Education is forbidden: The effect of the Boko Haram conflict on schooling in Nigeria*

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Very preliminary and incomplete
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Abstract

This paper studies the effect of the Boko Haram conflict on schooling in Northern Nigeria. We combine individual level data from three rounds of the Nigeria General Household Survey Panel (GHS-Panel) to detailed geo-referenced conflict data. Using different econometric strategies, we estimate the effect of conflict on both school attainment and attendance. We find that a one standard deviation increase in the number of fatalities in the 20 km radius of each household decreases the number of completed years of education for the cohort exposed to conflict during primary school by 0.6 years, compared to the non-exposed cohort, which translates into a 10 percent drop relative to the average educational achievement. At the same time, controlling for individual heterogeneity, we find that a one standard deviation increase in conflict intensity reduces the probability to be enrolled by 0.5 points. Our results are robust to different econometric specifications, variable definitions, and alternative measures of conflict intensity. Finally, we provide suggestive evidence of the conflict-induced reduction in household wealth as a possible mechanism explaining the negative effect of conflict on schooling.

Keywords: Boko Haram, conflict, education, Nigeria
JEL Codes: D22, D24, N45, O12.

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1 Introduction

"(Western) Education is forbidden" is the meaning of the name of the terrorist group Boko Haram.[1] Since 2009, faithful to its name, Boko Haram has targeted the Nigerian education system assaulting schools, students, and teachers in Borno, Yobe, and Kano states in Northern Nigeria.

Conflicts are often devastating for the education systems (Lai and Thyne (2007)). Unfortunately, the negative effects of conflict on schooling may also persist in the long term. At the micro-level, children affected by conflict during childhood can be particulalry vulnerable, with this translating into long-term consequences for household welfare (Case and Paxson (2010)). Moreover, conflict often deteriorates health and future labor market earnings (Akbulut-Yuksel (2014)).

The growing literature on the microeconomic effects of conflict has focused on different educational outcomes (see Blattman and Miguel (2010), and Justino (2012) for a review). These span from completion of primary and mandatory schooling (P. Justino, M. Leone and P. Salardi (2013); Shemyakina (2011); Valente (2014); Verwimp and Bavel (2013)), to primary school attendance (Justino, Leone and Salardi (2013)), educational attainment (Akbulut-Yuksel (2014); Akresh and de Walque (2014); Chamarbagwala and Moran (2011); Dabalen and Paul (2014); Leon (2012); Merrouche (2006); Pivovarova and Swee (2015); Swee (2015); Singh and Shemyakina (2016)), academic achievement (Bruek, Di Maio and Miaari (2014)), drop-out of school status (Rodriguez and Sanchez (2009)), and grade obtained conditional on age (Bundervoet (2012)). Not very surprisingly, the estimates on the microeconomic effects of violent conflict on education are widely heterogeneous.

This paper quantifies the impact of the Boko Haram conflict on different educational outcomes of Nigerian children and youth using the first available longitudinal General Household Survey (GHS) dataset for Nigeria. Since 2009, Boko Haram has started a conflict against the Nigeria state with the objective of creating an Islamic state in the region. The first part of the study exploits the variation in conflict exposure across birth cohorts and geographic areas to estimate the impact of a cumulated measure of fatalities[2] on the number of years of completed education of children in primary school age at the beginning of the conflict. Results show that a one standard deviation increase in the number of fatalities in the 20 km radius of each household (which corresponds to about 108 fatalities) decreases the number of completed years of education for the cohort exposed to the conflict during primary school by 0.6 years, compared to the non-exposed cohort. Considering that the average number of years of completed education

[1] The translation is from Hausa, the dominant language in northern Nigeria.

[2] A more thorough description of the measure is presented in Section 3 [Data].

for the young cohort in conflict affected areas is 5.85 years, this translates into a 10 percent drop relative to the average educational achievement. This negative effect is consistent to the usage of alternative conflict measures and it is robust to migration bias. The second part of the paper takes full advantage of the three survey rounds of the GHS-Panel (2010/2011; 2012/2013; 2015/2016) and estimates the effect of conflict on enrollment decision in mandatory school age. Results from the individual fixed-effect panel estimation indicate that, after accounting for individual unobserved heterogeneity, an increase in violence during the school year decreases the probability of enrollment in mandatory school age of about 0.5 percentage points. The result is robust to the inclusion of a a number of individual and household controls, for alternative measures of conflict intensity. Finally, we provide some suggestive evidence on one possible mechanism driving the negative effect of conflict on education, namely changes in household wealth. Results indicate that conflict seem to have a significantly negative effect on household's welfare, suggesting that the negative effect of conflict on educational outcomes may act through this channel.

The contribution of the present study is threefold. First, this study contributes to the literature on the impact of civil conflict on human capital formation. To the best of our knowledge, this paper provides the first investigation of the impact of the Boko Haram conflict on the educational outcomes in Nigeria, the largest economy in Africa. The results also speak to the growing attention to the so-called effects of the (self-declared) Islamic terrorism actions.

Second, this paper makes two contributions to the literature on the microeconomic effects of war. The first contribution relates to the nature of the data used in this analysis. Our dataset is made by three rounds of the GHS-Panel dataset in which each individual is observed over three school years. This allows us to complement the results from the standard cohort differences in difference analysis with a panel estimation regression approach.[3] The second contribution pertains to the level of precision of the conflict data used in the analysis. The availability of GPS coordinates for both the GHS and the Armed Conflict Location and Event Data (ACLED - Raleigh et al. (2010)) increases the level of precision of this analysis with respect to the existing literature. Although other studies used the ACLED dataset in the analysis of the impact of conflict on children human capital, the level of disaggregation of such analysis does not go beyond the department (Dabalen and Paul (2014)) or province (Minoiu and Shemyakina (2014)) level. For our analysis, we compute the number of conflict events and associated fatalities occurred in the vicinity of each household, thus increasing the level of details of the adopted conflict

[3]To the best of our knowledge, the two other papers that adopted the panel methodology either built a panel of individuals from a single cross-section (Justino, Leone and Salardi (2013)) or controlled for individual unobserved heterogeneity through a difference-in-dfferences fixed-effects model on a two-round panel (Pivovarova and Swee (2015)).

measurement.

Third, this paper contributes to the analysis of the political economy of Nigeria. Although Nigeria is one of the most rapidly growing economies in Sub-Saharan Africa, poverty is not decreasing. This low responsiveness is mainly attributed to the performance of the North East and North West geopolitical zones. These zones still lag behind southern ones with respect to different socioeconomic indicators, specifically education. Moreover, many socioeconomic indicators have worsened as a consequence of the current civil crisis in the Northern area. For these reasons, an analysis of the implications of the recent Boko Haram conflict on human capital accumulation is necessary to inform future poverty reduction strategies in the country.

In the next section, we present an overview of the Nigerian education system and of the Boko Haram conflict. We then present the data in Section 3, the empirical strategy in Section 4, and the estimation results in Section 5. Section 6 concludes.

2 Background

2.1 Education system in Nigeria

The education system in Nigeria consists of primary, secondary and tertiary education. Formal primary education typically starts at age 6 (grade 1) and runs up to age 12 (grade 6). Secondary schooling lasts 6 years and consists of 3 years of junior secondary schooling (ages 12-15), ending with the Basic Education Certificate Examination (BECE) which leads to 3 additional years of senior secondary school (ages 15-18). At the end of secondary school students are required to take the Senior Secondary Certificate Examination (SSCE), often a minimum requirement to access higher education. Since 1999, formal education is free and compulsory up to age 15 (Labo-Popoola, Bello and Atanda (2009)).

Nigeria accounts for the 10 percent of the world's out-of-school children, and access to education is also very low with 52 percent of children being out of school in the region (World Development Indicators - WDI). Nigerian net primary enrollment rate in 2010 was around 64 percent, well below the average rate for Sub-Saharan Africa (76 percent) and that of lower-middle-income economies (87 percent). Total primary completion rate (as a percentage of the relevant age group) in 2010 was around 76 percent, higher than the average rate for Sub-Saharan Africa (68 percent) but lower than the average for lower-middle-income economies (91 percent).

The completion of primary school does not necessarily mean that students are able to read and do simple arithmetic. Many students in Nigeria take ten or more years of schooling to master such basic competencies (Favara, Appasamy and Marito (2015)).

Disparities in educational achievements exist between the North and the South of the country. More than two-thirds of students in the North remain illiterate even after completing primary school, as compared to only about 18–28 percent of students in the South. Moreover, students in the North East have the lowest literacy outcomes from schooling, with 91 percent and 72 percent of students unable to read after completing grade 4 and grade 6, respectively (World Development Indicators - WDI).

2.2 The Boko Haram conflict

Nigeria has historically been a conflict-prone country due to its heterogeneous population along ethnic, religious, and cultural lines. From the colonial proclamation of 1900 to independence in 1960, the British controlled Nigeria through indirect rule,[4] fueling the ongoing uneven development between the North and the South of the country. Nigeria underwent a successful, although not peaceful, transition from military to civilian rule in 1999, and it has held four elections since then (World Bank (2016*b*)).

Violence in Nigeria is highly regionalized and has progressively taken various forms, spanning from the high levels of religious and ethnoreligious violence in the North, to the local insurgencies that mutated into criminality and maritime piracy in the Niger Delta region and the clashes between farmers and pastoralists in the Middle Belt region (Marc, Verjee and Mogaka (2015)).[5] In the West African region as a whole, the nature of violence changed over the last decade from large-scale conflicts and civil wars to a new generation of threats such as rising election-related violence, extremism, and terror attacks, drug trafficking, maritime piracy, and criminality. In addition, wars are increasingly being fought on the periphery of the state by armed insurgents who are both factionalized and in some cases militarily weak such as the Tuareg and Arab uprisings in Mali and Boko Haram in Nigeria.

Nearly fifteen million people have been affected by the violent radicalization of the Boko Haram members and the resulting military operations in the North-East of Nigeria since 2009[6]. An analysis of the aggregated ACLED data for the North East zone over

[4]After extending its protectorate from Southern Nigeria to the northern Fulani Islamist Sokoto Caliphate that was ruling Nigeria since 1804.

[5]Different types of violence are dominant in different areas, and the underlying determinants of the conflicts are also different (Abidoye and Calì (2015)). While riots and civilian protests are more frequent in the South of the country, in the last decade northern areas have seen an increase in episodes of violence against civilians. In the specific case of the North East region, violence against civilian have come to constitute the lion's share of registered conflict events (Figure 2). Moreover, the middle belt states of Plateau, Kano and Kaduna, have experienced an intensification of longstanding farmers/pastoralists confrontations in the last decade, while political demonstrations (particularly on fuel subsidies and corruption) mainly in urban areas have increased in recent years and have expressed themselves in violence in the federal capital Abuja and Lagos.

[6]The group's violence progressively escalated after the detention and death of the movement's leader, Ustaz Mohammed Yusuf, while in custody in July 2009.

the 2003-2016 period reveals that the year 2009 was a turning point for the violence in the region (Figure 1). The Boko Haram conflict has triggered an acute humanitarian and forced displacement crisis, with devastating social and economic impacts on the population, further deepening underdevelopment and regional inequalities. The fighting became particularly intense after 2013, and has led to the loss of at least 20,000 lives and the displacement of an estimated 2.1 million people internally and across international borders[7] (World Bank (2016*a*)). The most affected states are the northeastern states of Borno, Adamawa and Yobe[8], and the most affected groups are women, children, and the youth, which account for nearly 80 percent of the affected populations[9] (IOM (International Organization of Migration)). Sexual and gender-based violence during the conflict was widespread (UNOCHA (2015)), girls and women who experience sexual violence from Boko Haram members are stigmatised by their communities and girls are often used by the terrorist group as suicide bombers[10]. At the same time, men and boys also confront a range of threats, including violence, abduction, forced recruitment by Boko Haram and vigilante groups, and detention on suspicion of militancy sympathies (World Bank (2015)).

The conflict has had a particularly high impact on the education and vocational systems, disrupting access to education and social services, especially for young people. Schools were damaged and destroyed, teachers were threatened and in some cases killed, and schools were transformed into shelters for IDPs. Schools that are in operation across the three BAY (Borno, Adamawa and Yobe) States are overcrowded and are largely unable to meet the needs of the host population and IDPs. The estimated total impact of the conflict on the education sector of the North East is around US$ 273 million, 53 percent of which is accounted for by the State of Borno (World Bank (2016*a*)). and fear of violence impedes attendance at schools, especially for girls (NPVRN (Nigeria Political Violence Research Network)).

[7]About 84 percent of the forcibly displaced people have remained within the three conflict-affected states of Borno, Adamawa, and Yobe, while around 8 percent is scattered through Northern and Central Nigeria, and the remaining 8 percent moved into the neighboring countries of Cameroon, Chad and Niger.

[8]The Nigerian government declared a state of emergency in the three most northeastern states of Borno, Yobe and Adamawa in May 2013.

[9]Of the 1.8 million identified IDPs nationally, 52 percent are women, and 57 percent are children, of which, 28 percent are five or younger.

[10]http://www.nytimes.com/2016/04/08/world/africa/boko-haram-suicide-bombers.html

3 Data

This analysis uses data from the three rounds of the Nigeria General Household Survey Panel (GHS-Panel) conducted by the National Bureau of Statistics[11]. The GHS-Panel is a randomly selected sub-sample of the GHS cross-section consisting of 5,000 households; it covers three periods: August 2010/April 2011 (first wave), September 2012/April 2013 (second wave), and August 2015/May 2016 (third wave). Among others, the GHS-Panel provides information on individuals' enrollment in three different school years. The first two panel rounds report retrospective information on individuals' participation in the school years 2009/2010 and 2011/2012, while the most recent round reports on the current participation in the 2015/2016 school year[12]. Moreover, the dataset provides GPS information on villages so that they can be linked to geo-referenced conflict data.

Data on conflict events are drawn from the PRIO/Uppsala Armed Conflict and Location Event (ACLED) dataset, which covers conflict events through the 1997-2016 period. The ACLED dataset covers exact location, in terms of latitude and longitude, date, and additional characteristics of a wide range of conflict-related events in all African states. Civil conflict episodes are defined broadly, to include all kinds of activity involving rebels, such as recruitment or the establishment of headquarters. Event data are derived from a variety of sources, mainly concentrating on reports from war zones, humanitarian agencies, and research publications. Information from local, regional, national and continental media is reviewed daily (Raleigh et al. (2010)). Despite its wide coverage, we must acknowledge selection in reporting as one of the ACLED dataset limitations. As noted in Harari and La Ferrara (2013), it is possible that areas experiencing intense conflict might have a poorer media coverage, possibly leading to under-reporting of conflict. At the same time, it is unclear that such a reporting bias would be systematically correlated with our measure of schooling outcome.

Finally, it should be noted that the 2015/16 round of the GHS dataset (third wave) was collected during a period of intense civil conflict in the North East of the country. These events have limited the access for survey enumerators to the hot spots of the clashes in the North East. This under-reporting from more-heavily conflict-affected area may mitigate the estimated impact of conflict on the schooling outcome in the North East.

[11]The GHS-Panel, which is representative at the national and geopolitical levels, is part of the Living Standards Measurement Study - Integrated Surveys on Agriculture (LSMS-ISA) project which aims at improving agricultural statistics in Sub-Saharan Africa.

[12]In the 2010/11 round individuals were asked *"Were you in school during the 2009/10 school year?"*. In the 2012/13 round individuals were asked *"Were you in school during the 2011/12 school year?"*. In the 2015/16 round individuals are asked *"Are you presently in school?"*.

4 Empirical Strategy

4.1 Identification strategy I: Differences-in-Difference

The first identification strategy exploits the variation in conflict exposure across birth cohorts and geographic areas through a difference-in-differences (DID) model.[13] We compare the effect of exposure to conflict in the 2009-2016 period on primary educational attainment for individuals aged 6 to 9 in 2009, i.e. who were of primary school age at the beginning the conflict, with a control group including the cohort of individuals aged 16 to 20 in 2009.[14] In other words, we compare children who were exposed to conflict during their school-aged years with children of the same age living in areas not affected by conflict and with children who were old enough to complete their schooling before the conflict started. Figure 3 shows a graphical representation of the sample selection. The final sample a is composed of 878 individuals between 12 and 26 years in 2015.

We estimate the following model:

$$educ_{ijt} = c + \beta * (conflict_j * treated_t) + \delta_t + \alpha_j + \theta * X_i + \varepsilon_{ijt} \quad (1)$$

where $educ_{ijt}$ is the number of years of education completed by individual i, born in year t and residing in local government authority (lga) j. As alternative outcome, we also consider a binary indicator for primary schooling completion. The term $conflict_j * treated_t$ is the interaction between a dummy equal to one when the individual belongs to the treated cohort (she is of school age during the conflict) and our measure of conflict intensity. The latter is defined as the cumulated number of ACLED reported fatalities, registered in the 20 km radius of each household over the 2009-2015 period. We denote with δ_t the birth cohort fixed effect and with α_j the lga fixed effects. The latter controls for all (time-invariant) unobservable locality characteristics. ε_{ijt} is the error term. Standard errors are clustered at the lga level to account for common group effects.

In our analysis we also control for a set of individual and household-level socioeconomic variables X_i such as age and gender of the individual, sector of residence (urban or rural), parental education level as well as fathers' job sector and household's composition. To reduce the possibility that these characteristics are themselves influenced by

[13] Previous analysis using the same methodology include Akresh and de Walque (2014); Shemyakina (2011); Verwimp and Bavel (2013); Chamarbagwala and Moran (2011); Justino, Leone and Salardi (2013); Valente (2014); Akbulut-Yuksel (2014); Dabalen and Paul (2014); Singh and Shemyakina (2016).

[14] We select the control group to include individuals who should have completed primary school by the start of the conflict in 2009 but who are as close, and therefore as comparable, to the treated cohorts as possible. Although the primary age group in Nigeria is 6-12, we exclude from the analysis individuals aged 10-12 such that all affected cohorts are exposed to the conflict during most of their potential primary schooling careers.

the conflict, we compute them using the GHS-Panel survey 2010/11

Our analysis identifies the effect of conflict intensity on education by the coefficient β in equation 1. Our main identifying assumption is that differences in the educational outcomes between affected and unaffected cohorts would have been equal (in the absence of conflict) across lgas. We will discuss this assumption in detail in the next section.

4.2 Identification Strategy II: Panel regression

The identification of war intensity effects on schooling outcomes poses several challenges in the the context of cross-sectional data. For instance, self- selection given to non-random wartime displacement brings about a sample correlation between conflict intensity and the schooling outcome of affected cohorts, which is independent of the effects of war on schooling. If well-endowed households who are better able to cope with war have a lower propensity of displacement, then the proportion of well-endowed individuals will be greater in high intensity municipalities. The opposite could also be true if well-endowed individuals have better outside opportunities (in employment or schooling) and are thus more likely to move (Kondylis (2010)). As such, any unobserved individual trait that induces spatial sorting by war intensity and is correlated with schooling attainment will bring about a selection bias, resulting in a biased estimate of β in equation 1.

For this reason, we implement a second identification strategy to identifying conflict intensity effects to account for conflict endogeneity due to both (time-invariant) unobserved locality factors and non-random displacement. We intend to do so by taking advantage of the longitudinal nature of the Nigeria GHS-Panel. More precisely, the availability of the three rounds of the panel in 2010/11, 2012/13, and 2015/16 helps us tackling the unobserved individual heterogeneity that may influence the propensity of displacement as well as schooling outcome. To this end, we estimate a fixed-effects model of the form:

$$educ_{ijt} = c + \omega_i + \mu_t + \beta * conflict_{jt} + \gamma * X_{it} + \varepsilon_{ijt} \tag{2}$$

where $educ_{ijt}$ is a binary variable indicating whether an individual i, residing in lga j in year t is enrolled in mandatory school during the school year of reference. ω_i are time-invariant individual fixed effects, μ_t is survey year fixed effects, and ε_{ijt} is the random error term. X_{it} is a vector of individual and household specific socioeconomic characteristics including sector of residence (urban or rural), parental education level as well as father's job sector and household's composition. In this specification, the measure of conflict intensity $conflict_{jt}$ is defined as the total number of fatalities registered at the lga level during each school year of reference.[15] Standard errors are clustered at the lga

[15]Although the official Nigerian primary school year spans from September to July, our period of

level to account for common group effects.

The unit of analysis are individuals who are between 6 and 9 year old in the 2009/2010 school year, so that they can be tracked across the three survey waves, ensuring that all children have a minimum age of 6 in 2009/10 and a maximum age of 15 in 2015/16. The final panel sample is composed of 6,642 individuals.

5 Results

5.1 The Impact of Conflict on Primary Educational Attainment

As a first step of our analysis, Table 1 reports the difference in average years of completed education between cohorts exposed and not exposed to conflict during their primary schooling career. Cohorts exposed and not exposed to the conflict during primary schooling years are compared in areas of above-mean number of casualties and areas of below-mean conflict casualties over the 2009-2015 period. On average, cohorts in high conflict areas report significantly higher average years of education than their respective age groups in low conflict areas. The gap in average years of education between younger and older cohorts in the high intensity areas is statistically higher than that of the cohorts in lower affected areas. Overall, the difference-in-difference outcome suggests that individuals in the treated cohort experienced an average drop of about 2.5 years of schooling if s/he resided in high conflict intensity areas.

Table 1: Preliminary difference-in-differences, means of years of education by cohort and conflict prevalence

	No. years of completed education			
	High conflict	Low conflict	Difference	t test
Treated cohort (age 6 to 9 in 2009)	6.63	5.26	1.38	***
	(0.214)	(0.192)	(0.218)	
Non-treated cohort (age 12 to 15 in 2009)	11.47	7.66	3.81	***
	(0.522)	(0.579)	(0.397)	
Difference	-4.83	-2.40	-2.43	***
	(0.582)	(0.562)	(0.445)	

Notes. (* p-value< 0.1; ** p-value<0.05; *** p-value<0.01). Source: Author's computations using Nigeria GHS-Panel.

Next, we estimate the impact of exposure to violent conflict on educational outcomes using more detailed information on the intensity of conflict, controlling for unobserved

reference for the 2015/16 school year includes conflict episodes registered between September and May as May 2016 is the last period for which GHS data were collected.

heterogeneity between lga of residence and between regions over time. To this end, we use estimate the model in equation 1. The conflict measure used in this framework is the cumulated number of ACLED reported fatalities, registered in the 20 km radius of each household over the 2009-2015 period.

The results reported in Table 2 indicate that cohorts in conflict affected areas witnessed a loss in terms of average numbers of completed years of education. The results suggest that a one standard deviation increase in the number of fatalities in the 20 km radius of each household (which corresponds to about 108 fatalities) will decrease the number of completed years of education for the cohort exposed to the conflict during primary school by 0.6 years. Considering that the average number of years of completed education for the young cohort in conflict affected areas is 5.85 years, this translates in a 10 percent drop relative to average educational achievement.[16] These results are robust to including controls for household characteristics, suggesting that the results are not driven by a change in household composition due to, for example, selective mortality or migration (column (2)).

Table 2: The effect of conflict on number of completed years of education: Difference-in-differences estimation

	No. years of completed education	
	(1)	(2)
No. fatalities 20km from HH × treated cohort	-0.006***	-0.005***
	(0.001)	(0.001)
Female		-1.187***
		(0.356)
Age		-0.801
		(0.483)
Father works in agriculture		-1.695***
		(0.486)
Urban		2.075**
		(1.014)
Individual and household controls	NO	YES
Lga FE	YES	YES
Cohort FE	YES	YES
Observations	846	846

Notes. Robust standard errors in parenthesis. * p-value< 0.1; ** p-value<0.05; *** p-value<0.01). Individual and household controls include: number female aged 6-12 in the household, number male aged 6-12 in the household, household size, father's education, mother's education. All regressions include a constant not shown. Source: Author's computations using Nigeria GHS-Panel.

[16]The magnitude of this effect is in line with that of Valente (2014) and Singh and Shemyakina (2016))

5.1.1 Robustness checks

Our results are robust to a number of checks. First, we check the assumption of common trends before the conflict period, a condition for the difference-in-difference to be a valid strategy (Dabalen and Paul (2014)). In order to check this, we compare educational outcomes of individuals aged 16-20 and 20-25 in 2009 against individuals aged 24-28 and 30-35 years old, respectively. Presumably, individuals in all these age cohorts were not in school when the conflict took place. Given the statistically insignificant difference-in-difference coefficient, the outcomes in Table 3 suggest that exposure to conflict has a detrimental effect on years of education.

Table 3: Difference-in-differences estimation - Placebo

	No. years of completed education			
Placebo treatment:	Age 16-20 in 2009		Age 20-25 in 2009	
Control Cohort:	Age 24-28 in 2009		Age 30-35 in 2009	
	(1)	(2)	(1)	(2)
No. fatalities 20km from HH × treated cohort	0.00232	0.00225	-0.00131	-0.00260*
	(0.00170)	(0.00223)	(0.00169)	(0.00147)
Individual and household controls	NO	YES	NO	YES
Lga FE	YES	YES	YES	YES
Cohort FE	YES	YES	YES	YES
Observations	444	444	478	478

Notes. Robust standard errors in parenthesis. * p-value< 0.1; ** p-value<0.05; *** p-value<0.01). ndividual and household controls include: number female aged 6-12 in the household, number male aged 6-12 in the household, household size, father's education, mother's education, father works in agriculture, locality of residence (urban/rural). All regressions include a constant not shown. Source: Author's computations using Nigeria GHS-Panel.

As an additional check, we test for the presence of migration bias. Armed conflicts typically lead to substantial movements of population and migration out of conflict regions may bias estimates if households that are more likely to invest in children's education moved out (Singh and Shemyakina (2016)). By taking advantage of the longitudinal nature of the GHS data, we generate a dummy which takes the value of 1 if the household changed lga of residence at any point in time across the three survey rounds. When restricting the analysis to the North East zone we see that only 8 households changed location throughout the survey rounds. The latter suggests that migration bias is not a concern in this analysis. Table 4 reports the result of the estimation performed on the

non-migrant sub-sample for both number of years of completed education and primary completion rate, which are very similar to those presented in Table 2 and Table 5.

Table 4: Difference-in-differences estimation - Non-migrant sub-sample

	No. years of completed education	
	(1)	(2)
No. fatalities 20km from HH × treated cohort	-0.007***	-0.006***
	(0.001)	(0.001)
Individual and household controls	NO	YES
Lga FE	YES	YES
Cohort FE	YES	YES
Observations	838	838

Notes. Robust standard errors in parenthesis. * p-value< 0.1; ** p-value<0.05; *** p-value<0.01). Individual and household controls include: number female aged 6-12 in the household, number male aged 6-12 in the household, household size, father's education, mother's education, father works in agriculture, locality of residence (urban/rural). All regressions include a constant not shown. Source: Author's computations using Nigeria GHS-Panel.

Finally, we checked that results do not change if we include the dummy variable for the treated cohort as an additional control ($treated_{jt}$), thus excluding cohort fixed-effects.[17]

5.1.2 Additional results and heterogeneous effects

Alternative schooling outcome In Table 5, we report the results of our analysis when we look at a different school outcome, namely the probability to complete primary education. To this end, we use again model 1 where the outcome variable is now a dummy which takes value 1 if the student which is in school in 2009 has completed primary education by 2015 and 0 otherwise. The difference-in-difference estimates suggest a negative effect of around 0.5 percentage points of an increase in the number of fatalities in the vicinity of a household on the probability to complete primary education for children aged 6-9 in 2009. However, the magnitude of this effect seems small compared to what has been found in the literature. As an example, Verwimp and Bavel (2013) find that in Burundi the probability of completing primary schooling for a boy exposed to violent conflict declined by 7 to 17 percentage points compared to a non-exposed boy. While in Nepal, Valente (2014) finds that the primary schooling attainment rate of girls exposed to conflict increased by 5.6 percentage points.

[17]Results available upon request.

Table 5: The effect of conflict on completing primary education: Difference-in-differences estimation

	Completed primary	
	(1)	(2)
No. fatalities 20km from HH × treated cohort	-0.005**	-0.004*
	(0.002)	(0.002)
Female		-0.877**
		(0.362)
Age		-2.499***
		(0.600)
Individual and household controls	NO	YES
Lga FE	YES	YES
Cohort FE	YES	YES
Observations	749	749

Notes. Robust standard errors in parenthesis. * p-value< 0.1; ** p-value<0.05; *** p-value<0.01). Individual and household controls include: number female aged 6-12 in the household, number male aged 6-12 in the household, household size, father's education, mother's education, father works in agriculture, locality of residence (urban/rural). All regressions include a constant not shown. Source: Author's computations using Nigeria GHS-Panel.

Alternative conflict measures Next, we present results from the estimation of the model in equation 1 by using an alternative set of conflict measures. The alternative conflict measures have been generated through the same type of buffer analysis described in Section 3, but decreasing the buffer zone around each household from 20 km to 10 km. Thus, this new set of measures include the cumulated number of conflict episodes and fatalities registered in the 10 km radius of each household over the 2009-2015 period, and the cumulated number of conflict episodes registered in the 20 km radius of each household over the same time span. For completeness, when conflict episodes is mentioned in place of fatalities, any type of conflict event as per the ACLED categorization is considered, regardless of whether the event has caused any fatality (see Figure 2 for the different type of conflict events included in the ACLED data). Table 6 presents the descriptives of the different conflict measures. What is worth noting is the high variation in the mean fatalities at 20 km from the household, suggesting that even within the North East zone there has been high variation in the intensity of conflict across lgas.

Table 6: Descriptive statistics of conflict measures

	Mean	Std. Dev.	Min	Max	No. observations
No. cumulated fatalities at 10km from HH	8.78	43.21	0	298	878
No. cumulated conflict episodes at 10km from HH	1.60	6.78	0	47	878
No. cumulated fatalities at 20km from HH	79.31	161.14	0	815	878
No. cumulated conflict episodes at 20km from HH	9.02	14.74	0	50	878

Notes. Data refer to the Northern East region of Nigeria. All measures are cumulated over the 2009-2015 period. Source: ACLED dataset.

In Table 7, we present the results of the diff-in-diff estimation with the set of alternative conflict measures. By comparing this set of results to those in Table 2, we find a consistent negative effect of conflict on average number of years of education. While the measure of fatalities returns a coefficient of 0.01, as the one resulted from the main specification, the measures of conflict events return considerably higher coefficients. This could possibly be due to the less precise definition of conflict that results from aggregating a wide range of events, against narrowing the analysis to violent events that actually caused fatalities.

Table 7: Difference-in-differences estimation on North East - Alternative conflict measures

	Number years completed education		
	(1)	(2)	(3)
No. fatalities 10km from HH × treated cohort	-0.006***		
	(0.002)		
No. conflict 10km from HH × treated cohort		-0.042***	
		(0.014)	
No. conflict 20km from HH × treated cohort			-0.061***
			(0.01)
Individual and household controls	YES	YES	YES
Lga FE	YES	YES	YES
Cohort FE	YES	YES	YES
Observations	846	846	846

Notes. Robust standard errors in parenthesis. * p-value< 0.1; ** p-value<0.05; *** p-value<0.01). Individual and household controls include: number female aged 6-12 in the household, number male aged 6-12 in the household, household size, father's education, mother's education, father works in agriculture, locality of residence (urban/rural). All regressions include a constant not shown. Source: Author's computations using Nigeria GHS-Panel.

Cohort-specific effects As a next step, we explore the possibility of cohort-specific effects which maybe hidden beneath the average effect of conflict on schooling outcome. We replaced the dummy for affected cohort in equation 1 by a set of cohort dummies, one for each affected cohort. The complete set consists of 4 birth cohorts (aged 6-9 in 2009). The larger size of the coefficient for students aged 6 at the beginning of the conflict as reported in Table 8 seems to suggest that the effect is stronger for students that are exposed to conflict for a longer period.

Table 8: Differences in difference estimation: Cohorts analysis

	No. years completed education
No. fatalities20km from HH × aged 6 in 2009	-0.005***
	(0.001)
No. fatalities20km from HH × aged 7 in 2009	0.002
	(0.002)
No. fatalities20km from HH × aged 8 in 2009	-0.004*
	(0.002)
No. fatalities20km from HH × aged 9 in 2009	-0.003**
	(0.001)
Individual and household controls	YES
Lga FE	YES
Cohort FE	YES
Observations	846

Notes. Robust standard errors in parenthesis. * p-value< 0.1; ** p-value<0.05; *** p-value<0.01). Individual and household controls include: number female aged 6-12 in the household, number male aged 6-12 in the household, household size, father's education, mother's education, father works in agriculture, locality of residence (urban/rural). All regressions include a constant not shown. Source: Author's computations using Nigeria GHS-Panel.

Gender-specific effects Finally, we explore the possible gender effect of the impact of the conflict on human capital accumulation. To this end, we estimate the following specification :

$$\begin{aligned} educ_{ijt} &= c + \alpha_j + \delta_t + \gamma female_i + \beta(conflict_j * treated_t) \\ &+ \lambda(female_i * conflict_j * treated_t) + \theta(X_i) + \varepsilon_{ijt} \end{aligned} \tag{3}$$

where $female_i$ is the sex of the child ($female_i$=1 for girls), and the other variables are as in equation 1. In this specification, β gives the effect of conflict on the educational outcome of boys. The triple interaction coefficient λ tells us whether there is an additional effect for girls, and the sum of β and λ gives the total effect of conflict on schooling for girls. In addition, the sum of γ and λ gives the total effect of gender on schooling.

Table 9 reports the results of the gender-specific model for the educational outcome of interest. Results are quite consistent across the different specifications and report a positive coefficient on the triple interaction term suggesting that the conflict in the North East of the country has somewhat diminished the gender-gap in schooling. Within conflict affected areas, female have accumulated on average 0.003 more years of completed education with respect to boys. However, the gender gap in education still exists with women in the North East having on average 1.3 less years of completed education with respect to men (to see this one should add the coefficient of the variable $female$ to that of the triple interaction term).[18]

[18]Evidence on the gender effect of conflict is mixed. In Tajikistan, Shemyakina (2011) finds a large negative effect of exposure to violent conflict on the enrollment of girls, while she finds no effect of regional and household conflict exposure on education of boys. Singh and Shemyakina (2016) find substantial long-term negative effect of the Punjab insurgency on female educational attainment with respect to men of similar age. Chamarbagwala and Moran (2011) suggest that, as a consequence of Guatemala's civil war, the number of years of completed education dropped for the most disadvanatged groups of rural Mayan, especially among females. On a different side, in Nepal, Valente (2014) finds heterogeneous effects of conflict across gender and across type of conflict measurement. Indeed, she finds a positive effect of conflict casualties on female primary schooling attainment, while abductions by Maoists seem to have the reverse effect. Other studies find higher effects for males. Akresh and de Walque (2014) find that exposure to genocide in Rwanda resulted in a drop in educational achievement by 0.5 years of schooling for all children, but the impact was higher for boys from non-poor families. Swee (2015) in Bosnia and Herzegovina, and Kecmanovic (2012) in Croatia find lower levels of education among the cohort of young males affected by war due to military drafting. Moreover, due to the armed conflict in Cote d'Ivoire, Dabalen and Paul (2014) find an overall drop in average years of education by a range of 0.2 to 0.9 fewer years, with the estimated effect being larger for males and individuals between 19 and 22 years of age.

Table 9: Gender-differential impact of conflict

	No. years completed education	
	(1)	(2)
No. fatalities 20km×female×treated	0.004***	0.003*
	(0.001)	(0.002)
No. conflict 20km×treated	-0.008***	-0.007***
	(0.001)	(0.001)
Female	-1.331***	-1.286***
	(0.302)	(0.351)
Age		-0.787
		(0.483)
Individual and household controls	NO	YES
Lga FE	YES	YES
Cohort FE	YES	YES
Observations	846	846

Notes. Robust standard errors in parenthesis. * p-value< 0.1; ** p-value<0.05; *** p-value<0.01). Individual and household controls include: number female aged 6-12 in the household, number male aged 6-12 in the household, household size, father's education, mother's education, father works in agriculture, locality of residence (urban/rural). All regressions include a constant not shown. Source: Author's computations using Nigeria GHS-Panel.

5.2 The Impact of Conflict on Enrollment

In this section, we present the results of the estimation of the model in equation 2. The conflict measure used in this framework is the total number of ACLED reported fatalities registered at the lga level during each school year of reference. The dependent variable is enrollment for children in mandatory school age.

The results presented in Table 10 suggest that, after accounting for individual unobserved heterogeneity, an increase in violence during the school year decreases the probability of enrollment in mandatory school age of about 0.5 percentage points. This result holds when individual and household controls are taken into account. To the best of our knowledge, this is the first study that takes advantage of a three-round GHS-panel dataset to estimate the effect of violent conflict on enrollment rates through a fixed-effects model. For this reason we are not currently able to compare the magnitude of this finding with other studies in the literature.

Table 10: Conflict effect on enrollment in mandatory school

	Enrollment in mandatory school	
	Panel of children aged 6 to 9 in 2009	
	(1)	(2)
No. fatalities during school year	-0.005**	-0.005**
	(0.002)	(0.002)
Individual and household controls	NO	YES
Individual FE	YES	YES
Survey year FE	YES	YES
Number of groups	522	522
Observations	1,566	1,566

Notes. Robust standard errors in parenthesis. * p-value< 0.1; ** p-value<0.05; *** p-value<0.01). Individual and household controls include: number female aged 6-12 in the household, number male aged 6-12 in the household, household size, father's education, mother's education, father works in agriculture, locality of residence (urban/rural). All regressions include a constant not shown. Source: Author's computations using Nigeria GHS-Panel.

As a robustness check, we estimate equation 2 by substituting the continuous conflict measure by a dummy that accounts for the presence or absence of fatalities in a certain lga during the school year. As we have already mentioned in section 3, it is plausible that the underreporting in the ACLED data comes from the areas that were more affected by violence. The choice of a dummy variable should mitigate possible measurement error associated to the continuous measure of the number of fatalities. Table 11 reports the results of the effect of the discrete conflict measure on enrollment on manadatory school, in comparison to the results presented in Table 10. The results confirm the negative impact of the measure of violence on mandatory schooling enrollment, while its consistently bigger magnitude suggests that the point estimates found in Table 10 should most likely be interpreted as a lower bound of the effect of violence on mandatory schooling enrollment.

Table 11: Conflict effect on enrollment in mandatory school - robustness

	Enrollment in mandatory school	
	Panel of children 6-9 in 2009	
	(1)	(2)
Fatalities during school year (0/1)	-0.303*	-0.312*
	(0.165)	(0.165)
Individual and household controls	NO	YES
Individual FE	YES	YES
Survey year FE	YES	YES
Observations	1,566	1,566

Standard errors in parentheses . *** p<0.01, ** p<0.05, * p<0.1
Note: Ind. and household controls as in Table 10

Finally, in Table 12 we report the estimation of the fixed-effects model in equation 2 disaggregated by gender. The average negative effect obtained in Table 10 seems to be driven by the negative effect on females.

Table 12: Conflict effect on enrollment in mandatory school by gender

	Enrollment in mandatory school			
	Panel of children aged 6 to 9 in 2009			
	Male		Female	
	(1)	(2)	(1)	(2)
No. fatalities during school year	-0.003	-0.003	-0.007*	-0.007*
	(0.003)	(0.003)	(0.004)	(0.004)
Individual and household controls	NO	YES	NO	YES
Individual FE	YES	YES	YES	YES
Survey year FE	YES	YES	YES	YES
Number of groups	299	299	223	223
Observations	897	897	669	669

Notes. Robust standard errors in parenthesis. * p-value< 0.1; ** p-value<0.05; *** p-value<0.01). Individual and household controls include: number female aged 6-12 in the household, number male aged 6-12 in the household, household size, father's education, mother's education, father works in agriculture, locality of residence (urban/rural). All regressions include a constant not shown. Source: Author's computations using Nigeria GHS-Panel.

5.3 Mechanisms

The possible causal pathways behind the negative effect of conflict on educational outcomes are varied. One potential mechanism through which violence exposure might affect future educational outcomes is through household wealthIn the event of a conflict, parents might substitute away from schooling expenditure towards the consumption of basic necessities, especially when livelihoods are taken away (Akresh and de Walque (2014); Shemyakina (2011)). In this section we will test for the presence of such a mechanism in Nigeria.

As first step, we build a proxy for household welfare through a principal component analysis of households' basic assets indicators such as quality of household's floor, roof, and wall, main source of water, main source of cooking fuel, main trash disposal and toilet facility, and presence of electricity in the house. Next, we use this measure as outcome for the following regression:

$$wealth_{ijt} = c + \omega_i + \mu_t + \beta(conflict_{jt}) + \gamma(X_{it}) + \varepsilon_{ijt} \tag{4}$$

where $wealth_{ijt}$ indicates the wealth score of household i, located in lga j, during survey round t. ω_i are time-invariant household fixed-effects, μ_t are survey year fixed-effects, and ε_{ijt} is the random error term. X_{it} is a vector of household socioeconomic characteristics including sector of location (urban or rural), househol's head education level as well as household's composition. In this specification, as a measure of conflict intensity $conflict_{jt}$ we use both the total number of fatalities registered at the lga level during each school year of reference, and the cumulated measure of fatalities at 20 km from each household over the 2009-2015 period. For coherence with the fixed-effect analysis of Section 5.2, equation 4 is estimated on the sample of households in the GHS-Panel that reported having children in mandatory age. Such a sample is made of 4,896 households.

Table 13 reports the estimation results. Both measures of conflict seem to have a significantly negative effect on household's welfare, suggesting that the negative effect of violence on educational outcomes may act through this channel. As a robustness check, we estimate the model in equation 4 against the same set of alternative conflict measures as in Table 7. As shown in Table A.1, the results are consistent to the usage of alternative conflict measures.

Table 13: Impact of conflict on household income

	Wealth Index			
	Panel of households with children aged 6-15			
	(1)	(2)	(3)	(4)
No. fatalities during school year	-0.0008**		-0.0007*	
	(0.0004)		(0.0004)	
No. fatalities at 20km from HH		-0.0010***		-0.0010***
		(0.0004)		(0.0004)
Household FE	YES	YES	YES	YES
Lga FE	NO	NO	YES	YES
Survey year FE	YES	YES	YES	YES
Individual and household controls	NO	NO	YES	YES
Observations	4,896	4,896	4,896	4,896

Notes. Robust standard errors in parenthesis. * p-value< 0.1; ** p-value<0.05; *** p-value<0.01). Individual and household controls include: number female aged 6-12 in the household, number male aged 6-12 in the household, household size, father's education, mother's education, father works in agriculture, locality of residence (urban/rural). All regressions include a constant not shown. Source: Author's computations using Nigeria GHS-Panel.

6 Conclusions

In this paper we have provided the first empirical analysis of the impact of the Boko Haram conflict on schooling in Nigeria. Taking advantage of the unique data from three rounds of the Nigeria General Household Survey Panel, we estimate the effect of violent conflict on the both education attainment and enrolment decisions.

Our results indicate that a one standard deviation increase in the number of fatalities in the 20 km radius of each household decreases the number of completed years of education for the cohort exposed to the conflict during primary school by 0.6 years. This translates in a 10 percent drop relative to the average educational achievement. This negative effect is robust to the usage of alternative conflict measures and is not driven by cohort-specific effects or migration bias. We also find that, after accounting for individual unobserved heterogeneity, an increase in conflict intensity during the school year decreases the probability of enrollment in mandatory school age of about 0.5 percentage points. As for the mechanisms behind these results, we provide suggestive evidence that the negative effect of conflict on educational outcomes may act through a reduction in households' welfare.

There are at least two aspects of the analysis that needs further research. First,

the role of the supply side in determining household schooling choice. In particular, the current unavailability of quality disaggregated data on school-level indicators (e.g. the number and quality of schools, teachers, student/teacher ratios, and so on) prevent us to include these aspects in our analysis . Second, the matter internal and international displacement and its implications for the Nigerian education system need further analysis.

References

Abidoye, Babatunde Oluwakayode, and Massimiliano Calì. 2015. "Income shocks and conflict: Evidence from Nigeria." *Policy Research Working Paper*, WPS7213.

Akbulut-Yuksel, Mevlude. 2014. "Children of War: The Long-Run Effects of Large-Scale Physical Destruction and Warfare on Children." *Journal of Human Resources*, 49(3): 634–662.

Akresh, Richard, and Damien de Walque. 2014. "Conflict and the Formation of Political Beliefs in Africa." *HiCN Working Paper 47*, , (202): 1–35.

Akresh, Richard, Sonia Bhalotra, Marinella Leone, and Una Okonkwo Osili. 2012. "War and stature: Growing up during the Nigerian civil war." *American Economic Review*, 102(3): 273–277.

Bellows, John, and Edward Miguel. 2009. "War and local collective action in Sierra Leone." *Journal of Public Economics*, 93(11-12): 1144–1157.

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

Bruek, Tilman, Michele Di Maio, and Sami H Miaari. 2014. "Learning the Hard Way : The Effect of Violent Conflict on Student Academic Achievement." *IZA Discussion Paper Series No. 8543*.

Bundervoet, Tom. 2012. "War, Health, and Educational Attainment: A Panel of Children during Burundi's Civil War." *HICN Working Paper 114*, 1–34.

Case, Anne, and Christina Paxson. 2010. "Causes and consequences of early-life health." *Demography*, 47(Supplement): S65–S85.

Chamarbagwala, Rubiana, and Hilcias E. Moran. 2011. "The human capital consequences of civil war: Evidence from Guatemala." *Journal of Development Economics*, 94(1): 41–61.

Dabalen, Andrew L, and Saumik Paul. 2014. "Estimating the Effects of Conflict on Education in Cote d'Ivoire." *The Journal of Development Studies*, 50(12): 1631–1646.

Favara, Marta, Irajen Appasamy, and H. Garcia Marito. 2015. "Nigeria: Skills for Competitiveness and Employability." World Bank 96420NG (June), Washington, DC.

Foley, Kelly, Giovanni Gallipoli, and David A. Green. 2014. "Ability, parental valuation of education, and the high school dropout decision." *Journal of Human Resources*, 49(4): 906–944.

Harari, Mariaflavia, and Eliana La Ferrara. 2013. "Conflict, Climate Change and Cells: A Disaggregated Analysis." *CEPR Discussion Paper No. DP9277*.

Ichino, Andrea, and Rudolf Winter-Ebmer. 2004. "The Long-Run Educational Cost of World War II." *Journal of Labor Economics*, 22(1): 57–87.

IOM (International Organization of Migration). 2015. "Displacement Tracking Matrix Round VII."

Justino, Patricia. 2012. "Violent conflict and human capital accumulation." In *Elgar Handbook Of Civil War And Fragile States*. , ed. G.K. Brown and A. Langer, Chapter 13. Edward Elgar Publisher.

Justino, P., M. Leone, and P. Salardi. 2013. "Short- and Long-Term Impact of Violence on Education: The Case of Timor Leste." *The World Bank Economic Review*, 28(2): 320–353.

Kecmanovic, M. 2012. "The Short-run Effects of the Croatian War on Education, Employment, and Earnings." *Journal of Conflict Resolution*, 57(6): 991–1010.

Khan, Sarah, and Andrew J Seltzer. 2004. "The Impact of Fundamentalist Terrorism on School Enrolment: Evidence from North-Western Pakistan, 2004-09." , (10168).

Kondylis, Florence. 2010. "Conflict displacement and labor market outcomes in post-war Bosnia and Herzegovina." *Journal of Development Economics*, 93(2): 235–248.

Labo-Popoola, S.O., A.A. Bello, and F.A. Atanda. 2009. "Universal Basic Education in Nigeria: Challenges and Way Forward." *The Social Sciences*, 4(6): 636–643.

Lai, B., and C. Thyne. 2007. "The Effect of Civil War on Education, 1980–97." *Journal of Peace Research*, 44(3): 277–292.

Leon, Gianmarco. 2012. "Civil Conflict and Human Capital Accumulation: The Long-term Effects of Political Violence in Peru." *The Journal of Human Resources*, 47(4): 991–1022.

Marc, Alexandre, Neelam Verjee, and Stephen Mogaka. 2015. "The Challenge of Stability and Security in West Africa." World Bank. License: Creative Commons Attribution CC BY 3.0 IGO., Washington, DC.

Márquez-Padilla, Fernanda, Francisco Pérez-Arce, and Carlos Rodríguez-Castelán. 2015. "The (Non-) Effect of Violence on Education: Evidence from the War on Drugs in Mexico." , (April): 46.

Merrouche, Ouarda. 2006. "Households in Conflict Network The Human Capital Cost of Landmine Contamination in Cambodia." *HICN Working Paper*, , (25).

Miguel, Edward, and Gérard Roland. 2011. "The long-run impact of bombing Vietnam." *Journal of Development Economics*, 96(1): 1–15.

Minoiu, Camelia, and Olga N. Shemyakina. 2014. "Armed conflict, household victimization, and child health in Cote d'Ivoire." *Journal of Development Economics*, 108: 237–255.

National Population Commission and RTI International. 2016. "2015 Nigeria Education Data Survey Education Profile." United States Agency for International Development, Washington, DC.

NPVRN (Nigeria Political Violence Research Network). 2013. "Our Bodies, Their Battleground, Boko Haram and Gender-Based Violence against Christian Women and Children in North-Eastern Nigeria since 1999." *NPVRN Working Paper No. 1.*

Paulo, Pedro, and Orraca Romano. 2015. "Crime Exposure and Educational Outcomes in Mexico."

Pivovarova, Margarita, and Eik Leong Swee. 2015. "Quantifying the microeconomic effects of war using panel data: Evidence from Nepal." *World Development*, 66: 308–321.

Raleigh, Clionadh, Andrew Linke, Håvard Hegre, and Joakim Karlsen. 2010. "Introducing ACLED: An Armed Conflict Location and Event Dataset." *Journal of Peace Research*, 47(5): 651–660.

Rodriguez, Catherine, and Fabio Sanchez. 2009. "Armed Conflict Exposure, Human Capital Investments and Child Labor: Evidence from Colombia." *Documentos CEDE*, , (ISSN 1657-5334): 76.

Roy, Sutanuka, and Prakarsh Singh. 2016. "Gender bias in education during conflict Evidence from Assam." *WIDER Working Paper 67.*

Shemyakina, Olga. 2011. "The effect of armed conflict on accumulation of schooling: Results from Tajikistan." *Journal of Development Economics*, 95(2): 186–200.

Singh, Prakarsh, and Olga N. Shemyakina. 2016. "Gender-differential effects of terrorism on education: The case of the 1981-1993 Punjab insurgency." *Economics of Education Review*, 0: 1–26.

Swee, Eik Leong. 2015. "On war intensity and schooling attainment: The case of Bosnia and Herzegovina." *European Journal of Political Economy*, 40: 158–172.

UNOCHA. 2015. "Humanitarian Bulletin." July, Nige.

Valente, Christine. 2014. "Education and civil conflict in Nepal." *World Bank Economic Review*, 28(2): 354–383.

Verwimp, Philip, and Jan Van Bavel. 2013. "Schooling , Violent Conflict , and Gender in Burundi." *The World Bank Economic Review*, 28(2): 384–411.

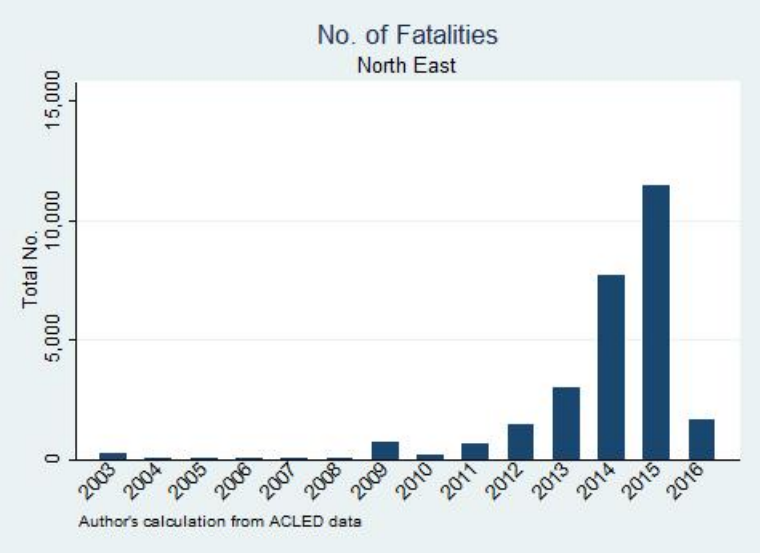
World Bank. 2015. "North-East Nigeria Recovery and Peace Building Assessment." World Bank, Washington, DC.

World Bank. 2016*a*. "Multi-Sectoral Crisis Recovery Project for North Eastern Nigeria." World Bank, Washington, DC.

World Bank. 2016*b*. "Poverty Reduction in Nigeria in the Last Decade." World Bank, Washington, DC.

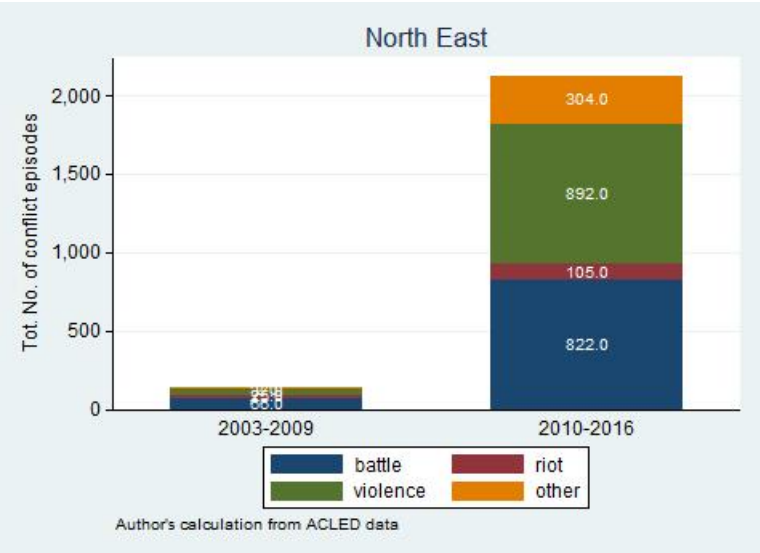
Figures

Figure 1: Total number of fatalities in each year (2003-2016)



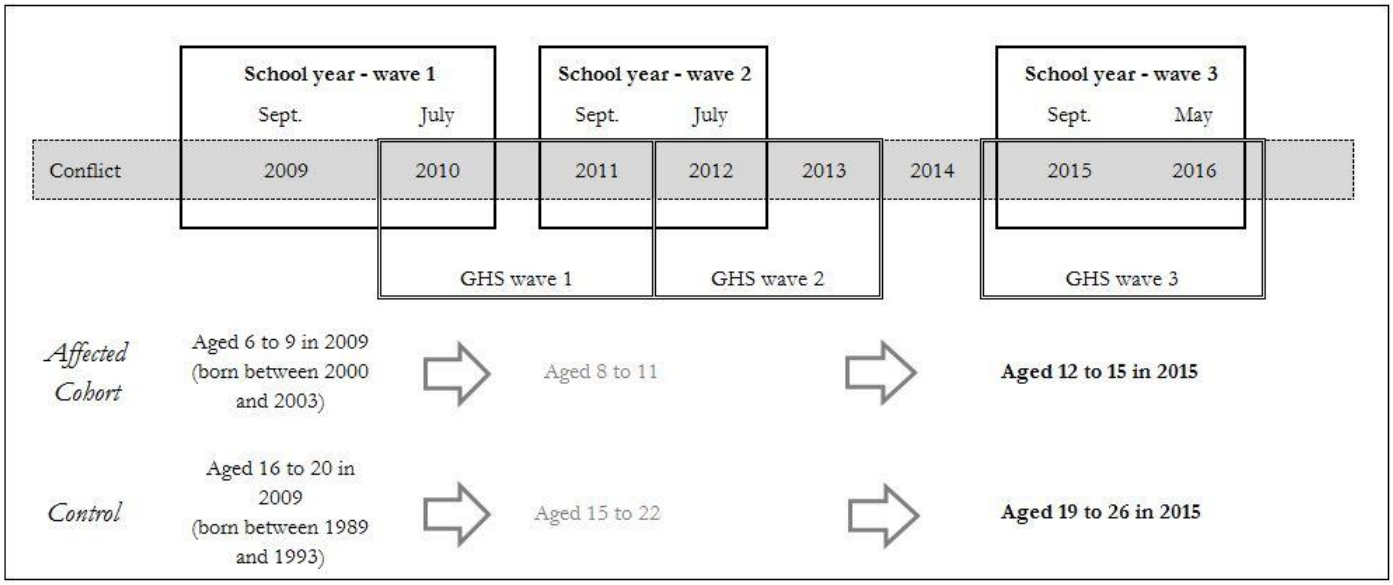
Notes. The figures plot the total number of fatalities in the Northern Nigeria as reorded in the ACLED dataset (Sources: ACLED).

Figure 2: Types of conflict events in Northern Nigeria (2003-2016)



Notes. The conflict events in the ACLED data are categorized into nine categories: (1) battle – government regains territory; (2) battle – no change of territory; (3) battles – non-state actor overtakes territory; (4) Headquarters or base established; (5) Non-violent transfer of territory; (6) Remote violence; (7) Riots and protests; (8) Strategic development; (9) Violence against civilians. For conciseness we generated the aggregated categories of (a) Battle= (1)+(2)+(3); (b) Riot=(7); (c) Violence=(9); (d) Other= (4)+(5)+(6)+(8).

Figure 3: Differences in Difference Cohort Definitions



Notes. The Figure reports the definition for the cohorts used in the differences in difference analysis.

Appendix

Table A.1: Impact of conflict on household income - Alternative conflict measures

	Wealth Index					
	Panel of households with children aged 6-15					
	(1)	(2)	(3)	(4)	(5)	(6)
No. fatalities at 10 km from HH	-0.00182***			-0.00180***		
	(0.00063)			(0.00063)		
No. conflict episodes at 10 km from HH		-0.0154***			-0.0133***	
		(0.00350)			(0.00361)	
No. conflict episodes at 20 km from HH			-0.0156***			-0.0139***
			(0.00267)			(0.00275)
Household FE	YES	YES	YES	YES	YES	YES
Lga FE	YES	YES	YES	YES	YES	YES
Survey year FE	YES	YES	YES	YES	YES	YES
Individual and household controls	NO	NO	NO	YES	YES	YES
Observations	4,896	4,896	4,896	4,896	4,896	4,896

Notes. Robust standard errors in parenthesis. * p-value< 0.1; ** p-value<0.05; *** p-value<0.01). Individual and household controls include: number female aged 6-12 in the household, number male aged 6-12 in the household, household size, father's education, mother's education, father works in agriculture, locality of residence (urban/rural). All regressions include a constant not shown. Source: Author's computations using Nigeria GHS-Panel.