from Ivorian parents.

[9] The seeds of the conflict were sown in the mid-1990s when the concept of "Ivoirité" (or "Ivoiry-ness") entered the political discourse. As the country has an ethnically-diverse population, a large share of foreign workers, and many naturalized first- and second generation Ivorians, the denial of voting rights, land rights, and hostility towards migrants led to tensions that culminated in the 2002-2007 conflict (Sany, 2010).

with multiple attacks by rebel forces representing mostly the Muslim, northern parts of the country. Violence erupted in several cities, including Abidjan in the south, Bouaké in the center, and Korhogo in the north.[10] Throughout the conflict the country remained essentially split into two, with the northern and western parts of the country under the control of rebel forces (*Forces Armées des Forces Nouvelles*) and the southern part under government control (UK Home Office, 2007).

In the rebel-controlled north, access to basic public services such as electricity and water, health clinics, and schools was severely impaired during the conflict. According to surveys analyzed in Fürst et al. (2009), the three most important conflict-related problems reported by households in the western province of Man were health (48 percent), a lack of food (29 percent), and the interruption of public services (13 percent). Precarious water distribution during the conflict compounded existing health problems, with reports that only one fifth of water pumps in the rural north were operational (UNOCHA, 2004). Education services were also severely disrupted in the north, where 50 percent of school-age children were deprived of education by 2004 (Sany, 2010). It is estimated that 70 percent of professional health workers and 80 percent of government-paid teachers abandoned their posts in the northern and western parts of the country (UNOCHA, 2004; Sany, 2010).

While the first years of the conflict were marked by more violence than the latter period, the Ivorian war stands out as a long and relatively low-intensity conflict. Records indicate that it caused some 600 battle fatalities per year in the initial phase compared to ten times as much in the average civil war in the Battle Deaths Dataset (UCDP/PRIO, 2009). It also led to large population movements and had a substantial economic impact. Per capita GDP growth during 2002-2007 was on average −1.5 percent, the second lowest in the region, and the poverty rate

[10] See Figure A1 for a map of Côte d'Ivoire.

rose sharply. Peace talks and negotiations held throughout the conflict culminated in March 2007 with the signature of the Ouagadougou Political Accord, which marked the official end to the conflict.[11]

To identify conflict-affected regions, we use information from the ACLED database on the exact dates and locations of violent incidents during the conflict, including riots, protests, armed battles, and violence against civilians. We match conflict events within each location and for each year to children's province-of-residence (at the time of the survey) and year-of-birth in the surveys. We define conflict regions as those provinces for which ACLED reports at least one conflict event from September 2002 to November 2007. Figure 1 depicts the spatial distribution of conflict events based on the ACLED dataset. With the exception of Abidjan, the economic and former political capital of Côte d'Ivoire, provinces with a higher incidence of violence, shown in darker shades, are concentrated in the rebel-held, northern and western parts of the country.

In Figure 1 the western part of Côte d'Ivoire stands out as the area most affected by high-intensity conflict (based on the frequency of conflict events). Several reasons may explain this pattern. First, fertile cocoa-growing regions of western Côte d'Ivoire had long-standing tensions between indigenous ethnic groups and non-Ivorians (mostly of Burkinabe and Malian origin) over property and land rights (Mitchell, 2011). Second, the region hosts large numbers of Liberian refugees who in the aftermath of the 1999-2003 Liberian Civil War settled in a special refugee zone extending over four western provinces. About one third of the population in these provinces is of foreign origin (Kuhlman, 2002) and foreigners were targeted during the

[11] A timeline of events based on the reports of the UN Mission in Côte d'Ivoire (ONUCI) is shown in Figure A2.

conflict.[12] Third, during the second phase of the conflict the western regions witnessed a large number of attacks by local militarized groups, including against United Nations bases and property (UNOCHA, 2006a, 2006b).[13]

III. Data and Methods

III.1. Household Surveys

The three datasets we use, the 2002 and 2008 Côte d'Ivoire HLSS and the 2006 MICS3, provide anthropometric information for 15,421 children aged 6-60 months at the time of each survey. Height-for-age z-scores are calculated using World Health Organization (WHO) Multicenter Growth reference datasets.

Summary statistics reported in Table 1 indicate that during the period of analysis Ivorian children lagged behind the international reference population, with average height-for-age z-scores being lower by almost two standard deviations in the early survey and by 1.5 standard deviations in the later ones. Average height-for-age z-scores are also higher in conflict regions. Mean age does not differ significantly across surveys or between more and less affected regions. However, we find statistically significant differences in the share of children of various ethnicities and religions inside and outside conflict regions. In conflict regions, mothers are less likely to be married, and children are less likely to reside in rural areas, but more likely to come

[12] In particular, hostilities resurfaced in Côte d'Ivoire between the same ethnic groups which had fought on the Liberian side of the border during the 1999-2003 Liberian War. Several UN documents report hostilities in the Liberian community during the Ivorian conflict (UNOCHA 2003a, 2003b). According to McGovern (2011, pp. 207), both parties to the conflict often attributed especially violent events to Liberian militias.

[13] Chelpi-den-Hamer (2011) provides a detailed account of the motivations and activities of armed factions in western Côte d'Ivoire during the conflict.

from poor households. We include most of these variables as controls in our regressions and perform robustness checks to ensure that our results are not driven by these differences.[14]

III.2. Baseline Specification

We begin by estimating the following difference-in-differences specification:

$$HAZ_{ijt} = \alpha_j + \delta_t + \lambda_{jt} + \beta_1(\text{Conflict Region}_j * \text{War Cohort}_t) + \varepsilon_{ijt} \quad (1)$$

where HAZ_{ijt} is the height-for-age z-score of child *i* (aged 6-60 months) residing in province *j* and born in year *t*; α_j are province fixed effects, δ_t are birth-cohort fixed effects (month-year of birth), λ_{jt} are province-specific trends in cohort health (province dummies interacted with the year of birth), and ε_{ijt} is a random, idiosyncratic error term. All regressions include gender and rural residence. The "War Cohort" variable identifies children measured in the 2006 and 2008 surveys who were thus exposed to the conflict at a young age or *in utero*. While the 2008 survey provides data only for children born after the conflict, the 2006 survey contains data for children born before or during the conflict and measured during the conflict. Therefore, all children from this survey are included in the war cohort.

In Eq. 1, the main coefficient of interest β_1 captures the average impact of residing in a conflict region on the health of children in the war cohort. The inclusion of province fixed effects allows us to account for unobserved characteristics that are constant across individuals within a province. This strategy removes potential bias in estimating the impact of the conflict by ensuring that time-invariant province-level factors that may systematically be related to exposure to the war are purged from the regressions. Birth-cohort fixed effects control for global factors that simultaneously affect the health of each cohort. All specifications include interactions

[14] Since migration information is unavailable in the 2006 survey, all results that refer to households' migration status use data from the 2002 and 2008 surveys.

between province effects and year of birth to control for pre-existing province-specific trends in cohort health, and rule out the possibility that such trends contaminate our results.[15]

We also consider several variations of the specification in Eq. 1 to exploit variation in the duration of exposure to the conflict. For instance we replace "War Cohort" with indicator variables for no exposure (reference category), exposure between one and 24 months, and exposure of at least 25 months, as well as a continuous measure of the duration of exposure to the conflict (in months). Children who were conceived or born after September 2002 are assumed to have also been exposed to the shock *in utero*. Thus, total exposure duration for them is the number of months *in utero* during the conflict plus their age in months.[16] To allow for gender differentials in the health impact of the conflict, we also estimate Eq. 1 with interaction terms between the variables of interest and a female dummy. Finally, we assess the sensitivity of our main results to adding controls for child, household head, and mother's characteristics.

III. Empirical Results

III.1. Baseline Regressions

The baseline OLS regressions are presented in Table 2, where we estimate the effect of residing in conflict regions and being in the war cohort on children's height-for-age z-scores for the sample of children from the three surveys. This first set of results indicates that children with *in utero* or early childhood exposure to the conflict and who lived in conflict-affected regions had height-for-age z-scores that were 0.414 standard deviations (s.d.) lower than children born during

[15] We also estimated specifications that did not include province-specific time trends and identified a negative, albeit smaller impact of the conflict than in our baseline specifications. This finding suggests that child health in conflict regions was on an improving trend relative to non-conflict regions.

[16] We obtained similar results when we replaced this measure with the number of months of exposure after birth only.

the same period who lived outside conflict regions (column 1). This estimate becomes 0.432 s.d. when allowing for a gender-specific impact (column 2). In columns 3-4 we replace "War Cohort" with indicator variables for the duration of exposure to the conflict. This specification yields impact estimates that are slightly higher for older children and lower for younger ones, which is consistent with the idea that older children, who had longer exposure to the conflict than younger ones, accumulated a greater deficit in height. (However, the coefficients for the age categories are not statistically significantly different from each other.) All interaction terms described above are statistically significant at least at the 5 percent level. Next we focus on a continuous measure of exposure to the conflict (columns 5-6) and find that an additional month of exposure reduces height-for-age z-scores by 0.010 s.d. on average (significant at the 1 percent level). This effect translates into a height-for-age z-score loss of 0.15 s.d. for a one standard deviation (15 months) increase in the duration of exposure to the conflict.

The estimated coefficients on the triple interaction term with the female dummy are not statistically significantly different from zero in most specifications. The estimated coefficient on the interaction term between “Female”, “Conflict Region” and “Exposure 0-24 Months” is large, positive, and statistically significant at the 5 percent level, suggesting that younger girls were affected by the conflict to a lesser extent than boys of similar age. This finding is not surprising in light of other anthropometric studies on sub-Saharan Africa. Unlike the research on child health and famines (Mu and Zhang, 2008) or natural disasters (Rose, 1999) in Asian countries, there is no consistent evidence of sex bias (against females) in child health studies for sub-Saharan Africa, either during tranquil times or after negative shocks. For example, Alderman et al. (2006) do not find significant differences in anthropometric outcomes by gender in a sample of young Zimbabwean children. Bundervoet et al. (2009) and Akresh et al. (2011, forthcoming)

show that the health of girls and boys was similarly impacted by the Burundian, Rwandan, and Eritrean-Ethiopian conflicts, respectively. Strauss (1990) documents marginally lower stature and weight for boys from rural Côte d'Ivoire. Evidence of sex bias is more common in the context of shocks other than conflict. Akresh et al. (2011) and Cogneau and Jedwab (2012) document a stronger negative health impact on young girls in the case of crop failure in rural Burundi and a drop in cocoa prices in Côte d'Ivoire.

Table 3 presents baseline specifications that have been augmented with several sets of control variables. In particular, we control for child ethnicity and religion, characteristics of the household head (age, gender, education) and characteristics of the child's mother (age, education, marital status). We include these controls to ensure that neither the factors we found to systematically differ for children in exposed vs. non-exposed households (Table 1) nor potential changes in sample composition during the period of analysis bias our results. F-tests for the joint significance of coefficients on the controls show that the only characteristic that does not systematically affect children's health is their ethnic background. In these regressions the average health impact of conflict is of similar magnitude to that in the specifications without controls.[17]

III.2. Robustness Checks

III.2.1. Alternative Baseline Cohort

A possibility we have to allow for is that events prior to the conflict affected the health of our baseline cohort, possibly confounding our main results. A major event that may have affected the health of all children surveyed in 2002 and that of some children surveyed in 2006 is a military

[17] In results not reported, we also estimated the baseline regressions allowing for differential trends in cohort health across rural vs. urban locations (after dropping the rural dummy to avoid multicollinearity).The results largely held up.

coup that led to a change in government in Côte d'Ivoire on December 26, 1999. The coup had a significant impact on the Ivorian economy, triggering a significant economic downturn (Doré et al., 2003). Following the coup, private investment collapsed, public investment projects were postponed, social spending was cut back, and migrant workers fled following ethnic clashes in the south. From 1998 to 2002, the national poverty rate rose by five percentage points to almost 40 percent.

It is thus possible that children born after December 1999 experienced a decline in their well-being as the crisis unfolded. Thus, children born between January 2000 and August 2002 in the pre-war survey may constitute a poor baseline group to study the impact of the 2002-2007 civil conflict.[18] Furthermore, children born during the same period and surveyed in 2006 could also be a poor treatment group as they were exposed to two large shocks—the coup and the conflict. As a robustness check, we exclude from the sample children from the 2002 and 2006 surveys who were born between January 2000 and August 2002, the month before the civil conflict erupted. Therefore, our new control group includes only children born *before* the coup and children born after the conflict started who lived *outside* conflict regions.

The results (Table 4) show that children born during the 2002-2007 conflict had significantly worse health compared to the new control group. In these specifications we control for child ethnicity and religion, as well as characteristics of the household head and the child's mother. Notably, the coefficient estimates on the interaction terms between the conflict exposure variables and "War Cohort" are at least twice as large compared to the baseline results (Tables 2-

[18] The December 26 1999 military coup led to a sharp drop in the economic performance and increased political instability, making it possible that children born *before* December 1999 also experienced a decline in health. We assume that any such impact was experienced uniformly across the country.

3). Our earlier results could thus be interpreted as conservative estimates of the impact of the Ivorian conflict on children's health.

III.2.2. Results Across Sub-samples

We further explore heterogeneity in the baseline results by separating children from different types of households and by gender. In Table 5 we present estimates for children from poor and non-poor households, girls vs. boys, rural vs. urban areas, and for children from households headed by individuals with some education and without any education. Columns 1-2 report results of the baseline regression models (as in Table 2, column 1) by poverty status.[19] Poor households are identified using an assets index that refers to the quality of the dwelling and access to the grid and utilities.[20] We find that war-exposed children were negatively impacted in both poor and non-poor households, losing on average 0.516 and 0.382 s.d. respectively relative to the reference population (significant at the 10 percent level).[21]

[19] Since the 2006 survey did not collect consumption data, we cannot construct consumption-based poverty measures that would be consistent across the three surveys and use instead information on household assets available in all three surveys to construct an assets-based wealth index.

[20] The quality of the dwelling refers to whether the walls and floor are in cement or brick, and whether the roof is in metal, cement, or stone. Access to the grid refers to whether the household has electricity and a phone. Investment in utilities represents access to a toilet and using oil, natural gas, coal or electricity for cooking, rather than wood. The asset index is the first factor extracted using principal components analysis on the seven components and explains 47 percent of their joint variance. Poor households are those with asset index values lower than the average.

[21] To further investigate whether poverty drives our results, we split the sample into three groups of children—in the poorest, middle, and richest households—based on the assets index. A statistically significant negative impact of the conflict is found both for the children from the poorest and the middle wealth categories. This result suggests that extreme poverty cannot explain our results (Table A1).

When we split the sample into boys and girls (columns 3-4), we find that both girls and boys in the war cohort who lived in conflict regions suffered important health setbacks compared to same-age children outside conflict regions (the effects are significant at the 5 percent level). Comparing these results with Table 2, we see that the coefficient estimated on the difference-in-differences term is larger in absolute value for girls, suggesting that young girls born or present during the conflict in more affected regions experienced a larger negative impact than same-age girls in less affected regions than was the case for boys. When splitting the samples by area of residence (rural/urban) or head's education, we find that children from the war cohort who lived in conflict regions were impacted more in rural households and in households headed by individuals without education. Nevertheless, formal tests of the equality of the impact coefficients across sub-samples fail to reject the null of equality except for the rural/urban split.

III.2.3. Selective Fertility and Mortality

Two possible threats to the validity of our main findings are endogenous fertility and selective mortality. These may affect our results insofar as fertility decisions are systematically correlated with mothers' characteristics which may in turn affect child outcomes, or sex ratios. To address these issues, we undertake two exercises. First, we look at fertility decisions during the war by women of fertile age and compare them in and outside conflict regions. Second, we look for patterns in sex ratios for surviving children. For the first exercise we pool all women from the 2006 and 2008 surveys who were of fertile age and hence could have had a child during the conflict.[22] We perform a set of regressions akin to Akresh et al. (forthcoming) in which the

[22] Since the surveys provide no or partial information on birth history, when it comes to women who had a child during the conflict, the analysis is confined to surveyed women with resident children and does not account for children who may have left the household or are deceased.

dependent variables (for which we have consistent information across surveys) are women's age, education, and marital status. The covariates include dummy variables for residence in a conflict region, having a child during the war, and their interaction. The regression results (Table 6) confirm that while women who had a child during the conflict are younger, less educated and more likely to be married, there are no systematic differences between the two groups across regions differentially affected by the conflict. It is important to keep in mind that that these results are conditional on children surviving the war and staying in the same household with their mothers, as well as on mothers surviving the war and not migrating outside Côte d'Ivoire. The same results may not hold if individuals who emigrated or died during the conflict were systematically different from those observed in the surveys.

Next we examine patterns of selective attrition due to mortality or migration outside of Côte d'Ivoire in the sample of surviving children from the three surveys. In Figure A3 we plot sex ratios by year of birth for children with non-missing information on gender and location of current residence. We notice that in conflict regions the sex ratio slightly exceeds one from 2000 to 2005; during 2002-2005 the sex ratios for conflict vs. non-conflict regions closely follow each other. While there are slightly more surviving boys than girls in most years during 1997-2007, there are no apparent differential trends across the two types of regions that could confound our results.

III.2.4. Placebo Test

Our analysis may be vulnerable to the criticism that the estimated impact of the conflict captures pre-existing differences between conflict and non-conflict regions. To alleviate this concern, we use household- and individual-level data from the 1994 and the 1998/1999 Demographic and Health Surveys (DHS) for Côte d'Ivoire to perform a placebo test. Households included in these

surveys could not have been affected by the war since the data were collected well before the 1999-2000 socio-economic crisis and the 2002-2007 conflict.

To perform the test, in Eq. 1 we replace "War Cohort" with a dummy for observations from the 1998/1999 DHS survey. The treatment group includes children from this survey aged 6-60 months who reside in placebo-conflict regions. The control group includes same-age children from the 1994 survey and children from the 1998/1999 survey who lived outside placebo-conflict provinces. Once again, the coefficient of interest is on the difference-in-differences term, and if we found a statistically insignificant impact coefficient, then the placebo test would strengthen our confidence that the baseline results are not contaminated by pre-existing factors.

The results (Table 7) suggest that children in the placebo-conflict regions had higher height-for-age z-scores (though not statistically significant) than children of similar age outside placebo-conflict regions and older children (columns 1-3). Furthermore, girls from placebo-conflict regions were worse off (column 4), but the term becomes statistically insignificant once we control for household head and mother's characteristics (columns 5-6).

IV. Household Victimization as a Conflict-Impact Mechanism

IV.1. Measures of Conflict-Induced Victimization

In this section we go one step further in analyzing the impact of conflict on child health by focusing on alternative, idiosyncratic measures of child exposure to the conflict. Specifically, we examine several types of victimization as channels through which the conflict can adversely impact child development.[23] We compute four household-level indices of victimization based on

[23] A growing number of studies focus on the link between individual war experiences such as conflict-induced victimization, and post-war outcomes including social capital in Uganda (Rohner et al., 2011) and Sierra Leone (Bellows and Miguel, 2009).

war experiences reported by the heads of households in the 2008 survey. The indices are calculated as simple sums of indicator variables for affirmative answers to victimization-related questions. These capture a wide range of types of distress, which we group as "economic losses" (loss of income, employment and productive economic assets such as farm and livestock), "health impairment" (physical and mental ailments such as conflict-related illness, anxiety, stress), "displacement" (conflict-related displacement of the entire household or of the household head, necessity to hide during the conflict), and "victim of violence" (being a direct victim of conflict-related violence and experiencing deaths in the household).[24]

We spatially examine the experience of war in Figure 2, a victimization map based on the share of households that report at least one type of victimization. Darker shades represent provinces with a greater share of households reporting victimization (responding yes to at least one question within each index). Panels A and B suggest that conflict-related economic losses, and to some extent health effects, were more prevalent in the rebel-held northern areas. The displacement and victim of violence indices (Panels C and D) appear to visually overlap the best with the ACLED-based conflict map (Figure 1), with more frequent reports of victimization in the western parts of the country, especially along the border with Liberia. The share of households reporting at least one level of victimization along the four dimensions considered, correlates positively with conflict intensity proxied by the number of conflict events in the ACLED dataset (Table 8) and the correlation coefficients range between 0.200 (health impairment) and 0.309 (victim of violence). The province-level victimization measures are

[24] Table A2 lists the questions underlying each index. T-tests for the differences in mean values of the components show that economic losses and displacement were more prevalent in conflict regions, while households experienced relatively similar levels of health impairment inside and outside conflict regions.

strongly correlated with one another, with the highest correlations found between economic losses and displacement on the one hand, and victim of violence on the other.

IV.2. Selection into Victimization

Before proceeding with our victimization analysis, we address a concern that is often raised in relation to self-reported victimization data, namely, that households that report victimization may belong to a select sample that was targeted for violence due to their observable or unobservable characteristics. To determine the extent to which victimization status is correlated with observables, we regress each victimization index on a comprehensive set of characteristics of the heads of households, including ethnicity and religion, rural residence, age, marital status, education, and gender.

The results are reported for the full sample and for non-migrant households in Table 9. There is some evidence of systematic selection into victimization according to certain characteristics. For instance, older heads of households report more conflict-induced health effects (columns 3-4), more educated ones are more likely to report being victims of violence (columns 5-8), and married ones report more of all types of victimization. For ethnic groups the results are more mixed. The Southern Mandé, who live primarily in the western regions extensively affected by the conflict, systematically report more of all types of victimization than the Akan ethnic group (reference category). This observation is consistent with the visual examination of the conflict and victimization maps (Figures 1-2) and reports on the intensity of conflict events. Non-migrant naturalized Ivorians, who constitute only 0.3 percent of the dataset, are significantly less likely to report being direct victims of violence. We would have expected the opposite effect as foreigners were targeted during the conflict. However, since many ethnic groups native to Côte d'Ivoire are also found in neighboring countries, ethnic status may not be a

good basis for classifying individuals as outsiders (Levinson, 1998). McGovern (2011, pp. 71) points out that in western Côte d'Ivoire, "anyone not born in a village is technically a 'stranger'…" and that men moving 20 or 2,000 kilometers away from their native villages would be treated as foreigners in their new place of residence.

In light of these findings, we allow for the possibility that household head's ethnicity and other characteristics may systematically be correlated with self-reported victimization (also suggested by the F-tests on the joint significance shown in Table 9) by including controls such as head's age, education, and child ethnicity (strongly correlated with household head ethnicity) in most of our specifications.

As the Ivorian conflict was characterized by high levels of migration and internal displacement (about 20 percent of the post-conflict sample), we also investigate whether households that moved out of conflict areas differ in their observables from those that did not, and whether they are more likely to report being victimized. When we compare household characteristics in conflict vs. non-conflict regions before and after the conflict, we find no systematic changes in the average household profile.[25] Further, households that migrated during the conflict, especially those displaced by the conflict, are statistically significantly *more* likely to report victimization than non-migrant households. This result holds across alternative definitions of migration, and is conditional on poverty status, area of residence (rural/urban), household head characteristics, and province fixed effects.[26] This finding suggests that there was negative selection into migration and positive selection into staying in conflict regions. Thus, the coefficient magnitudes estimated in the following section for the impact of household

[25] The results are reported in Table A3.

[26] The results are reported in Table A4.

victimization for the non-migrant sample may be viewed as conservative estimates of the true impact of the conflict.

IV.3. Identifying the Mechanisms

To examine the potential role played by each of the four forms of victimization discussed, we estimate two sets of specifications. First, we examine the cross-sectional impact of conflict-induced victimization using the post-war (2008) survey.[27] We estimate the following specification:

$$HAZ_{ijt} = \alpha_j + \delta_t + \lambda_{jt} + \beta_3(\text{Victimized}_i) + \varepsilon_{ijt} \quad (2)$$

The coefficient of interest, β_3, is an estimate of the direct effect of victimization on the health of children in the war cohort. We re-scaled each victimization index so it ranges between 0 and 1. The results are reported in Table 10 for each victimization index, for the full sample and by gender. Since non-migrant households are less likely to be victimized by the war, we show the estimates separately for all households (first two rows) and non-migrant households (next two rows). Household-level victimization impacted children's height, with signs mostly negative for either sample, but the estimates are statistically significant only for the economic losses index. The effect is stronger for boys but there are no systematic gender differences for any other form of victimization. A test for the equality of coefficient estimates across migrant and non-migrant households (results not shown) indicates that the effects are statistically equal regardless of migration status.[28]

[27] Since victimization data are only available in the post-war (2008) survey, observations from the 2006 survey are excluded from this analysis.

[28] The same regressions in which we use an alternative definition of the victimization indices, based on principal components analysis, yield broadly similar results (Table A5).

Second, we assess whether the impact coefficient identified in our baseline results (Tables 2-3) varies with the extent of victimization experienced by households during the conflict. To do so, we go back to the baseline specification (Eq. 1) and exploit the cross-sectional variation given by children living in households victimized by the war by interacting the difference-in-differences term "Conflict Region*War Cohort" from Eq. 1 with the victimization indices. Since victimization variables are available only in the 2008 post-conflict survey, this procedure amounts to estimating:

(3) $$HAZ_{ijt} = \alpha_j + \delta_t + \lambda_{jt} + \beta_4(\text{Conflict Region}_j * \text{Victimized}_i) + \beta_5(\text{Victimized}_i) + \varepsilon_{ijt}$$ [29]

on the pooled sample of children from the pre- and post-conflict surveys. By estimating Eq. 3 we look for a differential impact of conflict on child health according to the degree of conflict-related victimization experienced by the heads of households. This effect is captured by the estimate for β_4. The specification allows us to assess the *joint* impact of living in a conflict-affected region and in a victimized household (compared to all other households), and thus to examine the role of different channels through which conflict may affect child health. As in previous specifications, we control for average health differences across genders and rural residence, and add interaction terms with the female dummy.[30]

[29] This implies that (Conflict Region*War Cohort*Victimization) is equal to (Conflict Region*Victimization) and (War Cohort*Victimization) is the same as (Victimization).

[30] The estimated coefficients on the interaction terms with the female dummy, namely (Female*Conflict), (Female*War cohort) and (Female*Victimization), are not shown in the tables to conserve the space, but are included in all specifications. We consistently find that these variables have statistically insignificant joint effect on height-for-age z-scores.

The results (Table 11) suggest that the negative impact of the conflict on height is larger for children living in victimized households (Panel A).[31] Economic losses and health impairment are the types of victimization with the largest effect. For non-migrant households, the results are qualitatively similar except for displacement (Panel B), for which the estimated coefficients are statistically insignificant. This result is consistent with the fact that non-migrants are less likely to report conflict-related displacement, which strengthens our confidence in the quality of self-reported victimization data. Overall, the evidence suggests that conflict-impact mechanisms such as economic losses, health impairment, and being a victim of violence negatively affect the health of children from *all* households, while conflict-induced displacement has a stronger impact in migrant households. The estimated coefficient on the triple interaction term, which allows for a gender differential, is positive but not statistically significantly different from zero in all but one of the specifications.

IV.4 Impact of the Conflict vs. Victimization

To wrap-up the analysis, we compare the impact on child health of the covariate and idiosyncratic shocks. The covariate shock, captured by the ACLED-based measure of exposure to the conflict "Conflict Region" is an indicator variable for children residing in conflict regions (same definition as before). It assumes that *all* households in conflict regions were affected by the war. In contrast, "Victimized Household" is an idiosyncratic measure of the conflict which assumes that only households that report being victimized were affected by the war. The variable "Victimized Household" takes value one for children in households reporting at least one type of victimization along the four dimensions considered (i.e., the household heads respond yes to at

[31] In related work, Minoiu and Shemyakina (2012) find similar results using an alternative set of victimization indices.

least one question regarding economic losses, health impairment, displacement, and victim of violence). Then we combine these two measures in an interactive term to examine the joint effect of living in a conflict-affected area as well as in a victimized household. The results (Table 12) indicate that while both shocks led to a worsening of child health, children from households that were subject to *both* shocks experienced the largest setbacks. For these children, stature losses range between one half and 0.8 s.d. depending on the set of controls.

V. Discussion and Conclusions

We examined the effect of the 2002-2007 armed conflict in Côte d'Ivoire on children's height-for-age z-scores using data from three household surveys collected before, during and after the conflict, coupled with information on the location of conflict events. Our results show that children aged 6-60 months who lived in conflict-affected areas suffered significant health setbacks compared to those in less affected areas. The negative impact is stronger for children exposed to the conflict for longer periods, and for these exposed to the conflict both as an aggregate shock (living in conflict regions) and an idiosyncratic shock (living in victimized households). In line with other studies of child health in sub-Saharan African countries, we did not find any evidence of sex bias.

Studies on the consequences of armed conflict have proposed several mechanisms through which war affects populations, including destruction of economic assets, lack of access to public infrastructure, and significant population movements. We were able to assess the role of distinct war impact mechanisms using unusually rich information on households' experience of war from a post-conflict survey. Our results suggest that different forms of conflict-related victimization have a large and negative effect on child health, especially in conflict regions. Children in households experiencing economic losses through the destruction of productive

assets (livestock) and properties (farm), loss of income and employment, and more generally a fall in household revenues, experienced the largest health setbacks. Children in households from conflict regions headed by adults who suffered either physical or mental ailments due to the conflict, who had to go into hiding or were displaced, and who experienced direct violence and deaths in the family, also accumulated a stature deficit. Taken together, these findings help explain the adverse effects of armed conflict identified in the literature.

Naturally, the conflict impact mechanisms identified in our study are not exhaustive. Recent case studies by Fürst et al. (2009) and Betsi et al. (2006) document the decline in the state of the health infrastructure during the conflict, complementing our findings on the direct impact the conflict on child health and on the role played by conflict-related adult health problems in explaining this impact. Based on household interviews, Fürst et al. (2009) document a significant deterioration in access to health services and a higher incidence of tropical diseases in the conflict-affected western region of Man in 2003. Betsi et al. (2006) similarly report a large reduction in the number of health facilities and personnel (especially doctors) in the central, northern, and western regions of Côte d'Ivoire around the same time. In the first two years of the conflict, rebel-held regions lost between 75-90 percent of health personnel and 72-90 percent of health facilities due to looting or destruction. Given the relatively poor pre-conflict stock of health infrastructure, conflict-induced losses of health workers and facilities likely had a major impact on the health of children, both directly and indirectly through the adults in the household. In addition, the deterioration of public health infrastructure at a time when it was needed most may have compounded existing health deficiencies.[32]

[32] To test this idea, data on pre- and post-conflict stock and quality of health infrastructure at the province or community level would be required.

Our findings also suggest that displacement is an important channel through which the war affects child health. At the very least displacement leads to reduced access to household resources and social networks. The conflict ignited widespread harassment of foreigners in Côte d'Ivoire, including migrant workers from the region and refugees from Liberia and Sierra Leone living on the outskirts of cities. Some reports indicate that by late-2002 the number of war-affected people had reached between 2.7 million (including the internally displaced) and four million (including evacuees and refugees to Burkina Faso, Guinea, Liberia, Mali, and Sierra Leone) (UNOCHA, 2003). Other sources indicate that in the first ten months more than 500,000 people were displaced (UNICEF, 2003), of which more than two thirds were Burkinabe nationals (Sakurai and Savadogo, 2009).[33] We find that war-displaced households are more likely to report victimization. In the regression analysis of the joint effects of conflict and household-level victimization on child health, displacement comes in third after economic losses and health impairment in terms of impact magnitudes.

By documenting the role played by different war impact mechanisms in worsening child health in conflict regions, we can suggest policies to mitigate the adverse effects of the 2002-2007 armed conflict on child health. Interventions that target conflict regions and aim at rehabilitating basic social services, restoring economic well-being (for instance, through cash transfers or employment programs), and assisting the return of the displaced would seem most fit in alleviating the effects of the conflict. Nonetheless, there is little research on which policy interventions can best mitigate the negative effects of war on well-being in general, and child

[33] Martone (2003) offers comparable estimates—750,000 internally displaced people and 500,000 refugees. Betsi et al. (2006) estimate that the conflict in the central, northern and western regions led to displacement of 40, 25 and 55 percent of the local population respectively and that about 1.8 million people had left rebel-held regions by mid-2004.

health in particular. As knowledge on the consequences of large negative shocks on child development accumulates, more research into households' coping strategies and best public policy responses is needed.

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Data Appendix

Our data sources are:[34]

- Household surveys:
  - HLSS-2002. "Enquête sur le Niveau de Vie des Ménages de Côte d'Ivoire." (Household Living Standards Survey), National Statistical Institute, Ministry of Planning and Development of Côte d'Ivoire, World Bank and European Union.
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  - DHS-1994 and DHS-1998/99. Demographic and Health Surveys for Côte d'Ivoire. Available on: http://www.measuredhs.com/
- Armed Conflict Location and Event Data (ACLED) from http://www.acleddata.com/ (see http://www.acleddata.com/archived-data/ for datasets), Raleigh et al. (2010).

Calculating height-for-age z-scores

Height-for-age z-scores for children in the 2002 and 2008 surveys are calculated using WHO Multicenter Growth reference datasets and the WHO Anthro (version 3.2.2 January 2011) STATA routines (http://www.who.int/childgrowth/software/en/). Observations with biologically implausible z-scores (that is, more than 6 standard deviations away from the international reference population) are dropped from the analysis. The MICS3-2006 survey includes already-calculated height-for-age z-scores using WHO reference datasets. The total number of children with biologically plausible height-for-age z-scores is 15,421 (5,885 in the 2002 survey, 7,232 in the 2005 survey, and 2,304 in the 2008 survey).

Defining non-migrant households

HLSS-2002. Non-migrant households are defined as those that lived in their current location (as of the interview date in fall 2002) since December 1993. The December 1993 cutoff was chosen because it marks the death of Ivorian president Félix Houphouët-Boigny.
HLSS-2008. Non-migrant households are defined as households that had lived in their current location since August of 2002, that is, before the start of the 2002–2007 armed conflict.
MICS3-2006. Migration data is unavailable.

Defining rural households

Neither survey provides information on rural/urban sector of (current) residence. We create an indicator variable for children in rural residence based on children's recorded place of birth and migration history. Children from non-migrant households are assigned their sector of birth. For 23 children in the 2008 survey for whom this information is missing, we use instead the household head's sector of birth as long as the household head has been in the household's

[34] The surveys were undertaken by the National Institute of Statistics in Côte d'Ivoire in collaboration with the World Bank, European Union and UNICEF respectively. For information on how the height data was cleaned, see the online appendix of Minoiu and Shemyakina (2012).

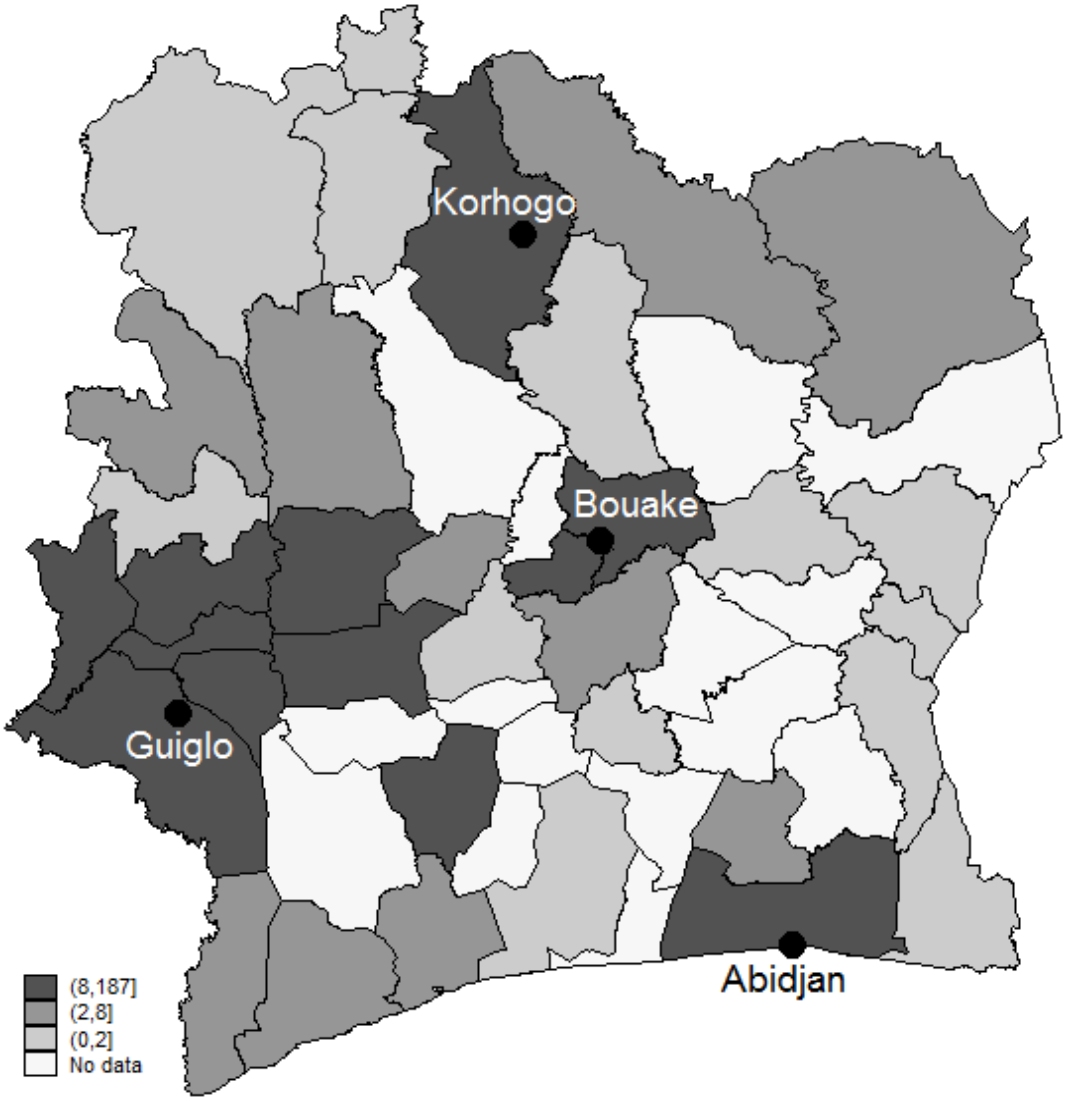
current location since the child's birth, and it is a non-migrant household (that is, the child was born in that location). For regressions examining selection into victimization, the household head's sector of birth is imputed as the sector of residence if the household head has been in their current location since birth.

Maps

The conflict event map was created by manually matching conflict event locations from ACLED with children's location in the household surveys. ACLED locations are either provinces, in which case the merging is automatic, or villages and towns, in which case we match them to their respective province (using information from http://www.maplandia.com/search/). The maps (Figures 1, 2) were created using the "spmap" STATA routine (http://www.stata.com/support/faqs/graphics/spmap.html). The Atlas for Côte d'Ivoire with GIS information is from Dynamic Atlas (http://psugeo.org/Africa/Tools.htm).

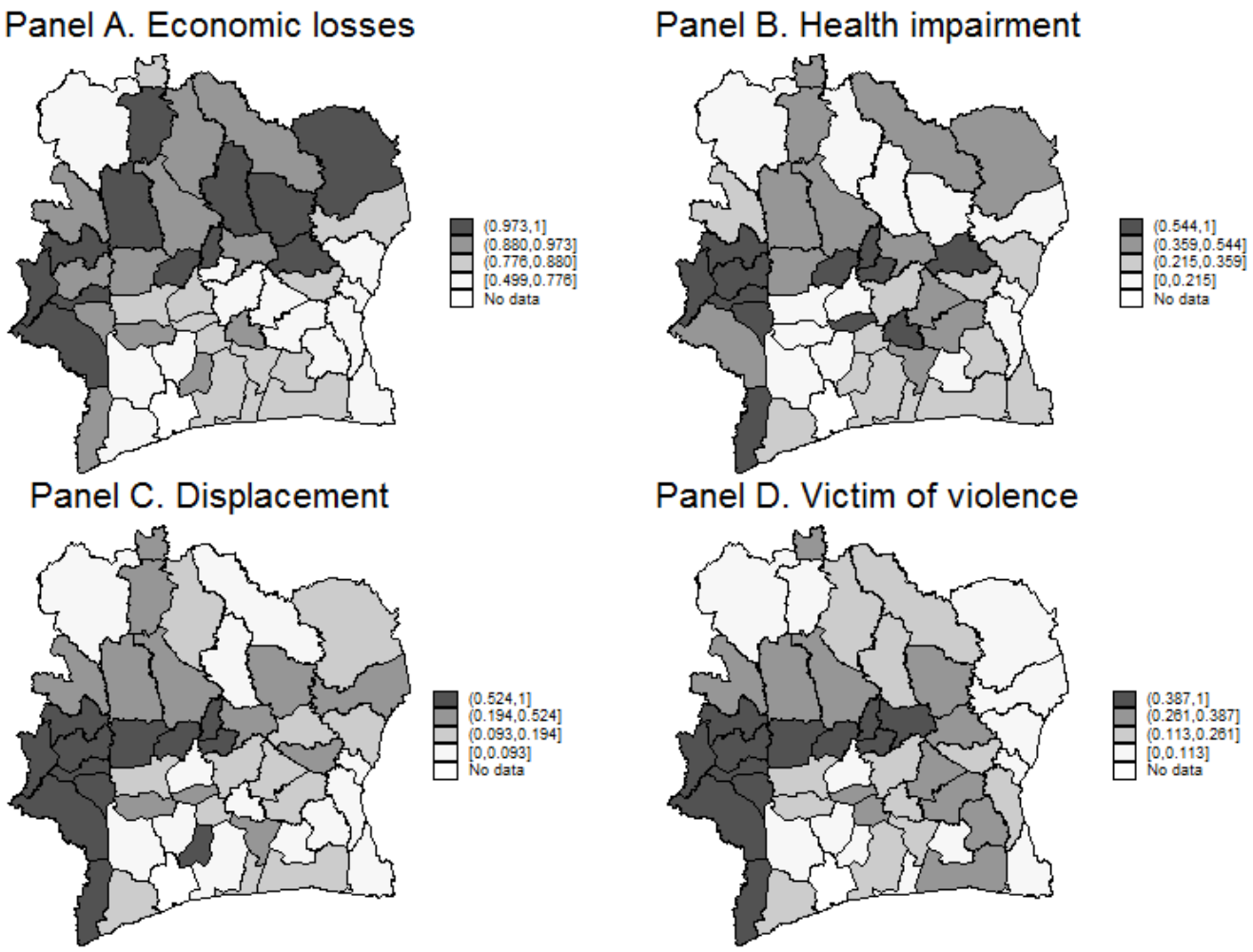
Tables and Figures

Figure 1. Map of Conflict Events in Côte d'Ivoire, September 2002-November 2007



Notes: Shaded areas represent conflict regions. Darker shades indicate a greater number of conflict events reported in the ACLED dataset. In the legend, the "No data" category stands for no reported incidents in the dataset and is treated as zero exposure to conflict in the analysis. The category (8, 187] includes 12 provinces, some of which had relatively low-intensity conflict (between 10 and 30 events) and some with relatively high-intensity conflict, such as Abidjan in the south (187 events), Bouaké in the center (62 events), and the province of Guiglo in the west (48 events). Data sources: Based on ACLED dataset, Raleigh et al. (2010).

Figure 2. Household Victimization Maps



Notes: Shaded areas represent regions where conflict-induced victimization was reported. Darker shades indicate a greater share of households reporting at least one level of victimization (one 'yes' answer to the questions underlying each index). In the legend, the “No data” category refers to the southern province Sassandra for which anthropometric information is missing for all observations in the 2008 survey. Data source: Based on the 2008 Côte d'Ivoire HLSS.

Table 1. Summary Statistics

	[1] Obs.	[2] Full	[3] Non-migrants	[4] Conflict Region	[5] Non-Conflict Region	[6] Difference in Means [4]-[5]
Child Variables						
Height-for-age z-score (2002)	5,885	-1.93	-1.97	-1.88	-2.01	0.13 **
Height-for-age z-score (2006)	7,232	-1.52	-	-1.49	-1.59	0.09 ***
Height-for-age z-score (2008)	2,304	-1.55	-1.61	-1.52	-1.61	0.10
Height-for-age z-score (pooled)	15,421	-1.93	-1.97	-1.88	-2.01	0.13 ***
Age in months (2002)	5,885	34.14	34.58	34.04	34.84	-0.81
Age in months (2006)	7,232	31.31	-	31.25	31.45	-0.19
Age in months (2008)	2,304	37.12	37.43	37.04	37.30	-0.26
Age in months (pooled)	15,421	34.13	34.58	34.03	34.83	-0.80
Child is female (pooled)	15,421	0.50	0.51	0.50	0.51	-0.01
Child resides in rural household (pooled)	15,265	0.56	0.61	0.52	0.65	-0.13 ***
Child resides in pre-conflict poor household (2002)	5,885	0.46	0.51	0.49	0.41	0.08 ***
Child resides in victimized household (2008)	2,304	0.86	0.87	0.87	0.84	0.18
Months of exposure to the conflict (2006)	7,232	39.34	-	39.30	39.44	-0.15
Months of exposure to the conflict (2008)	2,304	30.25	30.54	30.28	30.19	0.09
Months of exposure to the conflict (pooled)	9,536	37.08	30.54	37.05	37.16	-0.11
Exposure 0-24 months (pooled)	9,536	0.24	-	0.24	0.24	-0.01
Exposure at least 25 months (pooled)	9,536	0.76	-	0.76	0.76	0.01
Ethnicity (pooled)						
Akan	14,015	0.29	0.29	0.22	0.44	-0.22 ***
Northern Mande	14,015	0.13	0.14	0.15	0.09	0.06 ***
Southern Mande	14,015	0.13	0.14	0.16	0.05	0.11 ***
Krou	14,015	0.14	0.13	0.14	0.12	0.02 ***
Voltaique/Gur	14,015	0.12	0.12	0.15	0.07	0.08 ***
Naturalized Ivorian	14,015	0.003	0.004	0.004	0.002	0.001
Non-Ivorian	14,015	0.19	0.17	0.18	0.23	-0.05 ***
Religion (pooled)						
Muslim	15,381	0.35	0.36	0.37	0.30	0.07 ***
Christian	15,381	0.37	0.33	0.33	0.46	-0.13 ***
Other	15,381	0.28	0.32	0.30	0.24	0.06 ***
Head of the Household (pooled)						
Head's age	15,388	43.80	46.12	43.98	43.25	0.73
Head's education	15,391	0.44	0.39	0.45	0.42	0.03
Head is male	15,421	0.86	0.86	0.87	0.86	0.00
Child's Mother (pooled)						
Mother's age	13,746	29.76	30.33	29.90	29.58	0.32
Mother's education	14,648	0.32	0.28	0.32	0.31	0.01
Mother is married	13,749	0.83	0.82	0.83	0.84	0.00 ***

Notes: * significant at 10%; ** significant at 5%; *** significant at 1%. In the 2002 survey, non-migrant households have lived in their current location (as of interview date) since December 1993; in the 2008 survey they are households in their current location since before the start of the war. Information on households' migration status and household heads' marital status is unavailable in the 2006 dataset. Education of the head of household and child's mother is proxied by an indicator variable for having attended school. The pre-crisis poverty rate is based on the national (consumption) poverty line. Estimates are weighted by inverse sampling probability. Data sources: 2002 and 2008 Côte d'Ivoire HLSS, 2006 Côte d'Ivoire MICS3, and Raleigh et al. (2010).

Table 2. Impact of Conflict on Child Health. Baseline Regressions without Controls.

	[1]	[2]	[3]	[4]	[5]	[6]
Conflict region*War Cohort	-0.414**	-0.432***				
	(0.149)	(0.134)				
Conflict region*War Cohort*Female		-0.031				
		(0.107)				
Conflict region*Exposure 0-24 months			-0.369**	-0.560***		
			(0.155)	(0.166)		
Conflict region*Exposure at least 25 months			-0.427**	-0.417**		
			(0.159)	(0.161)		
Conflict region*Exposure 0-24 months*Female				0.332**		
				(0.133)		
Conflict region*Exposure at least 25 months*Female				-0.087		
				(0.078)		
Conflict region*Exposure (no. of months)					-0.010**	-0.010**
					(0.004)	(0.004)
Conflict region*Exposure (no. of months)*Female						-0.001
						(0.002)
Female	0.217***	0.137	0.217***	0.137	0.217***	0.137
	(0.060)	(0.121)	(0.060)	(0.121)	(0.060)	(0.121)
Rural household	-0.484***	-0.473***	-0.484***	-0.473***	-0.484***	-0.473***
	(0.094)	(0.085)	(0.094)	(0.085)	(0.094)	(0.085)
Observations	15,151	15,151	15,151	15,151	15,151	15,151
R-squared	0.075	0.075	0.075	0.075	0.075	0.075

Notes: Robust standard errors in parentheses, clustered at the province level. * significant at 10%; ** significant at 5%; *** significant at 1%. The dependent variable is the height-for-age z-score. All regressions include province fixed effects, month-of-birth fixed effects, and province-specific time trends. In columns 2, 4, 6 the coefficient estimates on interactions between 'Conflict region' or 'Exposure' variables and the female dummy were jointly statistically insignificant and are not shown. Estimates are weighted by inverse sampling probability. Data sources: 2002 and 2008 Côte d'Ivoire HLSS, 2006 Côte d'Ivoire MICS3, and Raleigh et al. (2010).

Table 3. Impact of Conflict on Child Health. Baseline Regressions with Controls.

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]
Conflict region*War Cohort	-0.344**	-0.435**	-0.367**	-0.470***								
	(0.144)	(0.154)	(0.135)	(0.142)								
Conflict region*War Cohort*Female			-0.027	-0.050								
			(0.106)	(0.116)								
Conflict region*Exposure 0-24 months					-0.292	-0.361*	-0.481**	-0.556**				
					(0.170)	(0.186)	(0.190)	(0.205)				
Conflict region*Exposure at least 25 months					-0.360**	-0.459**	-0.350**	-0.481***				
					(0.158)	(0.164)	(0.161)	(0.166)				
Conflict region*Exposure 0-24 months*Female							0.312**	0.281*				
							(0.145)	(0.147)				
Conflict region*Exposure at least 25 months*Female							-0.094	-0.070				
							(0.083)	(0.090)				
Conflict region*Exposure (no. of months)									-0.008**	-0.011**	-0.008**	-0.012***
									(0.004)	(0.004)	(0.004)	(0.004)
Conflict region*Exposure (no. of months)*Female											-0.001	-0.001
											(0.002)	(0.002)
Female	0.209***	0.218***	0.118	0.082	0.209***	0.218***	0.118	0.082	0.209***	0.218***	0.118	0.082
	(0.059)	(0.064)	(0.111)	(0.130)	(0.059)	(0.064)	(0.110)	(0.130)	(0.059)	(0.064)	(0.110)	(0.130)
Rural household	-0.415***	-0.427***	-0.404***	-0.412***	-0.415***	-0.427***	-0.404***	-0.412***	-0.415***	-0.427***	-0.404***	-0.412***
	(0.089)	(0.095)	(0.081)	(0.082)	(0.089)	(0.095)	(0.081)	(0.082)	(0.089)	(0.095)	(0.081)	(0.082)
Child controls	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Household head controls	yes	no	yes	no	yes	no	yes	no	yes	no	yes	no
Mother controls	no	yes	no	yes	no	yes	no	yes	no	yes	no	yes
p-value F-test of zero effect of:												
Child ethnicity	0.246	0.643	0.225	0.626	0.246	0.643	0.225	0.626	0.246	0.643	0.225	0.626
Child religion	0.041	0.214	0.043	0.204	0.041	0.214	0.042	0.204	0.041	0.214	0.042	0.204
Household head's characteristics	0.033		0.033		0.033		0.032		0.033		0.032	
Mother's characteristics		0.214		0.000		0.000		0.000		0.000		0.000
Observations	13,664	12,126	13,664	12,126	13,664	12,126	13,664	12,126	13,664	12,126	13,664	12,126
R-squared	0.083	0.102	0.083	0.103	0.083	0.102	0.083	0.103	0.083	0.102	0.083	0.103

Notes: Robust standard errors in parentheses, clustered at the province level. * significant at 10%; ** significant at 5%; *** significant at 1%. The dependent variable is the height-for-age z-score. All regressions include province fixed effects, month-of-birth fixed effects, and province-specific time trends. Child controls include ethnicity (Akan (reference categeory), Northern Mande, Southern Mande, Krou, Voltaique/Gur, naturalized Ivorian or non-Ivorian) and religion (Muslim, Christian, and other (reference category)). Household head controls include age, gender, and education. Mother controls include age, education, and marital status. In specifications that allow for a differential gender impact (columns 3, 4, 7, 8, 11, 12), the coefficient estimates on interactions between 'Conflict region' or 'Exposure' variables and the female dummy are jointly statistically insignificant and not shown. Estimates are weighted by inverse sampling probability. Data sources: 2002 and 2008 Côte d'Ivoire HLSS, 2006 Côte d'Ivoire MICS3, and Raleigh et al. (2010).

Table 4. Impact of Conflict on Child Health. Alternative Baseline Cohort.

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]
Conflict region*War Cohort	-0.892**	-1.046***	-0.976***	-1.128***								
	(0.323)	(0.358)	(0.301)	(0.337)								
Conflict region*War Cohort*Female			0.240*	0.159								
			(0.121)	(0.137)								
Conflict region*Exposure 0-24 months					-1.000***	-1.174***	-1.249***	-1.456***				
					(0.305)	(0.346)	(0.303)	(0.354)				
Conflict region*Exposure at least 25 months					-0.852**	-0.996**	-0.843**	-1.021**				
					(0.338)	(0.374)	(0.342)	(0.385)				
Conflict region*Exposure 0-24 months*Female							0.047	0.042				
							(0.088)	(0.112)				
Conflict region*Exposure at least 25 months*Female								0.561***				
								(0.125)				
Conflict region*Exposure (no. of months)									-0.021**	-0.024**	-0.021**	-0.026**
									(0.008)	(0.009)	(0.008)	(0.009)
Conflict region*Exposure (no. of months)*Female											0.003	0.003
											(0.002)	(0.003)
Female	0.113	0.110	0.175*	0.099	0.113	0.110	0.175*	0.099	0.114	0.110	0.176*	0.101
	(0.069)	(0.087)	(0.093)	(0.115)	(0.069)	(0.087)	(0.093)	(0.114)	(0.069)	(0.087)	(0.093)	(0.114)
Rural household	-0.364**	-0.380**	-0.371**	-0.379**	-0.364**	-0.380**	-0.371**	-0.379**	-0.364**	-0.380**	-0.371**	-0.379**
	(0.140)	(0.150)	(0.142)	(0.147)	(0.140)	(0.150)	(0.142)	(0.147)	(0.139)	(0.150)	(0.142)	(0.147)
Child controls	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Household head controls	yes	no	yes	no	yes	no	yes	no	yes	no	yes	no
Mother controls	no	yes	no	yes	no	yes	no	yes	no	yes	no	yes
p-value F-test of zero effect of:												
Child ethnicity	0.491	0.446	0.499	0.442	0.491	0.446	0.499	0.441	0.490	0.447	0.498	0.442
Child religion	0.903	0.927	0.905	0.926	0.903	0.927	0.905	0.926	0.903	0.926	0.905	0.925
Household head's characteristics	0.009		0.007		0.009		0.007		0.009		0.007	
Mother's characteristics		0.927		0.000		0.000		0.000		0.000		0.000
Observations	10,128	8,971	10,128	8,971	10,128	8,971	10,128	8,971	10,128	8,971	10,128	8,971
R-squared	0.094	0.120	0.094	0.120	0.094	0.120	0.094	0.120	0.093	0.120	0.094	0.120

Notes: Robust standard errors in parentheses, clustered at the province level. * significant at 10%; ** significant at 5%; *** significant at 1%. The dependent variable is the height-for-age z-score. All regressions include province fixed effects, month-of-birth fixed effects, and province-specific time trends. The control variables are as in Table 3. Estimates are weighted by inverse sampling probability. Data sources: 2002 and 2008 Côte d'Ivoire HLSS, 2006 Côte d'Ivoire MICS3, and Raleigh et al. (2010).

Table 5. Impact of Conflict on Child Health. Baseline Regressions on Different Sub-samples.

	[1] Poor	[2] Non-poor	[3] Girls	[4] Boys	[5] Rural	[6] Urban	[7] Head is educated	[8] Head is not educated
Conflict region*War Cohort	-0.516*	-0.382*	-0.602**	-0.297**	-0.655**	-0.017	-0.285	-0.507**
	(0.268)	(0.217)	(0.269)	(0.141)	(0.238)	(0.213)	(0.274)	(0.216)
Conflict region*War Cohort*Female	0.251	-0.269			-0.047	0.348*	-0.035	-0.020
	(0.215)	(0.178)			(0.139)	(0.179)	(0.158)	(0.224)
Female	0.317**	0.036			0.217	0.152	0.111	0.179
	(0.129)	(0.119)			(0.129)	(0.166)	(0.069)	(0.171)
Rural household	-0.087	-0.464***	-0.465***	-0.511***			-0.589***	-0.378***
	(0.093)	(0.096)	(0.082)	(0.119)			(0.083)	(0.106)
*p-value t-test of equality of coefficients on Conflict Region*War Cohort across sub-samples*		0.294		0.774		0.043		0.876
Observations	6,700	8,030	7,340	7,811	8,753	6,398	6,696	8,429
R-squared	0.088	0.091	0.088	0.095	0.098	0.069	0.117	0.077

Notes: Robust standard errors in parentheses, clustered at the province level. * significant at 10%; ** significant at 5%; *** significant at 1%. The dependent variable is the height-for-age z-score. All regressions include province fixed effects, month-of-birth fixed effects, and province-specific time trends. Households are classified as poor if an index of asset wealth is below average. The asset index is calculated based on seven types of assets: living in dwelling with cement walls, cement floor, metal or cement roof, electricity, phone, toilet, and access to natural gas, coal or electricity for cooking. The index is the first factor extracted using principal components analysis on the seven components, explains 47 percent of their joint variance, and has been standardized to have zero mean and unit variance. In all columns other than 3 and 4, the coefficient estimates on interactions between 'Conflict region' or 'War Cohort' and the female dummy are jointly statistically insignificant and not shown. Estimates are weighted by inverse sampling probability. Data sources: 2002 and 2008 Côte d'Ivoire HLSS, 2006 Côte d'Ivoire MICS3, and Raleigh et al. (2010).

Table 6. Characteristics of Women Who Had a Child During the Conflict

	[1] 1=Educated	[2] 1=Married	[3] Age
Conflict Region	-0.004	0.013	0.562
	(0.070)	(0.026)	(0.687)
Had Child During Conflict	-0.056**	0.094***	-5.809***
	(0.025)	(0.023)	(0.366)
Conflict Region*Had Child During Conflict	0.031	0.005	-0.451
	(0.035)	(0.023)	(0.599)
Constant	0.400***	0.764***	35.278***
	(0.031)	(0.020)	(0.599)
Observations	15,689	15,700	15,700

Notes: Robust standard errors in parentheses, clustered at the province level. * significant at 10%, ** significant at 5%, and *** significant at 1%. The sample contains all women surveyed in 2006 and 2008 that were of fertile age during the conflict (i.e., 15-49 years old). Data sources: 2008 Côte d'Ivoire HLSS, 2006 Côte d'Ivoire MICS3 and Raleigh et al. (2010).

Table 7. Placebo Test

	[1]	[2]	[3]	[4]	[5]	[6]
Conflict Region*War Cohort	0.134	0.095	0.132	0.427	0.397	0.419
	(0.159)	(0.158)	(0.158)	(0.263)	(0.245)	(0.260)
Conflict Region*War Cohort*Female				-0.725*	-0.710	-0.721
				(0.418)	(0.413)	(0.418)
Conflict Region*Female				0.168**	0.126*	0.175**
				(0.073)	(0.071)	(0.068)
War Cohort*Female				0.475	0.479	0.468
				(0.285)	(0.284)	(0.278)
Female	0.116*	0.128**	0.121*	0.001	0.041	0.001
	(0.058)	(0.057)	(0.059)	(0.061)	(0.059)	(0.061)
Rural	-0.365***	-0.313***	-0.344***	-0.357***	-0.309***	-0.336***
	(0.067)	(0.060)	(0.064)	(0.067)	(0.057)	(0.065)
Mother controls	no	yes	no	no	yes	no
Household head controls	no	no	yes	no	no	yes
p-value F-test of zero effect of:						
Mother's characteristics		0.000			0.000	
Household head's characteristics			0.140			0.096
Observations	4,076	4,066	4,042	4,076	4,066	4,042
R-squared	0.196	0.205	0.197	0.198	0.207	0.199

Notes: Robust standard errors in parentheses, clustered at the province level. * significant at 10%%, ** significant at 5%, *** significant at 1%. The dependent variable is the height-for-age z-score for children aged 6–60 months. "War Cohort" is an indicator variable for children born during January 1997-December 1999. Mother controls include age, education (a dummy variable for literacy), ethnicity (Akan (reference category), Northern Mande, Southern Mande, Krou, Voltaique/Gur, and other), and religion (Christian, Muslim, and other (reference category)). Household head controls include age, gender, and education (a dummy variable for literacy). All regressions include province fixed effects, month-of-birth fixed effects, and province-specific time trends. Estimates are weighted by inverse sampling probability. Data sources: 1994 and 1998/99 Côte d'Ivoire DHS, and Raleigh et al. (2010).

Table 8. Correlation Matrix for Number of Conflict Events and Share of Households Reporting At Least One Type of Victimization

	Conflict Region	Economic losses	Health impairment	Displacement
Economic losses	0.277*			
Health impairment	0.200	0.804*		
Displacement	0.240	0.883*	0.752*	
Victim of violence	0.309*	0.897*	0.856*	0.904*

Notes: * significant at 5%. Types of victimization include economics losses, health impairment, displacements, and victim of violence.
Data sources: 2008 Côte d'Ivoire HLSS and Raleigh et al. (2010).

Table 9. Selection into Victimization

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
	Economic losses		Health impairment		Displacement		Victim of violence	
	Full	Non-migrants	Full	Non-migrants	Full	Non-migrants	Full	Non-migrants
Rural household	-0.084	-0.053	-0.011	-0.009	-0.035	0.013	-0.030	-0.011
	(0.061)	(0.070)	(0.031)	(0.032)	(0.038)	(0.036)	(0.028)	(0.028)
Ethnicity: Northern Mande	-0.113	-0.113	-0.129	-0.185*	-0.074	-0.114*	-0.076	-0.098
	(0.083)	(0.091)	(0.091)	(0.104)	(0.063)	(0.065)	(0.060)	(0.067)
Ethnicity: Southern Mande	0.323*	0.325	0.334**	0.325**	0.228**	0.201	0.261***	0.239***
	(0.177)	(0.213)	(0.124)	(0.127)	(0.090)	(0.119)	(0.066)	(0.071)
Ethnicity: Krou	0.033	0.022	0.277**	0.283*	0.099	0.050	0.186**	0.172*
	(0.114)	(0.109)	(0.132)	(0.140)	(0.092)	(0.080)	(0.081)	(0.097)
Ethnicity: Voltaique/Gur	-0.142	-0.099	-0.024	-0.050	-0.075	-0.065	-0.103	-0.111
	(0.111)	(0.126)	(0.145)	(0.164)	(0.095)	(0.110)	(0.089)	(0.097)
Ethnicity: Naturalized Ivorian	0.058	0.098	0.078	0.102	-0.104	-0.070	-0.125	-0.198***
	(0.181)	(0.195)	(0.281)	(0.295)	(0.232)	(0.226)	(0.075)	(0.060)
Ethnicity: Non-Ivorian	-0.060	-0.047	-0.030	-0.043	0.049	0.043	-0.064	-0.077*
	(0.074)	(0.077)	(0.070)	(0.077)	(0.058)	(0.059)	(0.038)	(0.038)
Muslim	-0.044	-0.003	-0.029	-0.018	-0.086*	-0.046	0.008	0.028
	(0.081)	(0.084)	(0.084)	(0.095)	(0.042)	(0.047)	(0.020)	(0.022)
Christian	-0.100*	-0.063	-0.062	-0.059	-0.008	0.005	-0.049**	-0.032
	(0.052)	(0.064)	(0.037)	(0.044)	(0.030)	(0.030)	(0.020)	(0.021)
Head's age	0.003	0.003	0.002**	0.002*	-0.002**	-0.001	-0.000	-0.000
	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Head's education	-0.023	0.000	-0.003	0.002	0.038	0.025	0.066***	0.065***
	(0.044)	(0.045)	(0.040)	(0.039)	(0.033)	(0.029)	(0.018)	(0.022)
Head is male	0.036	0.030	-0.088	-0.096	-0.047	-0.055*	-0.008	-0.023
	(0.047)	(0.055)	(0.062)	(0.071)	(0.030)	(0.031)	(0.022)	(0.021)
Head is married	0.220***	0.217***	0.049	0.052	0.079**	0.055*	0.046***	0.042**
	(0.047)	(0.050)	(0.054)	(0.056)	(0.031)	(0.030)	(0.014)	(0.016)
p-value F-test of zero effect of:								
Head's ethnicity	0.240	0.307	0.002	0.009	0.039	0.004	0.000	0.000
Head's religion	0.153	0.505	0.150	0.188	0.129	0.525	0.012	0.007
Head's other characteristics	0.000	0.000	0.075	0.171	0.036	0.107	0.002	0.017
Observations	5,661	5,090	5,764	5,176	5,759	5,172	5,848	5,255
R-squared	0.226	0.238	0.162	0.177	0.258	0.284	0.228	0.238

Notes: Robust standard errors in parentheses, clustered at the province level. * significant at 10%; ** significant at 5%; *** significant at 1%. The dependent variables are the conflict-related victimization indices. Regressions are at the household level and include province fixed effects. Estimates are weighted by inverse sampling probability. Data source: 2008 Côte d'Ivoire HLSS.

Table 10. Impact of Household Victimization on Child Health (Post-Conflict Survey)

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]
	Economic losses			Health impairment			Displacement			Victim of violence		
	All	Girls	Boys	All	Girls	Boys	All	Girls	Boys	All	Girls	Boys
Panel A. Full sample:												
With child and household head controls	-1.003***	-0.709	-1.199**	-0.307	-0.032	-0.560	0.147	0.193	0.247	-0.225	-0.054	-0.346
	(0.292)	(0.448)	(0.461)	(0.247)	(0.317)	(0.342)	(0.286)	(0.400)	(0.407)	(0.221)	(0.410)	(0.208)
With child and mother controls	-0.792**	-0.711	-0.844*	-0.353	0.026	-0.665*	0.161	0.277	0.241	-0.301	-0.058	-0.428*
	(0.331)	(0.452)	(0.414)	(0.225)	(0.342)	(0.344)	(0.349)	(0.489)	(0.442)	(0.222)	(0.438)	(0.225)
Panel B. Non-migrants:												
With child and household head controls	-1.069***	-0.746	-1.440**	-0.197	0.028	-0.495	0.043	0.084	-0.142	-0.216	-0.174	-0.271
	(0.226)	(0.475)	(0.538)	(0.309)	(0.341)	(0.447)	(0.330)	(0.434)	(0.552)	(0.226)	(0.415)	(0.281)
With child and mother controls	-0.785***	-0.703	-0.984*	-0.283	-0.036	-0.553	-0.012	-0.094	-0.101	-0.277	-0.288	-0.243
	(0.270)	(0.457)	(0.485)	(0.294)	(0.368)	(0.449)	(0.399)	(0.499)	(0.613)	(0.222)	(0.398)	(0.258)

Notes: Robust standard errors in parentheses, clustered at the province level. * significant at 10%; ** significant at 5%; *** significant at 1%. The table reports estimated coefficients on victimization indices (variable "Victimized" in Eq. 2) from regressions estimated on the full sample (Panel A) vs. non-migrant households (i.e., households that have lived in their current location since before the start of the war) (Panel B). The victimization indices have been rescaled to range between 0 and 1. All regressions include province fixed effects, month-of-birth fixed effects, and province-specific time trends. Controls as in Table 3. Estimates are weighted by inverse sampling probability. Data source: 2008 Côte d'Ivoire HLSS.

Table 11. Conflict-Impact Mechanisms (Pre- and Post-Conflict Surveys)

	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]
	Economic losses			Health impairment			Displacement			Victim of violence		
Panel A. Full sample:												
Conflict region*Victimized	-2.191***	-2.100***	-2.212***	-2.356***	-2.198***	-2.641***	-1.726**	-1.662**	-1.908**	-1.360***	-1.290***	-1.645***
	(0.549)	(0.521)	(0.638)	(0.752)	(0.754)	(0.618)	(0.761)	(0.675)	(0.753)	(0.405)	(0.383)	(0.509)
Victimized	0.036	-0.092	0.163	1.029*	0.844*	0.925**	0.907**	0.851*	0.934*	0.422	0.297	0.399
	(0.471)	(0.490)	(0.603)	(0.493)	(0.471)	(0.405)	(0.414)	(0.406)	(0.473)	(0.325)	(0.345)	(0.348)
Conflict region*Victimized*Female	1.288	1.255*	0.867	0.687	0.628	0.729	0.569	0.759	0.591	0.940	0.825	0.937
	(0.780)	(0.713)	(0.745)	(0.715)	(0.763)	(0.676)	(0.910)	(0.826)	(0.871)	(0.845)	(0.821)	(0.802)
Female	0.137	0.118	0.082	0.137	0.118	0.082	0.137	0.118	0.082	0.137	0.118	0.082
	(0.122)	(0.111)	(0.131)	(0.122)	(0.111)	(0.131)	(0.122)	(0.111)	(0.131)	(0.122)	(0.111)	(0.131)
Rural household	-0.472***	-0.402***	-0.411***	-0.472***	-0.402***	-0.411***	-0.472***	-0.402***	-0.411***	-0.472***	-0.402***	-0.411***
	(0.085)	(0.082)	(0.082)	(0.085)	(0.082)	(0.082)	(0.085)	(0.082)	(0.082)	(0.085)	(0.082)	(0.082)
Observations	7,807	7,723	6,957	7,846	7,763	6,996	7,860	7,774	7,003	7,865	7,780	7,012
R-squared	0.076	0.083	0.103	0.076	0.083	0.103	0.076	0.083	0.103	0.075	0.083	0.103
Panel B. Non-migrants:												
Conflict region*Victimized	-1.865**	-1.706**	-1.863**	-2.394***	-2.162**	-2.540***	-1.865	-1.673	-2.055	-1.365*	-1.247*	-1.406*
	(0.703)	(0.669)	(0.671)	(0.816)	(0.849)	(0.711)	(1.151)	(1.125)	(1.229)	(0.654)	(0.664)	(0.702)
Victimized	-0.439	-0.578	-0.198	1.143**	0.905*	1.052*	1.096	0.829	1.297	0.494	0.337	0.454
	(0.690)	(0.700)	(0.690)	(0.517)	(0.511)	(0.520)	(0.890)	(0.878)	(0.878)	(0.479)	(0.498)	(0.461)
Conflict region*Victimized*Female	0.721	0.655	0.295	1.065	0.966	1.067	1.258	1.391	1.433	0.840	0.719	0.923
	(1.037)	(1.046)	(1.096)	(0.799)	(0.827)	(0.738)	(1.586)	(1.386)	(1.665)	(1.210)	(1.228)	(1.269)
Female	0.151	0.139	0.126	0.151	0.139	0.126	0.151	0.139	0.126	0.151	0.139	0.126
	(0.128)	(0.114)	(0.140)	(0.128)	(0.114)	(0.140)	(0.128)	(0.114)	(0.140)	(0.128)	(0.114)	(0.140)
Rural household	-0.422***	-0.344***	-0.383***	-0.422***	-0.344***	-0.383***	-0.422***	-0.344***	-0.383***	-0.422***	-0.344***	-0.383***
	(0.114)	(0.111)	(0.125)	(0.114)	(0.111)	(0.125)	(0.114)	(0.111)	(0.125)	(0.114)	(0.111)	(0.125)
*p-value test of equality of coefficients on (Conflict Region*Victimized) for migrant vs. non-migrant households*												
	0.757	0.566	0.621	0.544	0.688	0.935	0.437	0.518	0.415	0.341	0.421	0.875
Observations	5,922	5,859	5,240	5,949	5,886	5,266	5,965	5,901	5,278	5,966	5,902	5,282
R-squared	0.066	0.075	0.090	0.066	0.075	0.090	0.066	0.075	0.090	0.066	0.075	0.090
Child controls	no	yes	yes	no	yes	yes	no	yes	yes	no	yes	yes
Household head controls	no	yes	no	no	yes	no	no	yes	no	no	yes	no
Mother controls	no	no	yes	no	no	yes	no	no	yes	no	no	yes

Notes: Robust standard errors in parentheses, clustered at the province level. * significant at 10%; ** significant at 5%; *** significant at 1%. The dependent variable is the height-for-age z-score. The victimization indices have been rescaled to range between 0 and 1. All regressions include province fixed effects, month-of-birth fixed effects, and province-specific time trends. Controls are the same as in Table 3. Non-migrants households have lived in their current location since before the start of the war. Estimates are weighted by inverse sampling probability. Data sources: 2002 and 2008 Côte d'Ivoire HLSS, and Raleigh et al. (2010).

Table 12. Impact of Conflict and Household Victimization on Child Health (Pre- and Post-Conflict Surveys)

	[1]	[2]	[3]	[4]	[5]	[6]
	Covariate shock (Conflict Region)		Idiosyncratic shock (Victimized Household)		Joint shock (Conflict Region x Victimized Household)	
Panel A (no controls):						
Shock*War Cohort	-0.408*	-0.666***	-0.346	-0.750**	-0.485**	-0.844***
	(0.223)	(0.170)	(0.226)	(0.313)	(0.186)	(0.181)
Shock*War Cohort*Female		0.491*		0.853**		0.775**
		(0.260)		(0.303)		(0.330)
Observations	7,919	7,919	7,919	7,919	7,919	7,919
R-squared	0.075	0.075	0.075	0.075	0.075	0.075
Panel B (child and hh head controls):						
Shock*War Cohort	-0.352	-0.593***	-0.316	-0.677**	-0.435**	-0.770***
	(0.210)	(0.150)	(0.231)	(0.310)	(0.173)	(0.164)
Shock*War Cohort*Female		0.441*		0.763**		0.719**
		(0.244)		(0.296)		(0.322)
Observations	7,830	7,830	7,830	7,830	7,830	7,830
R-squared	0.083	0.083	0.083	0.083	0.083	0.083
Panel C (child and mother controls):						
Shock*War Cohort	-0.392	-0.629***	-0.338	-0.658*	-0.494**	-0.815***
	(0.229)	(0.183)	(0.261)	(0.343)	(0.203)	(0.191)
Shock*War Cohort*Female		0.384		0.666**		0.688**
		(0.243)		(0.280)		(0.302)
Observations	7,059	7,059	7,059	7,059	7,059	7,059
R-squared	0.102	0.103	0.102	0.102	0.102	0.102

Notes: Robust standard errors in parentheses, clustered at the province level. * significant at 10%; ** significant at 5%; *** significant at 1%. The dependent variable is the height-for-age z-score for children aged 6–60 months. The variable "Shock" is an indicator for residence in a conflict region (columns 1-2), residence in a victimized household (columns 3-4), and the interaction of the two variables (columns 5-6), respectively. Child controls include ethnicity (Akan (reference category), Northern Mande, Southern Mande, Krou, Voltaique/Gur, naturalized Ivorian or non-Ivorian) and religion (Muslim, Christian, and other (reference category)). Household head controls include age, gender, and education. Mother controls include age, education, and marital status. All regressions include province fixed effects, month-of-birth fixed effects, and province-specific time trends. Estimates are weighted by inverse sampling probability. Data sources: 2002 and 2008 Côte d'Ivoire HLSS and Raleigh et al. (2010).