

# Rebel governance and educational outcomes

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## Abstract

Existing literature does not empirically distinguish between the effects of exposure to violence and insurgents' territorial occupation. This paper addresses this gap by measuring both the immediate and persistent effects of occupation and rebel governance on schooling. I exploit the temporary occupation of Nigeria by Boko Haram as a quasi-experiment. Using individual-level panel data, I compare children exposed to violence with those exposed to both violence and occupation. Overall, children suffer a setback of more than a year of schooling in the years following the occupation, which they do not seem to catch up on. Girls are disproportionately affected, with attendance rates about 36 percent lower. This may be explained by parental disinterest in (female) education following the occupation. By comparing these findings with prior research on the impact of violence, this study demonstrates that territorial control can strongly influence civilian behavior, amplifying its effects beyond those of violence alone.

**JEL codes:** I24, D74, O10

**Keywords:** conflict, education, development

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## 1 Introduction

Between one-fourth and one-third of all insurgent groups occupy territory, exposing civilians to their governance and rule – and this has been increasing during the last decade (Huang 2016; Stewart 2018; Wood 2008; Arjona 2016; Stewart 2018; Rubin 2020).<sup>1</sup> During occupation by such non-state actors, the provision of public goods falls under the control of the group, which uses them to suppress, influence and coerce the local population, potentially altering its behavior and attitudes (Berman 2003; Mampilly 2021; Kalyvas 2006; Maynard 2019; Yakter and Harsgor 2022). There is a growing number of self-representing Islamic organizations with strong anti-educational ideologies among those groups occupying territory.<sup>2</sup> Occupation by these groups often involves denying access to education (GCPEA 2020a). Despite the fundamental differences between being ‘only’ exposed to violence versus living in occupied territories, being exposed to and having to adhere to rebel governance, existing work does not empirically distinguish between the two. Using the temporary occupation of territory during the Boko Haram insurgency as a quasi-experiment, I analyze the immediate and persistent effects of the antieducational rule of the insurgents on schooling behavior in the long run, disentangling the effects of territorial control of insurgents from exposure to violence.

Various aspects make Boko Haram a suitable setting for studying the effect of occupation by insurgents on educational outcomes. First, although the insurgency affected large parts of the country, Boko Haram occupied only a limited number of areas. This enables the comparison of those exposed to the insurgency to those exposed to the insurgency and the occupation, disentangling the effect of occupation from the effect of violence. Second, the temporary nature of the group’s occupation allows me to study whether potential behavioral changes in response to the group’s rule were temporary or persistent, outlasting the occupation. Third, Boko Haram has an explicit antieducational stance, and the prohibition of schooling was at the core of the group’s governance. Studying this case allows one to draw conclusions regarding many other examples of rebel rule with strong antieducational sentiment for which data are not available. The need for more insight into the effects of insurgent occupation is even more pressing, considering that various groups that previously lost territory – among which Boko Haram – are regaining ground (Crisis group 2022).

The analysis relies on panel data on children of school age from the Nigerian General Household Survey (NGHS). The treatment group consists of children exposed to the violence and Boko Haram’s occupation, and the control group is restricted to children that were only exposed to violent events and lived in close proximity of the occupied areas. I show that the treatment and control groups do not show significant differences in schooling trends prior to treatment and address concerns about migration, attrition, and endogeneity of treatment. Being confronted by rebel rule and territorial control by insurgents can lead to temporary changes in behavior that can have more long-lasting effects. To address this, the analysis includes two different outcomes: school attendance and the

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1. See figure A.4.

2. Such as the Islamic State of Iraq and the Levant (ISIL) and al-Qaeda along with their affiliates in the Maghreb, Somalia, Syria, Yemen and most recently south-Asia, the Taliban, al-Shabaab, and Boko Haram (Raleigh et al. 2010; Global Terrorism Index 2022; Crisis group 2016).

total number of years of schooling (YoS). The first captures the year-by-year shifts in attendance rates, indicating how any potential immediate effect might dissipate. The latter provides insight into how these potentially lower attendance rates translate into medium-term (six years after the occupation) losses in education.

The results indicate that territorial control by Boko Haram had a temporary and persistent negative effect on school participation. During the occupation, the children in the treatment group accumulated 1.22 years less schooling than their counterparts. To put this in perspective, the average adult in the region has approximately four and a half years of schooling. The initial loss of schooling corresponds to about 22 percent of the total years of schooling of an average adult in the region. Although there seems to be a negative effect on school attendance, it is driven by girls: they are 35 percent less likely than boys to attend school after the occupation. The results are robust with respect to alternative violence data sets, nonbinary measure of the treatment based on duration of the occupation on a local level, and alternative control groups. If anything, the robustness tests indicate that the effects might be more pronounced with respect to school attendance, suggesting that the baseline estimates are on the conservative side.

The pronounced effect for girls might be explained by parental disinterest in education: girls not attending school are 17 percent more likely to report this is due to their parents. This is even though women from the households in the survey with primary school education have a 12 percent higher chance to be employed than men with a similar education, suggesting there are potential future payoffs of education. I examine additional well-documented mechanisms that drive lower school participation in response to conflict. These are economic shocks that can increase child labor (Bundervoet et al. 2009; Jacoby and Skoufias 1997; Thomas et al. 2004; Duryea et al. 2007), worsen child health (Allison, Attisha, et al. 2019), child marriage (Mazurana et al. 2019; Mourtada et al. 2017; Walker 2013), and school supply (Akbulut-Yuksel 2014; Glewwe and Jacoby 1994; Jayachandran et al. 2002). There is weak to no evidence that any of these mechanisms offers a plausible explanation for the significant and large decreases in schooling.

This work contributes to the literature on rebel governance (March and Revkin 2015; Barter 2015a, 2015b; Arjona et al. 2015; Arjona 2014, 2017, 2016). Much of this growing literature focuses on the strategic value of occupying territory and governance for insurgents. Some, more closely related to this paper, focus on the response of civilians to occupation such as Rubin (2020), who focuses on how acts of rebels during occupation can affect civilians' support for the cause. This is related to the work of Kalyvas (2006), on selective and indiscriminate violence of rebels on the strategic decision-making of civilians. Other seminal work that considers civilians as agents in conflict and during rebel rule is Humphreys and Weinstein (2006) and Mampilly (2012, among others). However, to my knowledge, I provide some of the first empirical evidence of behavioral changes due to exposure to specific rebel-imposed rules, while controlling for and distinguishing this effect from exposure to violence. I present a novel way of approaching the topic and disentangle the effects of violence and conflict from governance and occupation, relying on a quasi-experimental setting to quantitatively estimate the effects.

More generally, by studying the relationship between insurgent governance, occupation, and education in a violence-based context, this study adds to the large literature that examines the effect of conflict on educational outcomes (see Justino 2011, for an overview), such as government expenditure (Lai and Thyne 2007), educational attainment (Swee 2015; Parlow 2011; Verwimp and Van Bavel 2014; Chamarbagwala and Morán 2011; Singh and Shemyakina 2016; Akresh and De Walque 2008) and school dropout rates, school attendance, and enrollment (Khan and Seltzer 2016; Shemyakina 2011; Valente 2014; Bertoni et al. 2019). It specifically relates to work studying exposure to Islamic insurgents and the effects on education, particularly work examining the effects of Boko Haram. Although related, these studies, such as Ajogbeje and Sylwester (2024), Peters (2014), Afzal (2020), and Bilyaminu et al. (2017), among others, focus on exposure to violence, not the occupation itself. An important and closely related example is the work of Bertoni et al. (2019), who study the effect of exposure to Boko Haram violence on school enrollment between 2009 and 2016. There are a few important differences between that work and this paper in terms of data and approach. However, the main point is that this paper does not consider violence by itself but the impact of occupation by insurgents, or rebel rule, on schooling (measured by multiple outcomes). In doing so, I show that although violence has an estimated effect that is very similar in size and sign as found by Bertoni et al. (2019), it is minor compared to the effect of occupation, further emphasizing the importance of considering occupation independently of violence.

Summarizing, this study demonstrates that school participation is severely affected by territorial control by an insurgent group, on top of the negative impact of conflict. Focusing on exposure to violence alone is not sufficient to properly examine these effects. The results show that the effects of occupation can be not just large, but can also persist after the government has regained control. Second, the effect of exposure to rebel governance varies across groups and over time, and cannot be explained by well-known mechanisms found in the literature.

The paper is structured as follows. Section 2 contains background information, providing a discussion of Boko Haram and its occupation of territory, along with evidence that the group actively forbade education and schooling in their proclaimed caliphate. The data, sample, treatment and control group are discussed in section 3. Section 4 describes the empirical approach and the identification strategy. Section 5 contains the results and section 7 concludes.

## 2 Background

Many organizations that self-identify as Islamic insurgent groups strongly oppose secular ("Western") education, despite the lack of religious justification for this anti-educational stance (VOA 2022). When such groups occupy territory, they often impose restrictions on education as part of their governance, frequently denying inhabitants access to schooling. Additionally, many of these groups target educational institutions, students, and teachers in violent attacks (GCPEA 2020b).<sup>3</sup>

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3. Examples include Ansarul Islam in Burkina Faso and Mali, Jama'at Nusrat ul-Islam wal-Muslimeen (JNIM) in Mali, Islamic State of Khorasan Province (ISKP) in Afghanistan, ISIL in Iraq, the Taliban and al-Qaeda in Pakistan, al-Shabaab in Somalia, and Boko Haram in the Lake Chad Basin region, particularly Nigeria.

Although their specific ideologies differ, these insurgent groups share several core ideological positions: the use of violence against those perceived as opposing Islamic principles, the belief in a duty to overthrow rulers who deviate from these principles, the goal of establishing an Islamic state, and the rejection of secular governance (Crisis group 2016). The rejection of secular education is a central component of the latter. The conquest of territory is a significant step towards their ultimate goal of establishing an Islamic state.

Boko Haram, one of the largest militant groups in Africa, shares these ideological positions. The group occupied territory in north-east Nigeria (see figure A.8) starting Spring 2014 until early 2015. The group imposed its rules upon the citizens living in the areas it controlled, and prohibited education. A detailed summary of Boko Haram’s background, ideology, and the sequence of events leading to its territorial control can be found in the appendix (see Section A.1).

Several factors make the Boko Haram insurgency a suitable context for studying the long-term effects of anti-educational rule during occupation on schooling behavior. First, while the insurgency affected much of the country, Boko Haram only occupied a limited number of areas. This distinction allows for a comparison between individuals exposed to insurgency-related violence and those who also experienced direct occupation, helping to isolate the specific impact of occupation from broader conflict-related violence. Second, the temporary nature of Boko Haram’s territorial control provides an opportunity to examine whether behavioral changes induced by its rule were fleeting or persisted over time. Third, substantial evidence confirms that Boko Haram imposed strict anti-educational policies in the areas it governed, making its rule comparable to that of other self-proclaimed Islamist insurgencies. However, unlike Boko Haram, many of these groups operate in contexts where systematic, individual-level data on educational outcomes and occupation effects are unavailable, making this case particularly valuable for empirical analysis.

## 2.1 Education in North East Nigeria

Under the Compulsory, Free Universal Basic Education Act of 2004, nine years of primary and junior secondary education are free and mandatory. However, Nigeria has the highest percentage of out-of-school children globally and the lowest educational outcomes in sub-Saharan Africa (Unicef 2015; Abdullahi and Abdullah 2014). The situation is particularly severe in the North East, a poorer and more rural region. Several factors contribute to the difficult relationship between the population of North East Nigeria and the education system. Afzal (2020) identifies four key reasons: First, the education system is seen as a post-colonial, Western imposition. Second, the system is blamed for poor educational outcomes, as the population had limited exposure to it during colonization, unlike the South. Third, the education system is criticized for its role in joblessness and low educational premiums. Finally, Western education is associated with corruption, as many state officials are Western-educated. This sentiment helped fuel Boko Haram’s anti-education platform.

### 3 Data and sample

I use data from five waves of the Nigerian General Household Survey (NGHS) and a longitudinal phone survey conducted during COVID (based on households from the NGHS) to create a panel data set at the individual school year level, spanning 2009-2024. Respondents are asked about school participation and years of education in both surveys across all waves and are often also asked about attendance in the previous year. The sample includes individuals born between 2001 and 2008 to ensure that they were of mandatory school-going age both before and in the first year after treatment, minimizing attrition from aging out of school. It is also restricted to rural households in LGAs covered in all survey waves and only includes individuals observed at least twice. In total, the data cover four school years before Boko Haram controlled the territory and six years after the occupation ended.

Data on Boko Haram territorial occupation come from IOM (2015), a United Nations related organization that coordinates, tracks and maps humanitarian efforts in conflict situations (discussed in more detail below), and are supplemented with information on strategic developments, such as the seizure of territory, from the Armed Conflict Location and Event Dataset (ACLED) (Raleigh et al. 2010).<sup>4</sup> While ACLED data have certain limitations, they remain the only available source for tracking strategic developments and serve as a crucial reference for verifying territorial occupation data from IOM (2015) as other sources do not include such events (Eck 2012). The ACLED data are also used to construct control variables that measure individual-level exposure to violent events involving Boko Haram. To account for the influence of past violence on current schooling decisions, all violence-related variables are lagged by one year, ensuring that the effects of violence during occupation are captured in the analysis. Since household locations in the NGHS data are anonymized at the village or community level, and given potential inaccuracies in the geographic precision of ACLED event locations (Eck 2012), I define exposure to violence as any event occurring within a 10-kilometer radius of a village. For robustness checks, I use the UCDP Georeferenced Event Dataset (Sundberg and Melander 2013) as an alternative source of violence data.

Finally, migration data are from the Famine Early Warning System (FEWS) and detail the (projected) changes in the population per LGA in northeast Nigeria in 2014 due to migration driven by violence and occupation. The data is based on reports from NGOs and humanitarian aid organizations that track the movements of refugees to and from certain areas, often refugee camps. The data describe which LGAs are projected to witness population increases (receive refugees) and which LGAs see decreases in population.<sup>5</sup> I use data from Archibong (2019) to create a measure of support for Boko Haram in each region, relying on the strong link between weak public goods

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4. ACLED collects data on violent events related to Boko Haram through media reports and a network of local journalists, informants, regional specialists, and NGO workers. Any attacks claimed or reported by Boko Haram are cross-referenced with these independent sources. Through this network, ACLED was able to gather information on events that occurred at the height of the conflict, including those within occupied territories.

5. Unfortunately, FEWS is funded by USAID and has been taken offline in January 2025. The data were available through this link: <https://fews.net/northeast-nigeria-maps-and-mapping-data>.

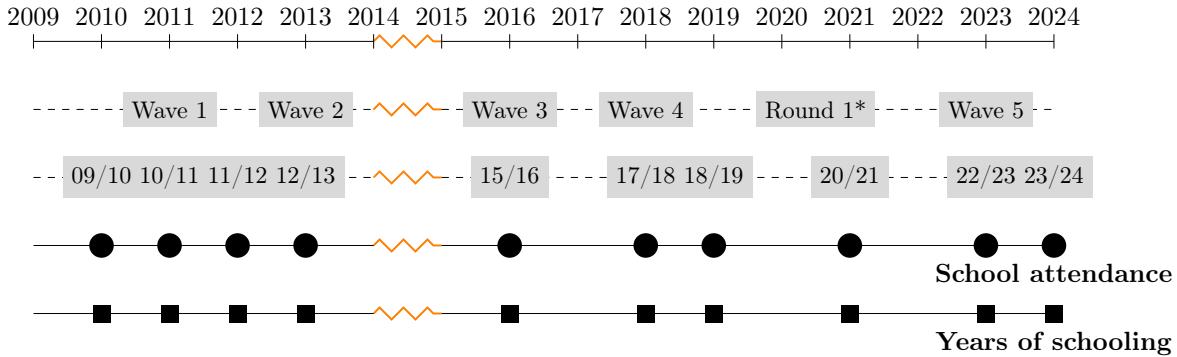
provision by the government and support for Boko Haram (Brechenmacher 2019).<sup>6</sup>

Table A.2 contains an overview of the data and variables.

### 3.1 Data structure and outcome variables

The two outcome variables in this study are school attendance and years of schooling (YoS). The first is a dummy that captures whether or not a child attends school in that school-year. The latter captures the total years of schooling as reported by the individual in each school-year. These variables tell us about the immediate and more long-term impact of the occupation on children's educational outcomes. As the survey was not conducted during Boko Haram's control, there is a gap of two full school-years between the last pre-treatment observation and the post-treatment observations (see figure 1). Hence school attendance measures participation for each school year after the occupation, showing the more immediate or short-term impact of insurgents' rule. Simultaneously, YoS allows us to examine to what extent children attended school in the two unobserved school years. Additionally, as it is a cumulative measure, the variable provides insight to potential long-term accumulated losses in schooling or whether children catch-up with schooling.

Figure 1: Data structure and outcome variables



*Notes:* The diagram explains the data structure. The timeline shows the period considered in this study; the occupation (treatment) took place between 2014 and 2015. Combined, the survey waves provide data on ten school-years. The gap in the data covers two school-years: 2013/2014 and 2014/2015. School attendance is measured for each year; the change in years of schooling is obtained by taking the difference between the current and previous total number of years of schooling. \*Round 1 refers to the Longitudinal phone survey conducted during COVID-19.

### 3.2 Treatment and control group

The treatment is defined as exposure to Boko Haram's temporary occupation between 2014 and 2015, meaning individuals who lived in an LGA that fell under Boko Haram's control during that

6. Archibong (2019) shows that areas that were traditionally ruled by a centralized authority and had a Muslim supermajority population experience lower levels of public good provision by the government.

period.<sup>7</sup>

Occupied areas are identified using two complementary data sources. First, ACLED data are used to determine where and when violent and non-violent territorial transfers to Boko Haram took place. Second, these data are cross-referenced with territorial control maps from IOM (2015), which depict areas fully or partially controlled by Boko Haram as of January 2015 (see Figure A.6). By combining both sources, potential measurement errors and discrepancies in reporting are accounted for.<sup>8</sup>

For the purposes of this analysis, an LGA is classified as occupied if it experienced a violent event in which Boko Haram gained control according to ACLED, and was simultaneously deemed inaccessible due to Boko Haram's presence or classified as under Boko Haram control by IOM.

This study aims to isolate and estimate the effect of an insurgent group's territorial control and anti-educational governance on school participation. Proper identification of this effect requires the selection of an appropriate control group. First, only individuals residing in LGAs where Boko Haram never gained territorial control (as recorded by ACLED) and which IOM (2015) identified as either 'fully accessible' or 'under government control' are eligible for inclusion in the control group.

Furthermore, anticipating the potential occupation by Boko Haram could influence behavior and decision-making. To account for this, the control group must consist of individuals who lived close enough to the occupied areas to have plausibly perceived a similar threat, yet were never actually occupied. Therefore, the control group is restricted to individuals residing in LGAs that directly border Boko Haram-occupied areas (see Figure A.5).<sup>9</sup>

**Descriptive statistics** There are 316 treated and 1558 control observations, resulting in a final sample of 1874. As shown in Table A.3, there are some differences with respect to exposure to any violent event within 10km. radius of the household (when relying on measures from ACLED) and the size of the household. The difference is likely due to UCDP only capturing violent events with fatalities, whereas ACLED measure includes non-fatal events. This will be addressed by including measures from both data sources in the analysis and robustness tests. Finally, any (unobserved) differences will be addressed in the estimation by including controls and individual-level fixed effects.

Given the nature of treatment, it is crucial that not only individuals, but also communities and areas in which individuals in the treatment and control group live, are comparable. Table A.4 shows

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7. As noted in Section A.1, Boko Haram's occupation was relatively short-lived, beginning in May 2014 and lasting until spring 2015. As shown in Figure A.7, government forces moved in quickly, reclaiming nearly all occupied areas shortly thereafter. This figure, based on ACLED event data, tracks both violent and non-violent territorial recaptures by government forces. However, as with data on Boko Haram's territorial occupation, military reports were not always independently verifiable, with some information filtered through media sources. Nonetheless, since the survey used in this study resumed in September–November 2015, it is reasonable to assume that the areas were no longer under Boko Haram control.
  8. For instance, two LGAs (Askira/Uba and Geidam) were not recorded in ACLED as having experienced events in which Boko Haram seized control. However, IOM classified them as fully under Boko Haram control. Further investigation revealed that multiple news sources explicitly reported these LGAs as occupied (BBC 2015; France24 2014; Al Jazeera 2014; Anadolu Agency 2015). Therefore, they are considered occupied in this study.
  9. For robustness, I extend the control group in additional tests to include the entire North East region. Additionally, I employ propensity score matching (PSM) as a more data-driven approach to ensure a balanced panel. The analysis and results of this approach are presented in the appendix.

the descriptive statistics for the communities in which respondents from the treatment and control group live. Interestingly, most communities in the treatment group appear to be more likely to have primary and secondary schools, as well as other infrastructure such as health centers, post offices, markets, etc. Most importantly, there is no significant difference between the level of support for Boko Haram in the bordering LGAs: this would have been a likely explanation for certain areas being occupied and/or preexisting attitudes toward education. Any potential time-invariant differences will be captured by including individual-level fixed effects in the analysis.

## 4 Empirical approach

### 4.1 Difference-in-difference estimation

The objective of this study is to estimate and explain the effect of exposure to Boko Haram's temporary occupation on the years of schooling and school attendance of children. The following model is estimated:

$$Y_{i,t,j} = \alpha_i + \lambda_t + \beta_{i,j,t}(D_t * T_{i,j}) + \sigma_{i,j,t}X_{i,j,t} + \epsilon_{i,j,t} \quad (1)$$

Where  $Y_{i,t}$  is either a continuous variable that captures the years of schooling of individual  $i$ , living in LGA  $j$ , in year  $t$  or a binary variable that captures school attendance.<sup>10</sup>  $D_t$  is a dummy variable that is equal to one for 2014 onward.  $T_{i,j}$  is the treatment variable, which is equal to one for individuals living in one of the LGAs that were occupied by Boko Haram.  $\alpha_i$  captures the individual fixed effects,  $\lambda_t$  the school-year fixed effects, and  $\epsilon_{i,t}$  is the error term. The school-year and individual-level fixed effects capture remaining unobserved structural differences between occupied and non-occupied communities and village-level characteristics.

$X_{i,t}$  is a vector of control variables. Controls included are dummies for whether the father of the child works in agriculture, gender, the child is of school age (5–15 y/o) and the household head is Muslim; the household size, exposure to violence and individuals' age. The measures for exposure to violence and conflict risk follow the literature and are constructed based on the number of events within a radius of the cluster of households (village) (Bertoni et al. 2019; Tapsoba 2022; Bertinelli et al. 2024). I lag the measures by one year.

There is likely a spatial correlation in the data, specifically with respect to conflict (risk). In order to address potential dependency between observations due to geographical proximity, Conley (1999, 2008) heteroskedasticity and autocorrelation consistent clustered standard errors are used, accounting for spatial correlation within a 20km radius of each village and across 3 school years.

**Heterogeneity** Though differential effects of civil war and conflict with respect to gender are highly context-specific (Buvinić et al. 2014), it is known that Islamic insurgent groups often strongly

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10. The first captures the annual change in total YoS, and is therefore one if a child attended school throughout the school-year, but equal to a maximum of two years during the treatment period due to the gap between the moments the survey was conducted. The latter variable is based on the answers respondents gave to the "Are you currently attending school?" or "Did you attend school in the previous school-year?" survey questions.

oppose girls' education. This dimension to the anti-educational rule will be examined by estimating the potential heterogeneity of the effect by gender. Moreover, it is reasonable to assume that children from Muslim households might have responded differently to Boko Haram than children from non-Muslim households. Though the data on religion is sparse (in certain waves it is not asked) after 2017 and the observations are limited, the heterogeneity of the effect by religion will be considered.

**Mechanisms** Two categories of mechanisms are examined. The first group of mechanisms focuses on factors that can have shifted the demand for schooling, such as child labor (whether a child works for a household farm, household business, or did other paid work), child health (whether a child got sick, visited a doctor or other healthcare professional), child marriage, and decreasing labor market prospects or potential future returns to education. Second, the supply of schooling is examined, such as the presence of primary and secondary schools, and whether children indicate they do not attend school due to a lack of teachers.

## 4.2 Identification

I addressed potential threats to the exogeneity of treatment, including local support for Boko Haram, variations in infrastructure and development at the LGA or village level. In addition, I elaborated on the selection and comparability of the control group and explained how the empirical strategy mitigates potential unobserved confounders. What remains is to address the standard assumptions underlying the difference-in-differences estimation. First, it is crucial that the treatment and control groups do not exhibit significant differences in the pretreatment trends of the outcome variables. These trends are illustrated in Figure 2. The data indicate that there are no significant differences between the groups before treatment for either variable, although there is a slight anticipatory effect in attendance.

Second, there is the issue of potential attrition and migration. Notably, due to safety concerns, 14 LGAs in Borno and Yobe were excluded from the survey sample starting in 2013, and several households were not visited. These households were removed from the sample by design and included both occupied and non-occupied LGAs. According to NGHS documentation, the exclusion of these LGAs accounts for nearly all non-interviewed households in the North East during that survey wave.<sup>11</sup> Most likely due to these changes in survey design, I do not find evidence of attrition in the treatment group. While this may seem unexpected given the circumstances, several factors

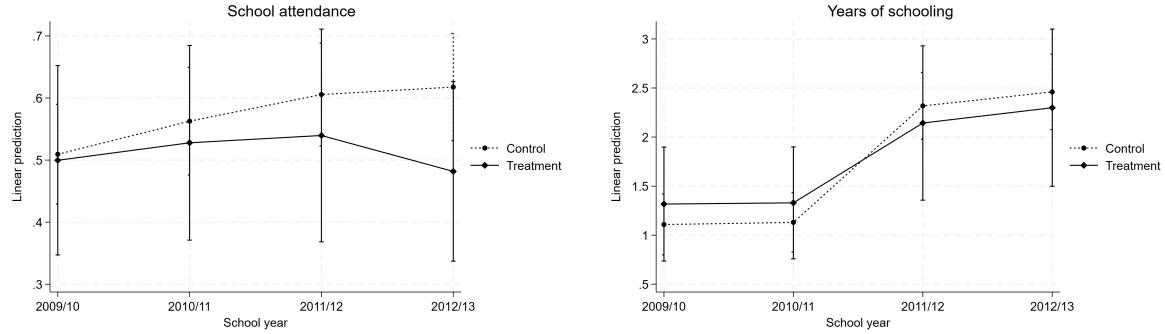
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11. In order to understand how people might have moved around in the areas due to violence or the occupation, I consider data from FEWS. This data details the changes in the population in LGAs in northeast Nigeria in 2014 due to migration driven by the violence of the insurgency. On average the occupied LGAs witnessed a decrease of approximately 16 percent, and the non-occupied LGAs examined in this study an increase of about 28 percent. However, both groups of LGAs experienced in- or decreases in the population (for example, one occupied LGA saw a 21% increase in population). To be precise, both Geidam and Monguno, two LGAs that were considered to be under Boko Haram's control, witnessed an increase in the population. About half of the treatment group lives in these two LGAs. It is likely that the fact that these two, though occupied by Boko Haram, were slightly safer or more stable (supported by the treatment group being exposed to less violence than the control group, see Table A.3) than the other LGAs and therefore those living in these areas might not have moved. Table ?? shows the correlations between the intensity of violent events (number of events per 1000 inhabitants of a population) and the projected percentage change in population due to migration.

could explain this beyond survey modifications. As discussed in Section A.1, Boko Haram actively prevented residents from leaving occupied villages, patrolling roads to restrict civilian movement. Furthermore, the attrition rate in the treatment group is consistent with the findings of Schon (2016), which suggest that the risk of violence along migration routes serves as a deterrent to displacement. This is further supported by anecdotal evidence from Unicef (2015) regarding Boko Haram's occupation, where individuals reported that fleeing to refugee camps was not a viable alternative. Many also indicated that escaping was either too dangerous or infeasible due to a lack of alternative housing options, such as family members with whom they could stay.

In contrast, the control group has an attrition rate of approximately 1 percent. Given that people in these areas faced fewer barriers to relocation, these rates seem to be consistent with the above arguments.

Figure 2: Pre-event study: change in YoS and school attendance



*Note:* The graph shows the conditional differences between school attendance and years of schooling for the treatment and control group for the pre-treatment school years. The confidence intervals are 95%.

## 5 Results

The first three columns of table 1 shows the results of the estimation of the effect of occupation on the years of schooling of a child. The result can be interpreted as the average loss in the years of schooling of a child exposed to the occupation in the years following, compared to children not exposed to the occupation. I find that, on average, children exposed to the occupation have about 1.22 years less of education than children not exposed to the occupation. Interestingly, considering column (2), it seems that especially males have suffered losses in education during the occupation. It is worth noting that on average an adult in the area has around 4.5 years of schooling. This implies that the setback of little more than a year corresponds to about 27 percent of the total average schooling in the area.

Do children return to school and potentially catch up with these losses? Considering school attendance, I only find a negative (significant) effect for girls. This group is 36 percent less likely to attend school than their male counterparts. This corresponds to more than a 50 percent deviation of the mean.

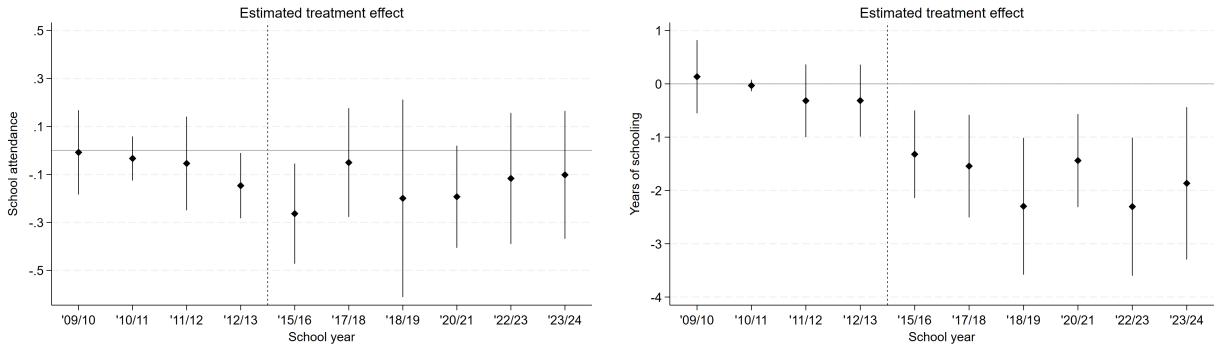
Table 1: The effect of insurgent rule on education

	(1)	(2)	(3)	(4)	(5)	(6)
	Years of educ.	Years of educ.	Years of educ.	Attendance	Attendance	Attendance
Occupation	-1.2223*** (0.3449)	-1.5909*** (0.3486)	-0.9306* (0.3766)	-0.1494 (0.0778)	-0.0029 (0.0579)	-0.0237 (0.0581)
Occupation*Female		0.5217* (0.2641)			-0.3552** (0.1265)	
Occupation*Muslim				-0.5438 (0.4899)		-0.2185 (0.1271)
Boko Haram violence	-0.0027 (0.0045)	-0.0027 (0.0044)	-0.0025 (0.0045)	-0.0018 (0.0012)	-0.0018 (0.0012)	-0.0018 (0.0012)
Mean $Y$	3.3385	3.3385	3.3385	0.6083	0.6083	0.6083
Observations	1805	1708	1805	1675	1604	1675
$R^2$	0.047	0.056	0.048	0.033	0.046	0.037

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ . Conley (1999, 2008) spatially adjusted standard errors in parentheses: distance cutoff of 20 kilometers and a time-lag of three school-years. All estimations include individual and year fixed effects. Controls included are the number of Boko Haram related violent events within a 10km radius of the village in the school-year prior; household size; whether it is an agricultural household; whether the child is female or Muslim; whether the child is of school-going age; a dummy that captures whether the state of emergency was declared prior to the occupation.

Given the situation, it is important to consider how the effect changes over time. Considering Figure 3, we see that in the case of attendance there is a significant drop immediately after occupation, after which attendance seems to rebound. However, this initial drop in attendance does appear to have resulted in a longer-term setback in terms of the total years of schooling of children, as shown in the year-on-year, significant, lower number of years of schooling. For completion, the trends of the two outcome variables for both the treatment and control group are shown in Figure A.11. It should be noted that we do not see any prominent effects of the COVID pandemic on school attendance.

Figure 3: Estimated coefficients per school year



Note: The estimated treatment effects as reported in Table 1 for school attendance (left panel) and years of schooling (right panel), by school year. 95% confidence intervals shown.

The goal of this study is to disentangle the effect of insurgents' occupation from exposure to violence, and estimate the latter. The difference between the effect of violence and occupation

becomes very clear when considering the size of the coefficients in the last row of Table 1. These coefficients show the effect of exposure to violent events that involved Boko Haram within a 10-kilometer radius of the village. These findings are relatively similar in size to those of Bertoni et al. (2019) who studied the effects of exposure to Boko Haram violence (albeit in a 5km radius of the village) on school enrollment using similar data: Bertoni et al. (2019) report coefficients of -0.002 when considering any violent event and an effect of -0.0009 when considering the number of fatalities in the vicinity of the village.<sup>12</sup> Interestingly, the researchers do not find a heterogeneous effect for girls, suggesting that exposure to Boko Haram's rule, not just violence, might have had a significantly different impact. It is remarkable how large the effect of occupation is compared to solely exposure to violence: this further emphasizes the importance of considering occupation, and not solely violence, when examining the effects of civil war and insurgency.

## 6 Mechanisms

I consider a variety of mechanisms to explain the effects, specifically with respect to the lower school attendance rates for girls.

The main finding is that parental disinterest in schooling has significantly increased due to the occupation (Table A.7). In general, children are 14 percent more likely to report this as the main reason for not attending school. However, this is driven by girls, who are 17 percent more likely than boys to stay out of school as their parents deem it unnecessary. This finding allows us to explain the main result above with respect to girls' school attendance after the occupation has ended.

I examine whether the increased disinterest can be due to the lowering education premiums experienced by parents or adults in households.<sup>13</sup> Education is an investment that is more likely to be made if there is an expected probability of future returns. Conflict could negatively affect these expectations, leading to deterioration in school outcomes (Shemyakina 2011; Chamarbagwala and Morán 2011). First, employment rates are on average higher in the occupied regions than in the other regions, but this does not seem to be heterogeneous across genders. Moreover, those with at least primary school education are more likely to be employed than those without.<sup>14</sup> Considering that the baseline effects were strongly heterogeneous by gender, it is interesting to find that women with primary school education have a 12 percent higher chance to be employed than men with a similar education.

Finally, I examine whether physical destruction of infrastructure, such as the destruction of school buildings, which has been shown to lead to lower educational results (Akbulut-Yuksel 2014) drives the effects. I consider three different outcomes (Table A.9). First, whether children who do not attend school indicate that this is due to the absence of schools or teachers present in the area. Second and third, whether it is reported through the community survey that there is a primary

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12. See table four, five and six on the pages 9-11 in Bertoni et al. (2019), respectively.

13. The sample is adjusted to only include individuals that were older than mandatory school going age at the start of the occupation, i.e., were born before 1998.

14. I refer to this as education premiums: the increased likelihood of employment due to education. Unfortunately, data on wages is too sparse to use instead.

or secondary school in the community. Although all coefficients are negative, they are very small, imprecisely estimated, and not significant, leading to the assumption that the presence (or rather lack) of schools and teachers is not driving the lower attendance rates. Moreover, I do not find effects suggesting that children are in worse health, have higher rates of child marriage, indicate that they have aged out of school, or are busy with household or childcare duties. There is evidence suggesting that children living in occupied areas are slightly less likely to have worked for a household business (Table A.5).

## 7 Concluding remarks

Although the effect of conflict on civilian behavior has been studied extensively, existing work does not empirically distinguish between exposure to violence and occupation by insurgents. This study addressed this matter. Given that one-fourth to one-third of all insurgents occupy territory at some point (Wood 2008; Arjona 2016; Stewart 2018; Rubin 2020) and the rise of self-representing Islamic militias with anti-educational stances, it is important to examine educational outcomes of children in households confronted with rebel rule. I disentangled the effect of violence and territorial occupation, and estimated the effect of the latter on schooling outcomes.

This paper relied on evidence from the case of Boko Haram, an insurgent group with strong anti-educational stance, that temporarily occupied various areas in North East Nigeria between 2014 and 2015. The individual-level panel data allowed to evaluate both the short and long-term impact of exposure to insurgents' occupation on behavior. With respect to the first, the results indicated that the occupation of Boko Haram lead to decreasing school participation for children of mandatory school-going age relative to those who were not exposed to the group's rule. The results show that especially girls are less likely to attend school directly after the occupation, but return to school later. To be precise, this initial setback results in long-term loss of education of over a year, that children do not seem to catch up on. Importantly, well-documented mechanisms through which conflict and violence affect education (such as child labor, health, marriage, etc.) did not seem to explain the negative impact on education. There is evidence that shows that parents or adults of the households surveyed are especially disinterested in girls' education, and this is given as a reason for not attending school. There seems to be an education premium for women in the labor market. I contrast these findings with earlier work examining the impact of exposure to violence in a similar setting, and show that the impact of occupation is significantly larger, and differs in terms of heterogeneity.

Summarizing, this study demonstrates that educational outcomes are severely affected by occupation of an insurgent group. By comparing these findings with prior research on the impact of violence, this study demonstrates that territorial control can strongly influence civilian behavior, amplifying its effects beyond those of violence alone.

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## A Appendix

### A.1 Background of Boko Haram

Boko Haram is one of the largest militant groups in Africa, primarily active around the Lake Chad basin in North East Nigeria (CFR 2022). The reader is referred to Iyekpolo (2016) for an excellent review of the background and ideology of Boko Haram. Summarizing, "the Boko Haram sect has advanced the message of reform and purification of the Nigerian political system against Western values and culture, which it argues are the cause of corruption and economic hardship" (p.2213) and that Muhammed Yusuf, one of the leaders of Boko Haram in the time period considered in this study, "advocated a withdrawal from the secular system of the Nigerian state and showed discontent with Western education. He believed that the Nigerian system represented the Western education model (boko) which must be discontinued, as it was forbidden for Muslims, hence the nickname given to his movement -Boko Haram." (p. 2218) (Iyekpolo 2016).

The insurgency began in 2009, escalating significantly in the following years. By the Spring of 2014, Boko Haram controlled several local government areas (LGAs) and declared a caliphate in August 2014.<sup>15</sup>

According to interviews conducted by Amnesty International (2015) with former inhabitants of the caliphate, the group enforced rules aligned with its strong anti-democracy and anti- (Western) education sentiment. Along with the group's rejection of all secular aspects of Nigerian society, its most prominent stance was its strict anti-education position, with the prohibition of schooling being central to its governance (Center for International Security and Cooperation 2018; Omenma et al. 2020; Anugwom 2018; Thurston 2016; CFR 2018). However, the territory under the control of Boko Haram was vast, which complicated controlling all civilians living on its territory at all times. This created some discrepancies between the rules and the strictness with which these rules were enforced. For example, in various villages, Boko Haram imprisoned people or placed them under constant guard; in others, civilians were allowed to move freely, but fighters patrolled the streets and areas between villages to ensure no one escaped the territory of Boko Haram (Amnesty International 2015). For our study, this implies that although schooling was forbidden, there may have been cases where children received some education.

In January 2015, an African task force started a counter-insurgency that led to the capture of Gwoza, the group's headquarters, in March 2015, marking the end of Boko Haram's territorial control in the region<sup>16</sup> After the expulsion of Boko Haram, violence in the north east decreased, although the group still carried out attacks (CFR 2018). The region also faced long-term consequences, including extensive damage to infrastructure and trade restrictions aimed at denying supplies to the group, which exacerbated food insecurity (Crisis group 2017). These challenges

15. Boko Haram continued to expand its territory into early 2015. Figure ?? shows the progression of Boko Haram's occupation, based on data from ACLED. The group's spread was largely restricted to more peripheral regions of Borno, avoiding the central areas, likely due to the presence of government forces stationed in Maiduguri (the capital) and nearby areas in September 2014 (see OCHA).

16. See figure A.7.

were particularly severe in Borno, Adamawa, and Yobe. Once the government regained control, humanitarian organizations were able to provide aid, including education, food, and health services. In particular, in all previously occupied states in the sample of the study, NGOs were present to deliver emergency learning and strengthen educational systems (Reliefweb 2017).

## A.2 Robustness

### A.2.1 UCDP Georeferenced Event Dataset

The analysis is re-run using violence data from the UCDP Georeferenced Event Dataset (UCDP GED) on violent events. Similar to ACLED, the data contains information on violent events, actors involved, number of fatalities, and location of the event. One important difference is that whereas, when relying on ACLED, events can be violent but non-fatal, all events included in the UCDP caused at least one death. I create measures of the number of violent events involving Boko Haram within a 10kkm radius of the household using the UCDP GED, identical to done earlier with data from ACLED. The results of the baseline analysis are in Table A.10, and are robust to the inclusion of alternative data on violence.

### A.2.2 Duration of occupation

The treatment variable is adjusted to capture the duration of the occupation in the various states: half a year, three quarters and a full year (due to the nature of the treatment, these are approximations based on reports of the IOM (2015) and ACLED data). The results are shown in Table A.11. These suggest that the longer the duration, the larger the losses in years of schooling and lower the rates of attendance, which would be in line with expectations.

### A.2.3 Sample selection

The control units are selected through propensity score matching, including only observations with a match in the final sample. Using propensity score matching reduces the dependence on the specification of the outcome model, as it is done without using the outcome variable, reducing bias and leading to more robust inferences (Ho et al. 2007; Rosenbaum et al. 2010; Rubin 2007). This is especially relevant when using propensity score matching with difference-in-differences estimation, as is the case in this study. The interested reader should refer to Stuart et al. (2014), for an excellent discussion. I match the two nearest neighbors without replacement. I match on the control variables used in the analysis – household size, whether the household is Muslim, gender, whether the household is an agricultural household, age, exposure to violence.

In general, the signs and sizes of the effects are relatively similar. Interestingly, it does not seem to be the case that boys have significantly fewer years of schooling than children in the control group. I find that women and children from Muslim households are even less likely to attend school in the years after the occupation than the baseline estimation suggested. Hence, the baseline results might be biased downward due to the selected sample, and the schooling situation might be worse than

initially assumed. However, when I relax the inclusion restriction with respect to the border states and include all children living in the north-east region (Table A.13), the estimates seem somewhat smaller and closer to the baseline estimates as in Table 1.

### A.3 Tables

Table A.2: Descriptive statistics

	Mean	SD	Min.	Max.	N	Source
<i>Individual level</i>						
Age	10.08	4.84	2	23	1874	NGHS
School-going age	0.59	0.49	0	1	1874	NGHS
Female	0.42	0.49	0	1	1773	NGHS
Muslim household	0.70	0.46	0	1	1874	NGHS
Household size	10.16	4.63	3	28	1874	NGHS
Agricultural household	0.25	0.43	0	1	1874	NGHS
Attendance	0.61	0.49	0	1	1718	NGHS
Years of educ.	3.34	3.49	0	18	1855	NGHS
Household business	0.02	0.13	0	1	1626	NGHS
Household farm	0.15	0.35	0	1	1626	NGHS
Wagework	0.01	0.08	0	1	1626	NGHS
Ill/Injured	0.08	0.28	0	1	789	NGHS
Doctor/Healthcare	0.09	0.28	0	1	800	NGHS
Marriage	0.01	0.07	0	1	1334	NGHS
Household/childcare	0.02	0.13	0	1	1874	NGHS
Parents not interested	0.11	0.31	0	1	1859	NGHS
Too old for school	0.01	0.09	0	1	1874	NGHS
No schools/teachers	0.02	0.13	0	1	1859	NGHS
<i>Village level</i>						
Primary school	0.96	0.19	0	1	1332	NGHS
Secondary school	0.91	0.29	0	1	1332	NGHS
Boko Haram viol., 5km	1.51	7.61	0	76	1824	ACLED
Boko Haram viol., 10km	7.08	18.84	0	78	1824	ACLED
Boko Haram fat., 5km	8.56	37.41	0	280	1824	ACLED
Boko Haram fat., 10km	30.41	71.44	0	286	1824	ACLED
Boko Haram viol., 5km	0.43	2.11	0	24	1874	UCDP
Boko Haram viol., 5km	1.99	11.97	0	153	1874	UCDP
Boko Haram fat., 5km	5.11	27.09	0	254	1874	UCDP
Boko Haram fat., 10km	13.57	55.23	0	555	1874	UCDP
<i>LGA level</i>						
Population	205144.68	140388.51	60834	540016	1633	Nat. Bur. of Statistics
Projected Pop.	119.56	45.69	53	240	1067	FEWS
Boko Haram support	0.51	0.46	0	1	998	Archibong(2019)

Table A.3: Control and treatment group, pre-treatment

	(1)				
	Control	Treatment	Difference	t-statistic	N
Agricultural household	0.257	0.315	-0.058	-1.65	1038
Household size	9.553	7.574	1.979***	6.59	1038
Female	0.441	0.452	-0.010	-0.26	981
Age	6.809	6.213	0.595**	3.03	1038
School-going age	0.801	0.741	0.060	1.87	1038
Muslim household	0.728	0.706	0.022	0.62	1038
Boko Haram events (ACLED)	13.129	0.305	12.825***	6.98	1024
Boko Haram events (UCDP)	3.517	1.614	1.903	1.51	1038

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

Table A.4: Control and treatment group, pre-treatment

	Control	Treatment	Difference	t-statistic	N
Primary school	0.935	1.000	-0.065**	-3.17	116
Secondary school	0.842	0.941	-0.099**	-2.68	116
Muslim	0.713	0.690	0.023	0.23	116
Bus stop	0.521	0.741	-0.220*	-2.00	100
Post office	0.179	0.426	-0.247**	-2.90	108
Market	0.586	0.885	-0.299**	-3.28	110
Hospital	0.361	0.556	-0.194*	-2.00	108
Health center	0.641	1.000	-0.359***	-4.88	110
Population density	616.495	76.994	539.501*	2.17	116
Support Boko Haram	0.492	0.609	-0.117	-1.04	85

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

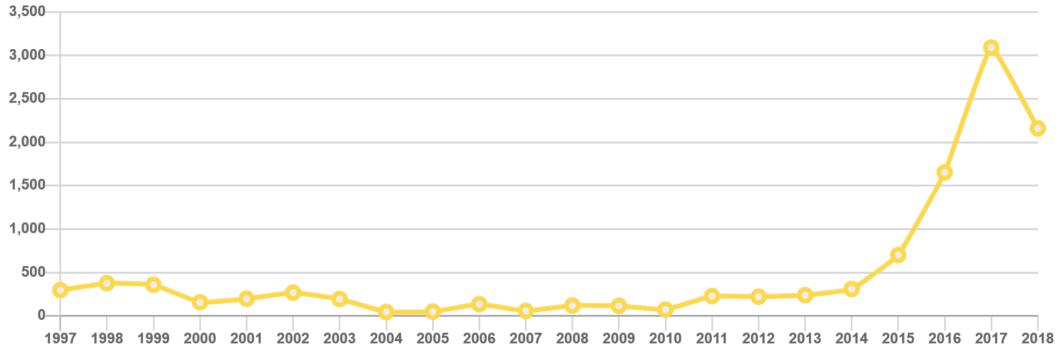
Table A.5: Mechanisms: child labor

	(1) HH business	(2) HH business	(3) HH business	(4) Farm	(5) Farm	(6) Farm	(7) External	(8) External	(9) External
Occupation	-0.0095 (0.0248)	-0.0237 (0.0277)	-0.0404* (0.0181)	-0.0143 (0.0906)	-0.0003 (0.1146)	-0.1355 (0.0899)	-0.0027 (0.0066)	-0.0038 (0.0074)	-0.0105 (0.0098)
Occupation*Female		0.0287 (0.0221)			-0.0568 (0.0891)			0.0020 (0.0021)	
Occupation*Muslim				0.0547 (0.0378)			0.2147 (0.1438)		0.0140 (0.0091)
Boko Haram violence	-0.0000 (0.0004)	-0.0000 (0.0004)	-0.0000 (0.0004)	0.0010 (0.0011)	0.0012 (0.0011)	0.0009 (0.0011)	-0.0002 (0.0002)	-0.0002 (0.0002)	-0.0002 (0.0002)
Mean $Y$	0.0166	0.0166	0.0166	0.1458	0.1458	0.1458	0.0068	0.0068	0.0068
Observations	1592	1520	1592	1592	1520	1592	1592	1520	1592
$R^2$	0.002	0.003	0.004	0.004	0.005	0.008	0.002	0.002	0.002

\*\*\* $p < 0.01$ , \*\* $p < 0.05$ , \* $p < 0.1$ . Conley (1999, 2008) spatially adjusted standard errors in parentheses: distance cutoff of 20 kilometers and a time-lag of three school-years. All estimations include individual and year fixed effects. Controls included are the number of Boko Haram related violent events within a 10km radius of the village in the school-year prior; household size; whether it is an agricultural household; whether the child is female or Muslim; whether the child is of school-going age; a dummy that captures whether the state of emergency was declared prior to the occupation.

## A.4 Figures

Figure A.4: Number of conflict events where territory is captured



Notes: The graph shows the total number of conflict events, per year, where territory was captured by non-state actors. Source: ACLED.

Table A.6: Mechanisms: health and marriage

	(1) Ill	(2) Ill	(3) Ill	(4) Doctor	(5) Doctor	(6) Doctor	(7) Marriage	(8) Marriage	(9) Marriage
Occupation	0.0050 (0.0380)	0.0114 (0.0490)	-0.0701 (0.0836)	0.0113 (0.0353)	0.0308 (0.0409)	-0.0533 (0.0758)	-0.0040 (0.0083)	0.0089 (0.0047)	0.0078 (0.0042)
Occupation*Female		0.0088 (0.0387)			-0.0210 (0.0284)			-0.0277 (0.0175)	
Occupation*Muslim			0.0999 (0.0826)			0.0869 (0.0737)			-0.0159* (0.0081)
Boko Haram violence	-0.0005 (0.0005)	-0.0006 (0.0005)	-0.0005 (0.0005)	-0.0000 (0.0005)	-0.0000 (0.0005)	-0.0000 (0.0005)	-0.0007* (0.0003)	-0.0007* (0.0003)	-0.0007* (0.0003)
Mean Y	0.0837	0.0837	0.0837	0.0850	0.0850	0.0850	0.0052	0.0052	0.0052
Observations	777	736	777	788	747	788	1315	1244	1315
R <sup>2</sup>	0.006	0.007	0.008	0.008	0.008	0.010	0.018	0.020	0.018

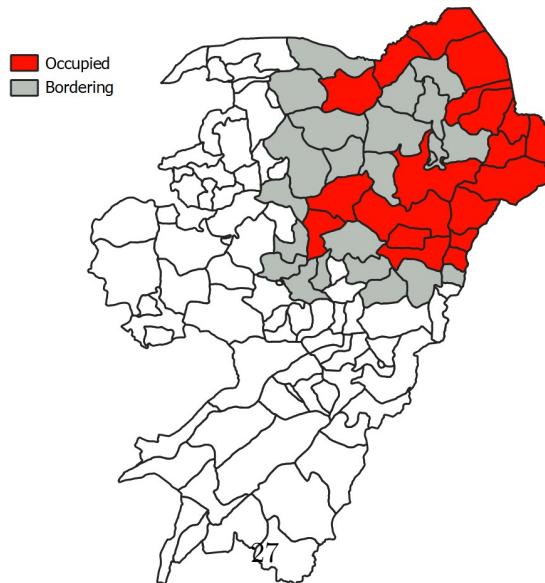
\*\*\* $p < 0.01$ , \*\* $p < 0.05$ , \* $p < 0.1$ . Conley (1999, 2008) spatially adjusted standard errors in parentheses: distance cutoff of 20 kilometers and a time-lag of three school-years. All estimations include individual and year fixed effects. Controls included are the number of Boko Haram related violent events within a 10km radius of the village in the school-year prior; household size; whether it is an agricultural household; whether the child is female or Muslim; whether the child is of school-going age; a dummy that captures whether the state of emergency was declared prior to the occupation.

Table A.7: Mechanisms: household or childcare, parental disinterest, age

	(1) Household/childcare	(2) Household/childcare	(3) Household/childcare	(4) Parents	(5) Parents	(6) Parents	(7) Too old for school	(8) Too old for school	(9) Too old for school
Occupation	-0.0134 (0.0186)	-0.0118 (0.0197)	0.0030 (0.0208)	0.1362** (0.0495)	0.0539 (0.0446)	0.1115** (0.0372)	-0.0042 (0.0136)	-0.0027 (0.0180)	0.0104 (0.0125)
Occupation*Female		-0.0055 (0.0148)			0.1684* (0.0696)			-0.0080 (0.0100)	
Occupation*Muslim			-0.0305 (0.0290)			0.0450 (0.0830)			-0.0271 (0.0232)
Boko Haram violence	-0.0000 (0.0005)	-0.0001 (0.0005)	-0.0000 (0.0005)	0.0011 (0.0010)	0.0010 (0.0009)	0.0011 (0.0010)	-0.0002 (0.0001)	-0.0002 (0.0001)	-0.0002 (0.0001)
Mean Y	0.0176	0.0176	0.0176	0.1054	0.1054	0.1054	0.0091	0.0091	0.0091
Observations	1824	1723	1824	1809	1708	1809	1824	1723	1824
R <sup>2</sup>	0.004	0.005	0.005	0.013	0.016	0.013	0.007	0.006	0.008

\*\*\* $p < 0.01$ , \*\* $p < 0.05$ , \* $p < 0.1$ . Conley (1999, 2008) spatially adjusted standard errors in parentheses: distance cutoff of 20 kilometers and a time-lag of three school-years. All estimations include individual and year fixed effects. Controls included are the number of Boko Haram related violent events within a 10km radius of the village in the school-year prior; household size; whether it is an agricultural household; whether the child is female or Muslim; whether the child is of school-going age; a dummy that captures whether the state of emergency was declared prior to the occupation.

Figure A.5: Occupied and bordering LGAs



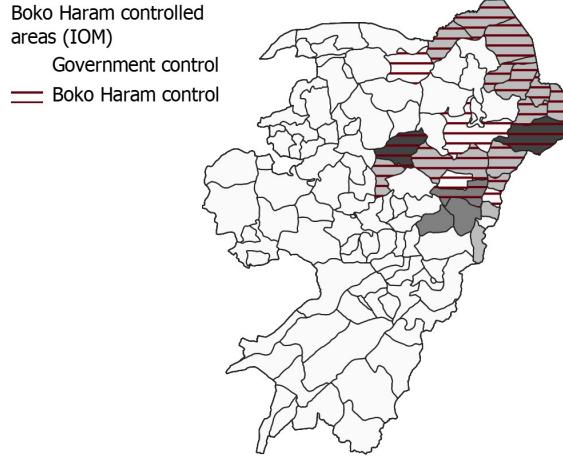
Notes: the map shows the bordering areas (light grey) and the occupied areas (red). Source: IOM and ACLED.

Table A.8: Mechanisms: education premiums

	(1)	(2)	(3)	(4)	(5)	(6)
	Employed	Employed	Employed	Educ. premium	Educ. premium	Educ. premium
Occupation	0.1619*	0.0593	0.2099*	0.2298***	0.1551*	0.2601***
	(0.0727)	(0.1089)	(0.1023)	(0.0519)	(0.0687)	(0.0510)
Occupation*Female		0.1990			0.1218*	
		(0.1093)			(0.0527)	
Occupation*Muslim			-0.0756			-0.0476
			(0.1190)			(0.0541)
Boko Haram violence	-0.0010	-0.0009	-0.0010	-0.0024*	-0.0022*	-0.0024*
	(0.0018)	(0.0017)	(0.0018)	(0.0009)	(0.0009)	(0.0009)
Mean $Y$	0.5578	0.5578	0.5578	0.3737	0.3737	0.3737
Observations	2214	1962	2214	2214	1962	2214
$R^2$	0.036	0.040	0.036	0.027	0.024	0.027

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ . Conley (1999, 2008) spatially adjusted standard errors in parentheses: distance cutoff of 20 kilometers and a time-lag of three school-years. Sample only includes respondents born before 1998 from households of which children from the original sample. Sample in column 4-6 is restricted to adults who indicate to be employed. All estimations include individual and year fixed effects. Controls included are the number of Boko Haram related violent events within a 10km radius of the village in the school-year prior; household size; whether it is an agricultural household; whether the respondent is female; whether respondent is Muslim; a dummy that captures whether the state of emergency was declared prior to the occupation.

Figure A.6: Occupation of territory by Boko Haram: ACLED and IOM (2015)



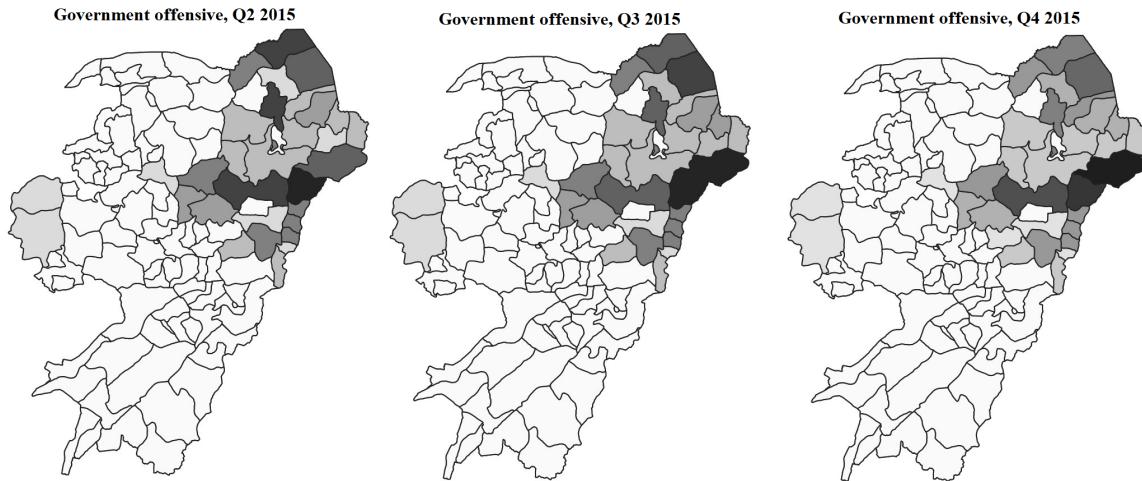
Notes: Maps shows the occupation of territory by Boko Haram in Q1 of 2015, the height of the occupation, as well as the areas that were occupied by the group according to the IOM (striped red). The darker, the more events took place where Boko Haram gained control over territory as recorded by ACLED by quarter/year. Source: ACLED.

Table A.9: Mechanisms: schools and teachers

	(1) No schools/teachers	(2) Primary school	(3) Secondary school
Occupation	-0.0595 (0.0489)	-0.0328 (0.0353)	-0.0558 (0.0708)
Boko Haram violence	0.0001 (0.0005)	0.0011 (0.0010)	0.0013 (0.0016)
Mean $Y$	0.0178	0.9632	0.9084
Observations	1809	1313	1313
$R^2$	0.008	0.033	0.011

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ . Conley (1999, 2008) spatially adjusted standard errors in parentheses: distance cutoff of 20 kilometers and a time-lag of three school-years. All estimations include individual and year fixed effects. Controls included are the number of Boko Haram related violent events within a 10km radius of the village in the school-year prior; household size; whether it is an agricultural household; whether the child is female; whether the child is of school-going age; a dummy that captures whether the state of emergency was declared prior to the occupation.

Figure A.7: Government offensives to retake territory



*Note:* Maps shows the progression of the government offensives to retake territory from Boko Haram. The darker, the more events took place where the government regained control over territory as recorded by ACLED by quarter/year. Source: ACLED.

Table A.10: Robustness: duration of occupation

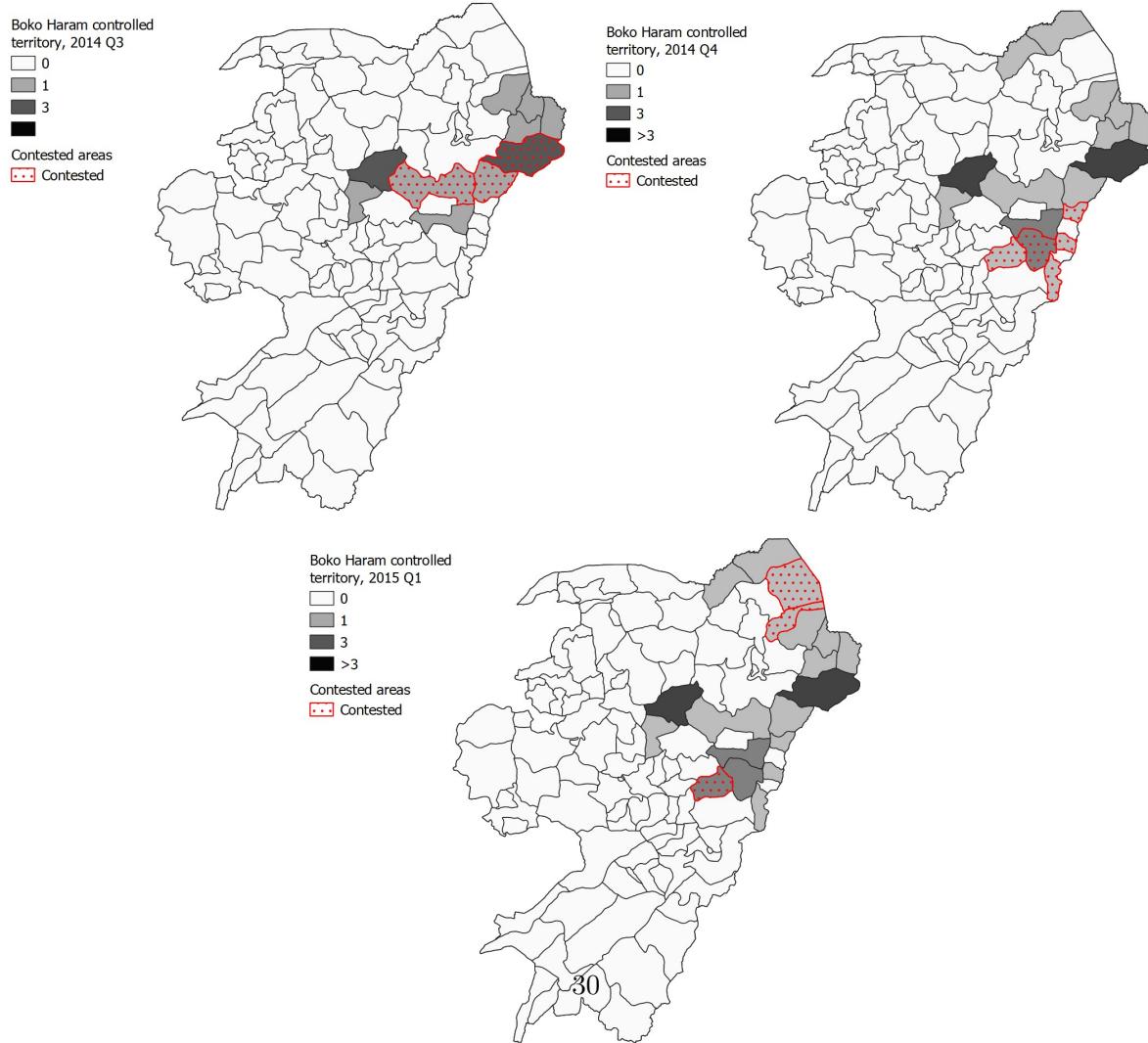
	(1) Years of educ.	(2) Years of educ.	(3) Years of educ.	(4) Attendance	(5) Attendance	(6) Attendance
Occupation	-1.2608*** (0.3402)	-1.6204*** (0.3428)	-0.9536* (0.3721)	-0.1521* (0.0768)	-0.0080 (0.0568)	-0.0371 (0.0577)
Occupation*Female		0.5198* (0.2632)			-0.3497** (0.1251)	
Occupation*Muslim			-0.5724 (0.4881)			-0.2002 (0.1274)
Boko Haram events (UCDP)	0.0071 (0.0050)	0.0051 (0.0051)	0.0074 (0.0051)	-0.0031*** (0.0009)	-0.0034*** (0.0010)	-0.0030*** (0.0009)
Observations	1855	1758	1855	1718	1647	1718
R <sup>2</sup>	0.047	0.055	0.048	0.038	0.050	0.040

Standard errors in parentheses

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

\*\*\* $p < 0.01$ , \*\* $p < 0.05$ , \* $p < 0.1$ . Conley (1999, 2008) spatially adjusted standard errors in parentheses: distance cutoff of 20 kilometers and a time-lag of three school-years. All estimations include individual and year fixed effects. Controls included are the number of Boko Haram related violent events within a 10km radius of the village in the school-year prior, based on UCDP GED; household size; whether it is an agricultural household; whether the child is female; whether the child is of school-going age; a dummy that captures whether the state of emergency was declared prior to the occupation.

Figure A.9: Contested and occupied territory in North-East Nigeria



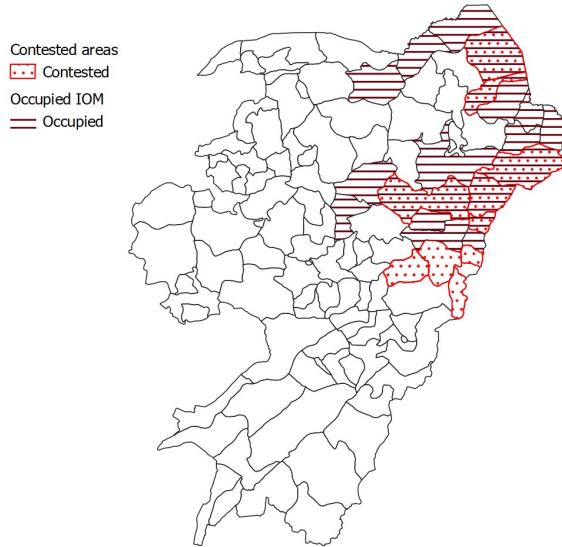
Note: Maps show the number of events, per LGA, where the Boko Haram gained control over territory as recorded

Table A.11: Robustness: duration of occupation

	(1) Years of educ.	(2) Years of educ.	(3) Years of educ.	(4) Attendance	(5) Attendance	(6) Attendance
Duration	-0.2596 (0.1458)	-0.3744* (0.1864)	-0.0884 (0.1680)	-0.0995* (0.0469)	0.0173 (0.0265)	-0.0188 (0.0254)
Duration*Female		0.1067 (0.1191)			-0.2375*** (0.0262)	
Duration*Muslim				-0.3578 (0.2613)		-0.1565** (0.0553)
Boko Haram violence	-0.0042 (0.0044)	-0.0043 (0.0043)	-0.0040 (0.0044)	-0.0018 (0.0012)	-0.0018 (0.0012)	-0.0017 (0.0011)
Mean $Y$	3.3385	3.3385	3.3385	0.6083	0.6083	0.6083
Observations	1805	1708	1805	1675	1604	1675
$R^2$	0.033	0.037	0.034	0.037	0.057	0.044

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ . Conley (1999, 2008) spatially adjusted standard errors in parentheses: distance cutoff of 20 kilometers and a time-lag of three school-years. All estimations include individual and year fixed effects. Controls included are the number of Boko Haram related violent events within a 10km radius of the village in the school-year prior; household size; whether it is an agricultural household; whether the child is female; whether the child is of school-going age; a dummy that captures whether the state of emergency was declared prior to the occupation.

Figure A.10: Contested and occupied territory in North-East Nigeria



Note: The map shows the areas that were contested based on data from ACLED (see A.9) and the areas that were occupied according to the IOM (2015). Source: IOM and ACLED.

Table A.12: Robustness: propensity score matching

	(1) Years of educ.	(2) Years of educ.	(3) Years of educ.	(4) Attendance	(5) Attendance	(6) Attendance
Occupation	-0.8614*** (0.1563)	-0.8423*** (0.1479)	-0.8562*** (0.2128)	-0.2928 (0.1828)	0.0713 (0.0368)	0.0041 (0.0300)
Occupation*Female		-0.0358 (0.1690)			-0.6763*** (0.1097)	
Occupation*Muslim			-0.0106 (0.2013)			-0.5992*** (0.1597)
Boko Haram violence	0.0033 (0.0035)	0.0033 (0.0035)	0.0033 (0.0035)	0.0006 (0.0005)	0.0006 (0.0006)	0.0007 (0.0005)
Observations	3633	3633	3633	3595	3595	3595
R <sup>2</sup>	0.027	0.027	0.027	0.025	0.031	0.030

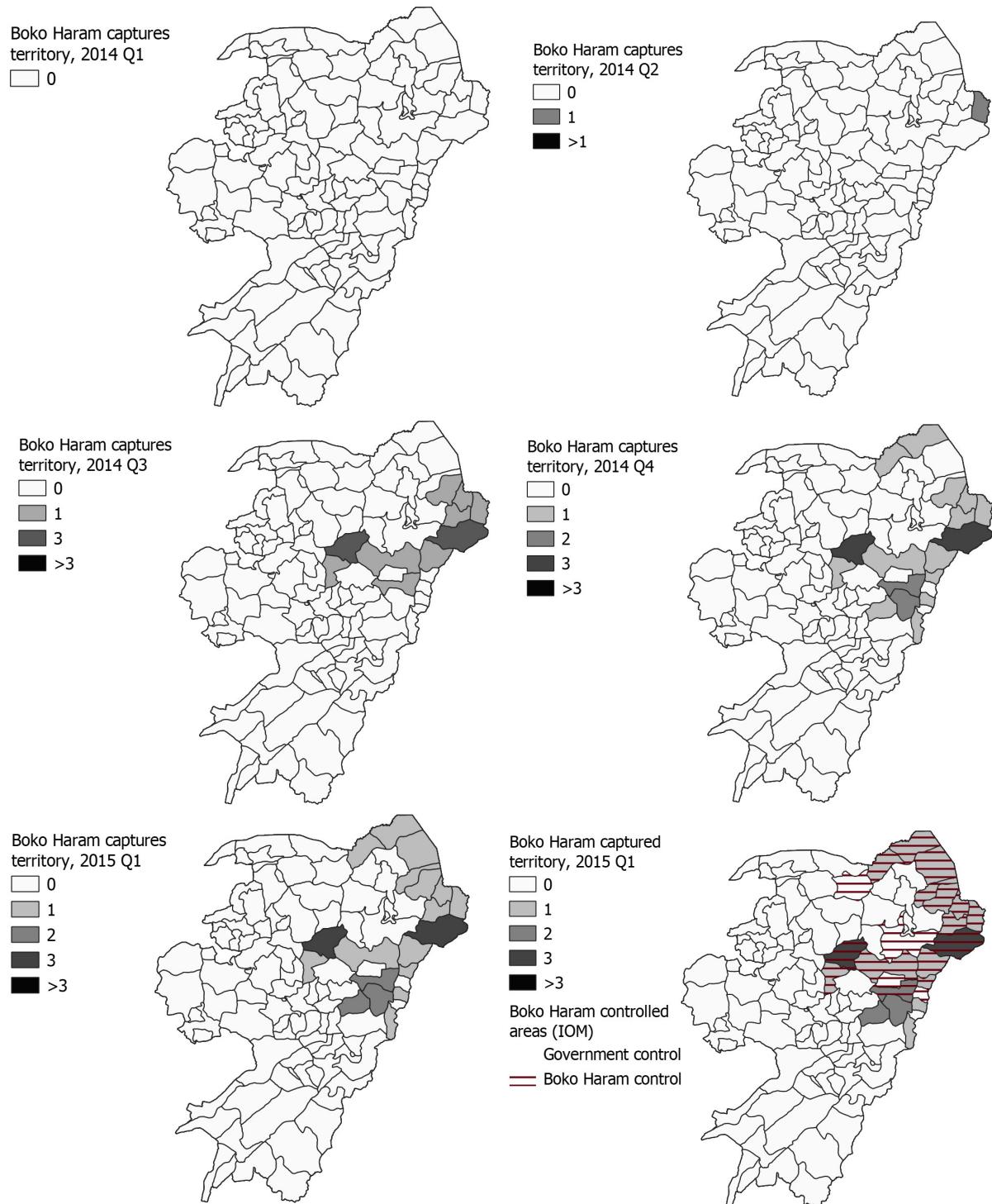
\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ . Conley (1999, 2008) spatially adjusted standard errors in parentheses: distance cutoff of 20 kilometers and a time-lag of three school-years. Sample selected through propensity score matching. All estimations include individual and year fixed effects. Controls included are the number of Boko Haram related violent events within a 10km radius of the village in the school-year prior; household size; whether it is an agricultural household; whether the respondent is female; whether respondent is Muslim; a dummy that captures whether the state of emergency was declared prior to the occupation.

Table A.13: Robustness: North East sample

	(1) Years of educ.	(2) Years of educ.	(3) Years of educ.	(4) Attendance	(5) Attendance	(6) Attendance
Occupation	-1.2218*** (0.3099)	-1.4946*** (0.3186)	-0.9239** (0.3398)	-0.1521 (0.0789)	0.0007 (0.0562)	0.0014 (0.0590)
Occupation*Female		0.5254* (0.2646)			-0.3679** (0.1306)	
Occupation*Muslim			-0.5506 (0.4850)			-0.2647* (0.1291)
Boko Haram violence	-0.0018 (0.0035)	-0.0022 (0.0035)	-0.0018 (0.0035)	-0.0011 (0.0012)	-0.0011 (0.0012)	-0.0011 (0.0011)
Observations	7319	6839	7319	6996	6646	6996
R <sup>2</sup>	0.025	0.030	0.025	0.019	0.023	0.020

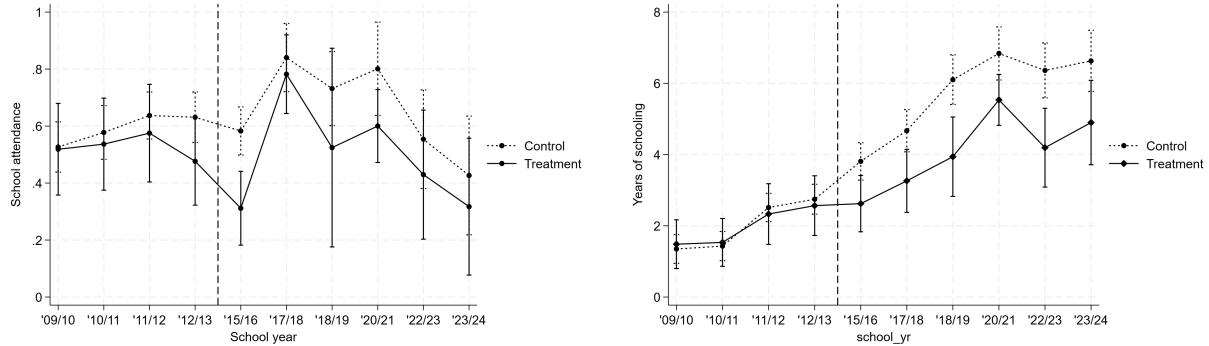
\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$ . Conley (1999, 2008) spatially adjusted standard errors in parentheses: distance cutoff of 20 kilometers and a time-lag of three school-years. Sample includes all children living in the North East, but adhering to the other inclusion restrictions outlined in 3. All estimations include individual and year fixed effects. Controls included are the number of Boko Haram related violent events within a 10km radius of the village in the school-year prior; household size; whether it is an agricultural household; whether the respondent is female; whether respondent is Muslim; a dummy that captures whether the state of emergency was declared prior to the occupation.

Figure A.8: The progression of the occupation of territory in North-East Nigeria by Boko Haram.



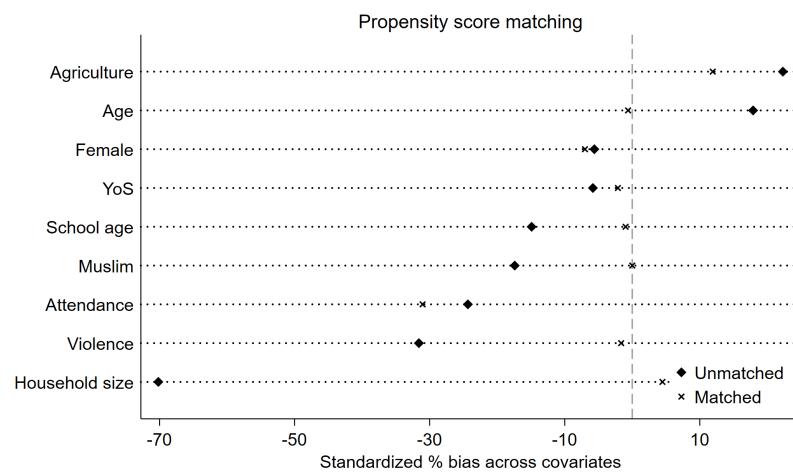
*Note:* Maps show the number of events, per LGA, where Boko Haram gained control over territory as recorded by ACLED by quarter/year. The last map shows all captured territory as well as the LGAs that were designated by the IOM as being under full Boko Haram control in January 2015. Source: ACLED.

Figure A.11: Estimated coefficients per school year



Note: The trends, full the full time period, of the outcome variables (school attendance in left panel, years of schooling in the right panel) for the treatment and control group.

Figure A.12: Balancing through propensity score matching



Notes: The graph shows the results for the propensity score matching. The x-axis shows the reduction in the bias, in percent, due to the matching procedure.