

Education during conflict: the effect of territorial occupation by insurgents on schooling

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Abstract

This paper estimates short and long-run effects of exposure to territorial occupation by insurgents on behavioral change, using evidence from the temporary occupation of territory in Nigeria by Boko Haram. Exploiting the anti-educational rule the group imposed in their territory, behavior is measured through school participation among children. Exposure to occupation is disentangled from exposure to violence by comparing children exposed to the insurgency, with children exposed to both the insurgency and occupation. Propensity score matching is used to create a balanced sample. The effects are estimated using a difference-in-differences approach, accounting for spatial correlation between observations. The results show immediate and persistent changes in behavior following the occupation: children exposed to Boko Haram's occupation accumulate 0.77 fewer years of schooling during, and are 21% less likely to attend school after, the occupation. Those sharing a social identity with the insurgents, facing heightened social pressure to conform, or that are exposed to enforcement of the anti-educational rule are most affected. Well-documented mechanisms linking conflict to education do not explain the effects. Extensive robustness tests further validate the notion that the occupation itself, and not violence, is driving the results.

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1. Introduction

While the effect of conflict on civilians' behavior has been studied extensively, existing work does not empirically distinguish between exposure to violence and to occupation by insurgents. But the two concepts differ fundamentally: in the event of violence, public goods – such as safety, law, order, education or healthcare – can be provided by the public or private sector, while in the event of occupation the provision of these goods falls under control of the occupying group. Insurgents use these public goods to suppress, influence and coerce the local population, potentially changing behavior and attitudes of those they rule (Berman, 2003; Kalyvas, 2006; Mampilly, 2021; Maynard, 2019; Yakter & Harsgor, 2022). In this paper I analyze the effect of occupation by rebels on civilians' behavior in the short and long-run, considering various sources of heterogeneity and potential mechanisms driving the effects. By using evidence from a quasi-natural experiment, I am able to disentangle the effect of exposure to territorial occupation by insurgents from the effect of exposure to violence, addressing the gap in the literature.

The setting I focus on is the case of Boko Haram, an Islamic insurgent group active in the Lake Chad basin in north-east Nigeria. Various aspects make this a suitable setting to study the effect of occupation. First, though the insurgency affected large parts of the country, Boko Haram occupied only a limited number of areas. This allows me to compare 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 groups occupation allows to me study whether any potential behavioral changes among those exposed to its rule were temporary or persistent, out-lasting the occupation. Third, Boko Haram imposed its anti-educational rule on individuals living in these places.¹ This explicit anti-educational stance and prohibition of schooling being at the core of its governance provides a clear outcome to focus on and measure behavioral change: school participation.

Conceptually, the occupation – interchangeably called rule or governance – is defined as the territorial control of a rebel group and their actions towards civilians that live in that area, specifically the imposition of anti-educational rules. This relates to the definition of rebel governance from Arjona et al. (2015), who defines rebel governance as “the set of actions insurgents engage in to regulate the social, political, and economic life of non-combatants during civil war” (p. 182). Within this framework, individuals confronted with occupation and governance are considered to face a choice between cooperation or resistance (Arjona et al., 2015). Moreover, there are various factors that affect whether individuals are more likely to cooperate with rebels during territorial occupation. Such determinants are (pre-existing) positive sentiment towards, or local support for the rebels (Arjona et al., 2015; Brechenmacher, 2019) increasing the social pressure within groups to conform to the rules (Bursztyn & Jensen, 2017; Panagopoulos, 2014), having social identity markers in

¹Boko Haram, loosely translated, means “Western education is forbidden” (Bertoni et al., 2019)

common (Stets & Burke, 2000) and experiencing violent enforcement of rule (Arjona et al., 2015; Olson, 1993). Applying this conceptual framework to the setting of this study, individuals either choose to comply with Boko Haram's anti-educational rule, or defy the groups' governance and continue schooling. The determinants of cooperation (in addition to more 'traditional' sources of heterogeneity such as gender and age) are considered as sources of heterogeneity and form the basis for explaining the differences between the effect of the occupation for individuals and groups.

Econometrically, this study relies on a sample of rich panel data on children of school-going age for five school-years from the Nigerian General Household Survey (NGHS). The treatment is defined as having been exposed to the territorial occupation, and thereby the anti-educational rule, of Boko Haram. The control units are selected through propensity score matching. This ensures that both the treatment and control group are comparable with respect to various individual characteristics and factors such as exposure to violence and (proximity to areas with) higher levels of support for Boko Haram. I estimate the extent of cooperation or resistance using a difference-in-differences (DiD) approach. The econometric model addresses potential spatial correlation, or dependency between observations due to geographical proximity, by incorporating Conley (1999, 2008) standard errors. Moreover, I show that the trends of the treatment and control group do not differ significantly prior to the intervention, and provide an in-depth discussion addressing concerns regarding migration and attrition. A variety of factors that could threaten the identification strategy are addressed. For example, I show that the towns and communities that were occupied are comparable to those that remained under government control in terms of infrastructure, public good provision, population density, and so forth. Additionally, to address why Boko Haram might have gained control over certain areas or areas and not others, pre-existing positive sentiment towards the group as well as earlier fundamentalist conflicts and historical evidence for rejection of the secular state in the region is discussed, as well as the advancement and sudden halt – when pushed back by the Nigerian military – of the groups occupation. Finally, inclusion of control variables and fixed effects in every estimation further support the identification of the effect of occupation.

Being confronted by rebel rule and territorial occupation by insurgents can lead to changes in behavior that are temporary, lasting for the duration of the occupation, or more permanent, remaining after the occupation has ended and the government regained control. To address both the short-run and long-run effect, I focus on two different outcomes. First, I analyze the impact of the occupation on school participation in the short-run by measuring the increase in the years of schooling (YoS) for an individual throughout a school-year. For obvious reasons, the household survey was not conducted during the two school-years that spanned the six months preceding the occupation, the occupation itself, and roughly six months after the end of the occupation. Hence this first outcome captures for how many of these two school-years a child received schooling. The second outcome provides insight into whether any potential changes that occurred during the occupation were permanent, and captures whether a child is attending school in the school-year following the end of the

occupation. An effect of the treatment on this outcome indicates whether initial responses to the occupation were long-lasting (e.g., children stayed out of school), or shifted when the occupation had ended and the government regained control (children returned to school).

The results indicate that the territorial occupation by Boko Haram decreased school participation for children of mandatory school-going age, relative to those who were not exposed to the occupation, in both the short and long-run. During the occupation, those in the treatment group accumulated 0.77 years of schooling, or about nine months, less than their counterparts. Considering that the average adult in the region has 4.90 years of schooling, this is an educational set-back of about 16%. Moreover, I find that children exposed to Boko Haram's rebel governance are 21% less likely to attend school after the occupation had ended and the government had retaken control. Considering the heterogeneity of these effects, the results show that male and female children were equally affected during the occupation, but girls are significantly more likely to stay out of school in the long-run. Younger children were more likely than those of earlier birth cohorts to experience a set-back in schooling in the short-run, potentially postponing the start of school as there are no differences between birth cohorts with respect to school attendance after the end of the occupation.

Next, I consider additional sources of heterogeneity of the baseline effect. My analysis leads to several findings, that I interpret in the light of the determinants of potential compliance with Boko Haram's anti-educational rule. First, social identity theory posits that those sharing identity markers – religion – are more likely to adjust their behavior to be aligned with that of the group. This study finds evidence that this is indeed the case. Children from Muslim households are significantly more likely to have lower schooling outcomes, both in the short and long-run, in response to Boko Haram's occupation. This suggests that these children are especially vulnerable with respect to exposure to Islamic insurgent groups. Moreover, this finding highlights the importance of considering occupation independently of violence: other studies have found that the effect of exposure to Boko Haram's violence on school attendance rates is not heterogeneous for children of Muslim households (Bertoni et al., 2019).

Second, the presence of local support for Boko Haram can give rise to social pressure to adhere to the groups' rule. This can either be due to other people in the area supporting the group or out of fear for general retribution when the rules are broken. I find that while children in areas with high levels of support for Boko Haram suffer significant set-backs in education during the occupation, they are more likely to be attending school in the long-run. This suggests that these children are initially forced out of school (against their will), but they return to school when this is possible.

Third, insurgent groups often use violent rule enforcement within their territory (Arjona et al., 2015; Olson, 1993). Especially Islamic insurgent groups claim the right to use violence aimed at those not conforming to their rule (Crisis group, 2016). Distinguishing school-targeted from non-school targeted violence, the results show that experiencing being exposed to anti-educational violence while facing the occupation decreases school participation in the long-run. Importantly,

this result does not hold for exposure to non-targeted violence.

It is important to emphasize that I study the impact of territorial occupation within a context of insurgency, violence and conflict. The occupation was temporary, and individuals experienced ongoing conflict after the occupation had ended. To account for the effect this might have had on school participation in the long-run, I examine various well-documented mechanisms. These are economic shocks that may increase child labor (Bundervoet et al., 2009; Duryea et al., 2007; Jacoby & Skoufias, 1997; Thomas et al., 2004), worsening child health (Allison, Attisha, et al., 2019), child marriage (Mazurana et al., 2019; Mourtada et al., 2017; Walker, 2013), school supply (Akbulut-Yuksel, 2014; Glewwe & Jacoby, 1994; Jayachandran et al., 2002), and changes to labor market outcomes and education premiums (Chamarbagwala & Morán, 2011; Shemyakina, 2011). Analyzing these mechanisms additionally functions as a validity test: if I would find that the results can be explained by mechanisms linking conflict to education, this would cast doubt on the correct identification of the occupation effect.

There is weak to no evidence that any of the conflict mechanisms offer a plausible explanation for the significant and large decreases in school participation. I do find, however, that there are wage and employment premiums for those that completed primary education. This suggests that there is still value in obtaining an education, even after the occupation occurred and in the face of the ongoing insurgency. Importantly, the fact that the results cannot be explained by these mechanisms diminishes the risk of the estimated effects are being driven by conflict.

The baseline analysis is extended in various ways to further illustrate the results. I estimate a model with a non-binary treatment variable to account for the duration of the occupation per area. The results from this estimation show that the longer the duration, the stronger the effects on school participation. Various robustness tests are carried out and discussed. First, I show that the results are robust with respect to different specifications of the spatially-clustered standard errors. Moreover, the results are not affected by employing different clustering methods such as the wild bootstrap approach of Cameron et al. (2008). Furthermore, I consider different control groups. For example, I take a more qualitative approach to the selection of the control units and select only those individuals that live in areas directly bordering the occupied territory, providing a discussion of the spread of the occupation throughout the region. Importantly, there is evidence that the bordering areas were at high risk of being occupied next if Boko Haram had not been suddenly halted by the Nigerian military. The robustness of the results to this specification of the control group shows that the decrease in school participation is most likely not due to fear of occupation, but occupation itself.

The results of this study demonstrate the need for accounting for occupation, and not solely violence, when considering the impact of insurgencies involving self-representing Islamic groups on education. In doing so this work contributes to the growing literature on rebel governance (Arjona, 2014, 2016, 2017; Arjona et al., 2015; Barter, 2015a, 2015b; March & Revkin, 2015). However, the

majority of this literature focuses on the insurgents and the strategic value of the occupation of territory and governance, whereas this paper examines the effect of occupation on education for those facing the rebels. By estimating the effect of occupation in a quasi-experimental setting, I present a novel way of approaching the matter and allows to disentangle effects of violence and conflict from governance and occupation. This research thereby contributes to the work on the impact of occupation on civilians (Humphreys & Weinstein, 2006; Kalyvas, 2006; Mampilly, 2012; Rubin, 2020, among others). Importantly, this study is, to my knowledge, one of the first that provides empirical estimates of the impact of rebel occupation on civilians' behavior, additionally showing evidence suggesting that social identity and social pressure are key in explaining why certain people change their behavior in response to occupation and others do not. By discussing these matters and the violent enforcement of a specific (anti-educational) ideology within a framework of behavioral change in response to occupation, this paper contributes to the debate concerned with ideology and attitudes during civil war as mentioned in Hirose et al. (2017). Moreover, by studying the relationship between insurgents' rebel governance and occupation on educational outcomes during conflict, this study adds to the large literature that examines the effect of conflict on educational outcomes (Justino, 2011, for an overview) such as governments' expenditure (Lai & Thyne, 2007), educational attainment (Akresh & De Walque, 2008; Chamarbagwala & Morán, 2011; Parlow, 2011; Singh & Shemyakina, 2016; Swee, 2015; Verwimp & Van Bavel, 2014) and school drop-out rates, school attendance and enrollment (Bertoni et al., 2019; Khan & Seltzer, 2016; Shemyakina, 2011; Valente, 2014).

Summarizing, this study demonstrates that school participation is severely affected by territorial occupation of an insurgent group, on top of the already 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 group has retreated and 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. However, this study provides a first step in the direction of better understanding the role that identity, pressure, and enforcement play with respect to how, and to what extent, various individuals are affected by the occupation.

The paper is structured as follows. Section 2 contains background information, providing a discussion of Boko Haram and its occupation of territory, as well as evidence that the group actively forbade education and schooling in their proclaimed caliphate. Section 3 discusses a framework within which to consider occupation, rebel governance and conflict, and discusses hypotheses and mechanisms. The data, sample, treatment and control group are discussed in section 4. Section 5 describes the empirical approach, and 6 discusses the identification strategy. Section 7 contains the results, and section 8 the mechanisms behind the effects. Finally, extensions of the estimation and robustness tests are shown in section 9 and section 10 concludes.

2. Institutional background

Though self-identified Islamic groups' ideologies vary, there are various ideological stances that they have in common: the use of violence aimed at those who are at odds with Islamic imperatives, the obligation to use violence when (Muslim) rulers deviate from this, the goal to found an Islamic state, and rejection of the secular state (Crisis group, 2016). The conquering of territory (as done by Boko Haram, al-Shabaab and Islamic State of Iraq and the Levant (ISIL), and others) is a clear step towards the latter.

Moreover, many organizations that represent themselves as Islamic insurgent groups strongly oppose secular ("Western") education, though there is no religious justification for the anti-educational stance (VOA, 2022). Occupation of territory by such actors often involves subsequent denial of access to education for inhabitants as part of the insurgents' governance (GCPEA, 2020), and many of such groups carry out attacks on educational targets such as schools, students and teachers (GCPEA, 2020). Examples are Ansarul Islam, active in Burkina Faso and Mali, Jama'at Nusrat ul-Islam wal-Muslimeen (JNIM) in Mali, Islamic State of Khorasan Province (ISKP) active in Afghanistan, ISIL in Iraq, the Taliban and al-Qaeda in Pakistan, al-Shabaab in Somalia, and Boko Haram in the area of the Lake Chad basin, specifically in Nigeria.

Carrying out attacks instills fear and intimidates the population, and has been shown to decrease schooling outcomes (Bertoni et al., 2019). However, control over territory is fundamental in allowing these groups to further exert their power and (anti-educational) ideology: controlling territory and proclaiming yourself as ruler provides a group with a sense of legitimacy (Loyle et al., 2021), and is a prerequisite for rebels' exercising of local authority (Anders, 2020; Kalyvas, 2006; Kasfir, 2005). Control over territory allows insurgent groups to – in this case – exercise their anti-educational rule and prohibit schooling. The educational system is one of the main tools at rebels' disposal to gain support among or suppress the population (Mampilly, 2021), and there is evidence that Islamic insurgent groups that occupy territory almost entirely prohibit education, closing schools and prevent other means of schooling (GCPEA, 2020).² This study analyzes the effect that experiencing such occupation has on the school participation of children, by focusing on the specific case of Boko Haram and its occupation of territory in North East Nigeria.

²There is only one recorded exception: the case of the Islamic State. The group, after keeping schools closed for prolonged period of time, completely redesign the curriculum to fit with their ideology and allowed children to attend school. However, only specific (IS controlled) schools were allowed, and girls were strongly discouraged from attending (Arvisais & Guidère, 2020). Note that the initial closing of schools and prohibiting of education lead to severe losses in education among children.

2.1. Education in North East Nigeria

Nine years of (primary and junior secondary) education are free and obligatory in Nigeria, as per the Compulsory, Free Universal Basic Education Act implemented in 2004. Nevertheless, Nigeria in general has the largest percentage of out-of-school children in the world (Unicef, 2015) and the lowest educational outcomes of all sub-Saharan countries (Abdullahi & Abdullah, 2014). The situation is especially dire in the North East, a poorer and more rural region.

There are various reasons for the difficult relationship of the population of the North of Nigeria with the education system. Afzal (2020) cites four reasons for this. First, there is a lack of support in the north for the state's imposed, post-colonial, and Western system of education. Second, the education system is held accountable for poor educational outcomes in the north, as the population had not become familiar with it during colonization, contrary to the south. Third, following low educational outcomes, the system is blamed for joblessness and low educational premiums. Finally, Western education is seen to represent the Nigerian state's corruption, as many state officials are Western-educated. Against this background, Boko Haram formed as an insurgent group with clear anti-educational stance.

2.2. The case of Boko Haram

The Boko Haram insurgency started in 2009 and is currently ongoing. Boko Haram is one of the largest militant groups in Africa (CFR, 2022), and is predominantly active around the Lake Chad basin. The Islamic insurgent group rejects all secular aspects of Nigerian society and strives to establish an Islamic state in Nigeria (Anugwom, 2018; Center for International Security and Cooperation, 2018; Omenma et al., 2020; Thurston, 2016) with Shari'a criminal courts (CFR, 2018). It asserts the right to rebel against allegedly infidel states, use force to impose a strict interpretation of Islamic law on civilians (Thurston, 2016), and specifically rejects Western education (Anugwom, 2018).³

In the years following the initial anti-government uprising that started the insurgency, the frequency, size and impact of the attacks carried about by Boko Haram drastically increased. This change has been attributed to changes in leadership of Boko Haram, as well as Boko Haram's co-operation with al-Qaeda (Center for International Security and Cooperation, 2018). As Boko Haram grew in size and carried out more attacks, it started to finance itself through robberies, kidnapping, extortion and raids of military stations. In response to the escalating situation the Nigerian government declared the state of emergency in three states in the North East - Borno, Adamawa and Yobe - in May 2013 and deployed a high number of military personnel to the area. Though the number of military personnel in the region increased significantly, Boko Haram started to carry out more

³Boko Haram, loosely translated, means "Western education is forbidden".

military-style offensives on towns in the region, gaining control over various local government areas (LGAs). In the second and third quarter of 2014 Boko Haram captured more territory and declared its caliphate in August 2014.⁴

According to interviews conducted by Amnesty International (2015) with former inhabitants of the caliphate, Boko Haram ruled according to its set of beliefs and ideology. The group actively tried to wipe out all (Western) influences on day-to-day life, and convert and enforce its ideas on the local population.⁵ To aid ruling its caliphate, Boko Haram appointed Emirs who dealt with matters in a town.⁶ Civilians that did not follow the rules risked being trialed and punished.⁷ For those who cooperated with Boko Haram, followed the rules and supported the group, life could sometimes be mildly easier. For example, Boko Haram distributed food, often looted from other villages, among households that supported them. The rules that Boko Haram enforced were aligned with goal to implement a strict Shari'a law in its territory, and were based in its strong anti-democracy and anti (Western) education sentiment. Attending schools and other forms of education were entirely forbidden under Boko Haram's rule.

Boko Haram rapidly expanded the area under control rapidly and continued to do so into early 2015. In January of that year, Goodluck Jonathan - the Nigerian president at the time - supported the creation of an African task-force aimed at countering Boko Haram. In February 2015 the military offensive of the task-force started, and Gwoza - considered the headquarters of Boko Haram - was captured in March 2015.⁸ This was considered the end of Boko Haram's caliphate and control over the region.

In the time period that followed, the North East saw a significant drop in violence (CFR, 2018) but suffered the long-term consequences of the conflict and occupation. While Boko Haram was expelled from the areas it controlled, the group still carried out attacks in the region. According to the Crisis group (2017), the extensive damage to the economic infrastructure in various parts of the North East, and bans or restrictions on trade as to deny Boko Haram access to supplies lead to

⁴Figure A.6 shows the progression of the occupation of Boko Haram based on this data from ACLED. Considering the pattern of the spread of occupation in figure A.6, it is clear that the group steered clear, or was incapable of, conquering the more central and middle regions of Borno specifically. This can be explained by the fact that the government forces were stationed in September 2014 around Maiduguri (the capital of Borno) and more south towards the northern borders of Damboa and Bama (OCHA).

⁵According to Amnesty International (2015) the rules affected almost every aspect of day-to-day life such as the usage, possession or sale of cigarettes, the type of clothing worn by and general appearance of men and women, the selling of products on markets, etc.

⁶For example, the Emir (often someone from the town that supported Boko Haram) was responsible for approving forms of travel between towns within Boko Haram's territory for civilians, as well as ensuring that Boko Haram's rules were followed. Note that leaving the caliphate was in most cases almost entirely prohibited. In various villages Boko Haram imprisoned people or placed them under constant guard. In places where civilians were allowed to move freely within the town, Boko Haram fighters patrolled the streets and areas between villages, ensuring no-one escaped Boko Haram territory (Amnesty International, 2015).

⁷In order to deal with such cases, Boko Haram installed institutions such as a courts where civilians' cases were judged (Amnesty International, 2015).

⁸The recapturing of the areas by the government are shown in figure A.7.

a heightened level of food insecurity. This situation affected the entire North East, but especially Borno, Adamawa and Yobe. After the government had regained control over the region it was possible for humanitarian groups to access the previously occupied LGAs and provide educational, food, and health aid. Importantly, according to Relief web (2017), in all previously occupied states (in the sample used in this study - see section 4) there were NGOs present to provide access to education, quality emergency learning, and educational system strengthening.

Considering the evidence discussed above, it is clear that Boko Haram actively engaged in rebel governance. Moreover, the fact that Boko Haram's strong anti-educational stance was central to this governance makes it a suitable case to examine the impact of Islamic insurgents' occupation of territory on schooling.

3. Framework and mechanisms

The territorial control of Boko Haram, proclamation of its caliphate in these areas, and the groups' actions towards civilians under their rule are considered the occupation and subsequent rule that this paper focuses on. Conceptually, occupation (often) takes place within a general setting of conflict. This implies that aside from occupation, dynamics relating to conflict are present. Therefore this paper builds on work on rebel governance, in order to capture dynamics in occupied territory and understand how any effects might have arisen, as well as the extensive literature on conflict and its effects on education. The frameworks are applied to the case of Boko Haram, the effects of exposure to conflict and occupation disentangled, and the effect of the latter on school participation estimated. In doing so, this study examines whether those exposed to occupation adjust their behavior to adhere to the rebels' rule, and provides an in-depth discussion of channels and mechanisms that drive these effects.

3.1. Occupation and rebel governance

Occupying territory allows rebels to exercise authority and thereby govern, or impose rules on, the population of those areas (Anders, 2020; Kalyvas, 2006; Kasfir, 2005; Loyle et al., 2021). As discussed in Arjona et al. (2015), when facing rebel governance, the population can either choose to cooperate (comply with the rules) or resist (reject the rules). In the case considered, lower schooling outcomes would imply that an individual adhered with Boko Haram's prohibition of schooling, i.e., cooperated with Boko Haram – and vice versa, with resistance leading to higher schooling outcomes. The literature identifies various determinants that might lead to certain sub-groups of the population being more likely to cooperate or comply. These determinants will be examined as potential sources of heterogeneity of the treatment effect.

3.2. Heterogeneity: social identity, social pressure to conform and enforcement of rule

First, sharing a social identity can lead to a heightened sense of belonging or shared identity among people (Stets & Burke, 2000). Having such a shared identity can lead to higher support for those that have, for example, the same religion (Knott & Lee, 2020; Seul, 1999; Stets & Burke, 2000). As noted by Stets and Burke (2000), those who feel a the sense of belonging to a certain group are “more likely than not to participate in that groups culture [...] and show attraction to the group in their behavior” (p. 4). It might be that having a religion in common indeed leads to having a more positive sentiment or higher level of support, compared to those who do not share a religion. Based on this, I posit that inhabitants of the caliphate that have identity markers, such as religion, in common with Boko Haram might have been more likely to converge in terms of behavior and attitudes (i.e., rejection of education) than those who do not have similar identity markers.

Additionally, building upon shared identity, the extent of compliance among the local population can be due to pre-existing pro-Boko Haram sentiment among the population. Especially “those who perceive their institutions as illegitimate or ineffective may welcome change” (Arjona et al., 2015, p. 186). Given the anti-Western education sentiment in the North East (Afzal, 2020) as mentioned above, it is likely that many might have been receptive to Boko Harams’ viewpoints. Moreover, it is known that weak service provision and negligence on behalf of the government lead to increased local support for Boko Haram (Brechenmacher, 2019). Crucially, rebel control in areas with low government service provision leads to heightened social cohesion within villages (Rubin, 2020). Increased cohesion implies higher levels of social pressure to conform to ideas or rules. Moreover, individuals are more likely to engage with pro-social behavior and compliance with social rules when they are being watched or experience social pressure (Bursztyn & Jensen, 2017; Panagopoulos, 2014). This is especially the case during occupation by insurgents, when failure to conform is punished, and the negative consequences of one person failing to conform can affect the whole group (Arjona et al., 2015).

This suggests that those who live in an environment where there is stronger pro-Boko Haram sentiment and the occupation increased levels of social control and pressure to conform, will experience lower schooling outcomes. In order to obtain an instrument that measures support for Boko Haram, and consecutive heightened pressure to conform to Boko Harams’ rule, I turn to Archibong (2019). Archibong (2019) shows that areas that were traditionally ruled by a centralized authority and had a Muslim super-majority population experience lower levels of public good provision by the government. The measure of Archibong (2019) will be used as an instrument to capture positive sentiment towards Boko Haram (discussed more in-depth in section 5 and 6) and examine potential heterogeneity of the treatment effect.

Violence can be used as a tool during occupation, conflict and war. It serves a different purpose in

occupied and non-occupied territory. According to Olson (1993), insurgents in control of territory (stationary bandits) often strive for “peaceful order”. Violence aimed at the civilians is often used to punish disobedience or defiance of groups’ governance. This form of violence will be referred to as enforcement of rule. In areas where insurgents govern, cooperation with the occupying rebels most frequently takes place as to avoid such violence (Arjona et al., 2015). Based on this notion, I expect that those who experience such enforcement are more likely to adjust their behavior (i.e., have lower schooling outcomes) compared to those who are not exposed to such violence.

The differential effects of civil war and conflict with respect to gender are highly context-specific (Buvinić et al., 2014), but it is known that Islamic insurgent groups often strongly oppose girls’ education.⁹ This dimension to the anti-educational rule will be examined by estimating the potential heterogeneity of the effect by gender. Moreover, the start of the occupation will have coincided with a different stage in the education of each child. A child that is just about to start primary school might opt not to attend school anymore; one that has been going to school already might be more inclined to return. This will be considered by examining the effect for different birth cohorts.

3.3. Education during conflict and civil war

The above focuses on the adjustment of behavior in response to direct exposure to rebel governance. It frames cooperation with Boko Harams during occupation as compliance with its prohibition of schooling, leading to rejection of education and, in turn, lower educational outcomes. However, this study is also concerned with what happened in the long-run: did children go to school after the government regained control? Did those who might have dropped out during the occupation return to school? These questions – as well as those concerning what happened during the occupation itself – are answered in a general conflict setting.¹⁰ It is therefore important to acknowledge the potential presence of mechanisms that are not specific to occupation and rebel rule, but conflict in general. Moreover, after the occupation, “regular” civil war or conflict dynamics might have become more prominent. Examining these mechanisms additionally serves as a validity test: if the results indicate that any effects can be explained by conflict, this would cast doubt upon the identification of the effect of occupation.

Turning to the literature considering the relationship between educational outcomes and conflict, the dominant narrative is that exposure to (civil) war, conflict and violence has a negative impact on educational outcomes (for an excellent overview, see Justino (2011)). The mechanisms I consider are well-documented explanations for the decrease in schooling. First, conflict and civil war can lead to a decrease in income for the household (Bundervoet et al., 2009; Jacoby & Skoufias, 1997; Thomas et al., 2004), causing children to work in order to compensate the loss in household income

⁹A clear example related to the case at hand is the kidnapping of schoolgirls by Boko Haram in Chibok in 2014.

¹⁰Even though Boko Haram was expelled from the areas it controlled, it still carried out attacks in the area and the conflict is considered to have been ongoing.

(Duryea et al., 2007). Second, a decrease in access to healthcare, as well as the potential exposure to danger and violence can lead to worse health among children. Children with worse health are less likely to attend school (Allison, Attisha, et al., 2019). Moreover, child marriage is shown to increase in response to conflict, as the economic situation deteriorates, returns to education diminish, and schooling is disrupted (Mazurana et al., 2019; Mourtada et al., 2017; Walker, 2013). Additionally, when future expected payoffs of having an education are lower, the cost of attending school might not out-weigh potential benefits and children might decide to stay home (Chamarbagwala & Morán, 2011; Shemyakina, 2011).

Considering the general background of conflict and civil war, it is important to examine the role of violence.¹¹ In non-occupied territory insurgents act as roving bandits and violence in such a setting is aimed at looting and extracting resources (Olson, 1993). This different type of violence (i.e., not aimed at upholding or enforcing rules) can have an impact on educational outcomes. It might be that such violence is a mechanism driving the potential effect on educational outcomes. Various forms of violence will be examined to consider this possibility.

Finally, conflict can affect the supply of education, prohibiting those that want to go to school to do so. For example, children cannot attend school when there are no schools or teachers, i.e., when school supply is low or non-existent (Akbulut-Yuksel, 2014; Glewwe & Jacoby, 1994; Jayachandran et al., 2002). Similarly, it is important to consider whether children might have changed the type of school they attended (whether children might have switched from state to religious schools, etc.) or commute to school has increased.

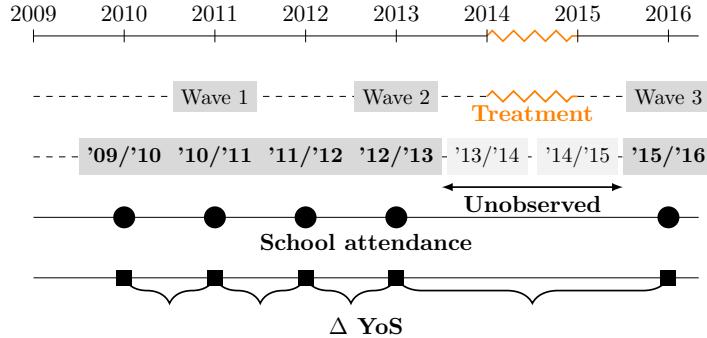
4. Data and sample

Individual-level panel data is obtained from three waves of the Nigerian General Household survey (NGHS). Every wave covers two years, and the survey is conducted twice per wave: once during the harvest season (fall), and once during the planting season (spring). Aside from regular questions with regards to individual characteristics, respondents are asked whether they attend school, what type of school they attend, and so forth, for both the current and/or previous school-year. The survey therefore provides information on the 2009/10, 2010/2011, 2011/12, 2012/13, and 2015/16 school-years. The survey does not cover the 2013/2014 and 2014/2015 school-years, the time period during which Boko Haram controlled large swathes of territory. The last school-year observed in the data prior to the occupation is 2012/2013, and the only school-year observed after the treatment is the 2015/2016 school-year. Hence there is a gap of two full school-years between the last pre-treatment observation and the post-treatment observation (see figure 1).

Only individuals born between 1998 and 2008 are included in the sample as to ensure they were of

¹¹The potential difference in type (and level) of violence that took place in occupied and non-occupied areas is a potential threat to identification. I will discuss this in section 5 and 6.

Figure 1: Data structure: individual panel data for five school-years



Note: The diagram explains the data structure. The timeline shows the period considered in this study; the occupation (treatment) took place between 2014 and 2015. The three waves were carried out in 2010/2011, 2012/2013, and 2015/2016. Combined, these provide data on the school-years shown. 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 Yos.

mandatory school-going age prior to the start of the treatment. The sample is further restricted to include only individuals who live in an LGA that was covered in all survey waves. Due to safety concerns, various LGAs were excluded from the survey in later years. Any individuals living in these regions are excluded from the sample, as they would not have been observed prior to the treatment. However, individuals who potentially might have dropped out of the sample are also excluded. This is an inclusion restriction that might have affected the attrition rates, which are discussed below.

The NGHS includes a community component. For this part of the survey a group of community members is surveyed on the presence of various public goods, local events, infrastructure, and so forth. These surveys were conducted in 2010, 2012 and 2016. I rely on this part of the NGHS to examine potential differences between the communities in the sample prior to and after the treatment, as well as obtain more detailed information on the school supply in the region.

Data on violent events comes from ACLED (Raleigh et al., 2010).¹² I focus on events categorized as violent (excluding, for example, peaceful protests) and that are initiated by Boko Haram. Since ACLED includes information on the precise location of the violent event and the NGHS on the location of the household, it is possible to construct variables that capture the individual-level exposure to violence. Similarly, data on the locations of schools is from Archibong et al. (2015), and is used to first determine the school(s) in vicinity of a household, and then determine whether these were attacked by Boko Haram. I discuss this measure in section 5, and when considering the

¹²ACLED gathers data on violent events related to Boko Haram through media reports, and a local network of journalists, informants, regional specialists and NGO workers. Any attacks claimed or reported by Boko Haram themselves are cross-referenced with these sources. Through this network ACLED was able to obtain information on events during the height of the conflict and on those that took place in occupied territories.

results with respect to exposure to violent enforcement of Boko Haram's rule. All variables regarding violence are lagged by one year, as to account for last years' events affecting the observed years' decisions on schooling. Note that by doing so, any violence that occurred during the occupation (2014/2015) is accounted for in the analysis.

Additionally, data on the number of primary and secondary school teachers per LGA comes from the Universal Basic Education Commission (UBEC) and is available for 2010, 2011, 2012, 2013 and 2016. Data on rainfall and temperature on LGA level is obtained from the World Bank, and information on migration flows from FEWS. Finally, data on precolonial centralization and regional ethnic majorities is taken from Archibong (2019) and is used to discuss historical grievances and potential positive sentiment towards Boko Haram in various areas, as well as to measure pro-Boko Haram sentiment in various regions.

4.1. Treatment

The treatment is defined as being exposed to Boko Haram's temporary occupation that occurred between 2014 and 2015.¹³ The areas that the group occupied are identified using two different data sources. First, data from ACLED is used to document where and when (non-)violent transfer of territory to Boko Haram occurred. Second, the data from ACLED is cross-referenced with maps of the IOM (2015). These maps depict the areas that were fully and partially under Boko Haram control in January 2015 (see figure A.6). By cross-referencing data from both sources, it is possible to control for potential measurement errors or diverging accounts.¹⁴ All LGAs that have experienced any violent event during which Boko Haram gained control over territory according to ACLED, and were deemed "inaccessible" or "under control of Boko Haram" according to the IOM, are considered to have been occupied. Individuals in the sample that live in one of these LGAs are considered to be treated.

¹³ As noted previously, Boko Haram lost control of the areas relatively quickly and the occupation was temporary, starting in May 2014 and lasting until Spring 2015. As can be seen in figure A.7, the task-force moved in rapidly and almost immediately recaptured the entire area. The figure is based on ACLED event-data and shows the number of events where the government retakes, or non-violent transfers of, territory. As was the case with data on Boko Haram's occupation of territory, it has been noted that the military did not always put out verifiable statements which partially feed into the data shown (through media outlets, etc.). However, as the survey that this study relies on was able to be conducted again in September-November 2015, it is assumed that the areas were no longer under Boko Haram control.

¹⁴ For example, two LGAs (Askira/Uba and Geidam) that did not experience events during which Boko Haram seized control according to ACLED, are considered to be fully controlled by Boko Haram by the IOM. Investigating this further, it turns out that these LGAs are explicitly mentioned in various news sources as having fallen under Boko Haram control and being occupied (Al Jazeera, 2014; Anadolu Agency, 2015; BBC, 2015; France24, 2014). For these reasons, these will also be considered occupied in this study.

4.2. Specification of control group

The purpose of this study is to isolate and estimate the effect of an Islamic insurgent groups' occupation on school participation. In order to correctly identify the effect, selecting the correct control group is crucial. First, inhabitants of LGAs that did not experience any events during which Boko Haram gained control over territory according to ACLED, and additionally are identified by the IOM (2015) as "fully accessible" or "under control of government forces" in the corresponding time periods are considered eligible to be included in the control group. Second, to support the identification of the effect it is required that the control group experienced the conflict and insurgency, and was additionally comparable to the treatment group in many other ways.

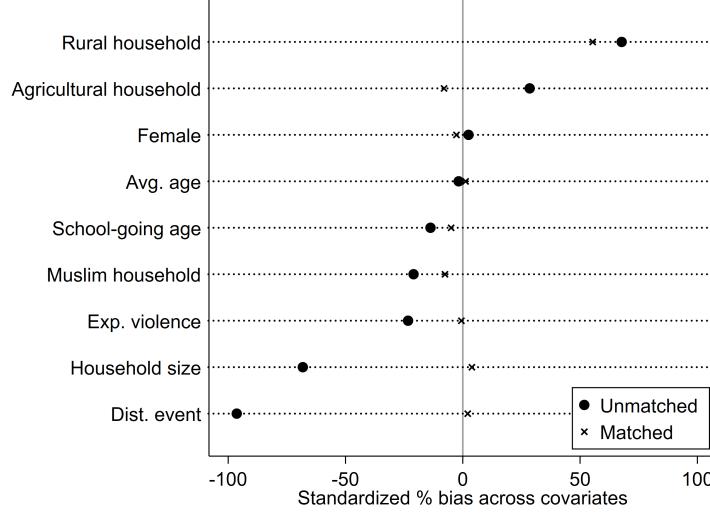
The control units are selected through propensity score matching. Various characteristics are used to match on, including household size, religion, gender, whether the household is an agricultural household, age, and exposure to violence. Moreover, I include a measure for local support for Boko Haram in the propensity score matching in order to account for potential differences between the treatment and control group, and additionally address a threat to the identification of the effect. I use data from Archibong (2019) on regional ethnic majorities and pre-colonial centralization of rule, which are shown to be related to lower levels of public good provision by the government. As shown by Brechenmacher (2019), lower public good provision is correlated with higher support for Boko Haram among the population. Unfortunately, this data is not available for all units that are eligible to be included in the control group. I therefore account for the level of local support for Boko Haram by including the distance to closest event where Boko Haram occupied territory in the propensity score matching. There is a very strong, negative, significant correlation between the distance to one of these events and the measure of Archibong (2019).

4.3. Descriptive statistics

The treatment and control group have very similar characteristics, as shown in table 1. The only difference is that individuals in the treatment group are slightly more likely to be from a rural household. This differences will be addressed in the estimation by including controls and individual level fixed effects.

The two main variables of interest that capture the level of cooperation with Boko Haram's rule on education, change in the YoS and school attendance, are shown in figure A.10. Considering the left panel of the figure, two things jump out. First, the average annual increase in YoS was slightly lower for individuals in the treatment group, compared to those in the control group, before the treatment. However, this differs greatly between the two groups when considering the change in YoS throughout the years of the occupation. Note that the 'gap' in the data, during which Boko Haram occupied LGAs, is about two years in total, while the occupation of Boko Haram lasted

Figure 2: Balancing through propensity score matching



Note: 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. The circles show the unmatched scores; the crosses show the bias of the matched sample.

Table 1: Descriptive statistics of treatment and control group

| Variable | Mean control group | Mean treatment group | Diff. | T-test |
|------------------------|-----------------------|-------------------------|----------|--------|
| Rural household | 0.89 | 1 | -0.11*** | -5.39 |
| Agricultural household | 0.08 | 0.11 | -0.03 | -1.27 |
| Female | 0.52 | 0.49 | 0.03 | 0.74 |
| Avg. age | 7.90 | 7.43 | 0.47 | 1.76 |
| School-going age | 0.70 | 0.66 | 0.04 | 1.05 |
| Muslim household | 0.69 | 0.66 | 0.04 | 0.95 |
| Exp. violence | 0.58 | 0.78 | -0.19 | -1.59 |
| Household size | 7.68 | 7.86 | -0.18 | -0.84 |
| Δ YoS | 0.44 | 0.36 | 0.08 | 0.72 |
| <i>School att.</i> | 0.52 | 0.49 | 0.03 | 0.74 |
| <i>N</i> | 831 | | | |

Note: Means of the control variables used in the analysis, for both the treatment and control group. Difference between the means in column four, t-test in column five. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

approximately a year.¹⁵ Throughout these two years the children in the control group witnessed an average increase of 1.45 years in YoS, while children in the treatment group increased their education with little over half a year.

¹⁵These two years spanned roughly two school-years, 2013/2014 and 2014/2015.

Considering school attendance (right panel), it is clear that children in the treatment and control group had similar school attendance rates prior to the occupation. However, whereas attendance rates among children in the control group are higher after the occupation than before the occupation, the reverse is true for children in the treatment group: school attendance rates have decreased. This corresponds to anecdotal evidence regarding a significant decrease in school attendance rates among children of obligatory school-going age reported by NGOs such as Unicef (2017). The following section is dedicated to the estimation of these differences between the two groups with respect to both outcomes.

5. Empirical approach

5.1. 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 change in YoS and school attendance of children. The following model is estimated:

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

Where $Y_{i,t}$ is a continuous variable that captures the change in the total YoS of individual i , living in LGA j , in year t or a binary variable that captures school attendance.¹⁶ D_t is a dummy variable that is equal to one for 2014 onward. $occupation$ is the treatment variable, which is equal to one for individuals living in one of the LGAs that were occupied by Boko Haram. α_i captures the individual fixed effects, λ_t the school-year fixed effects, and $\epsilon_{i,t}$ is the error term.

$X_{i,t}$ is a vector of control variables. Controls included are a dummies for whether the father of the child works in agriculture, the child is of mandatory school-going age (6 – 14 y/o), it is a rural household and the household head is Muslim; the household size, the number of sons/daughters of school going age in the household, exposure to violence and individuals' age, as well as and rainfall and temperature (on LGA level).¹⁷

It is likely that there is spatial correlation in the data. In order to address this potential dependency between observations due to geographical proximity, Conley (1999, 2008) heteroskedasticity and autocorrelation consistent standard errors are used. In the baseline model, there is a distance cut-off of 20 kilometers and a time-lag of three school-years. In section 9, I vary the cut-off value of the

¹⁶The 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.

¹⁷Violence is measured as number of fatalities due to Boko Haram related events within a 5km radius of the household, similar to the measure used by Bertoni et al. (2019).

geographical distance between observations in the sample, as well as the time lag for the calculation of the Conley (1999, 2008) standard errors.

5.2. Heterogeneity of effect: drivers of cooperation

As mentioned in section 3, those who share social identity markers with the rebel group and/or have positive sentiment towards the group are more likely to adhere to the rules of the rebels. The first is estimated by interacting the treatment variable with a dummy for whether or not the household is Muslim. The second by using the measure of Archibong (2019) as an instrument to capture higher levels of support for Boko Haram, as well as increased social cohesion.¹⁸ Due to the potential overlap between sharing social identity markers and living in an area with heightened support for Boko Haram, these two factors will be considered simultaneously.¹⁹

Additionally, enforcement of rule is an important tool rebels use in order to influence the behavior of those they govern. By using violence to ensure civilians adhere to the prohibition of schooling, Boko Haram might have intimidated the population and raised fears of punishment. It is examined whether the baseline effect is driven by those who have experienced targeted violence by considering the heterogeneity of the effect for those who have, and have not, experienced such enforcement. Enforcement is operationalized by a variable capturing attacks to the school closest to the household.

Finally, the literature suggests that it is likely that there are differences in educational outcomes by gender and birth cohort. All the mentioned factors potentially leading to a heterogeneous effect – social identity, social pressure, school-focused violence, gender and birth cohort, captured below by $W_{i,j,t}$ – are interacted with the treatment variable in equation 2.

$$Y_{i,t,j} = \alpha_i + \lambda_t + \beta_{i,j,t}(D_t * occupation_{i,j} * W_{i,t,j}) + \sigma_{i,j,t}X_{i,j,t} + \epsilon_{i,j,t} \quad (2)$$

Importantly, aside from providing insight into the workings of the effect of occupation by Islamic insurgents, these sources of heterogeneity serve as an additional test: if there is evidence that the treatment effect is indeed heterogeneous for these groups, the notion that the effect of occupation is correctly identified is further supported.

¹⁸As mentioned before, the data on support for Boko Haram is sparse and the sample size is therefore smaller when considering this source of heterogeneity.

¹⁹I.e., since support for Boko Haram is likely higher among Muslims, there is a higher chance that someone that lives in an area with higher support for Boko Haram is Muslim. By estimating the role of social identity and social pressure identity simultaneously, this is controlled for.

5.3. Mechanisms

This study considers the effect of exposure to rebel governance through living in occupied areas within a context of conflict. Therefore, aside from estimating the effects as outlined above, it is important to consider what mechanisms – potentially due to the general conflict setting – might drive the effects.

The first group of mechanisms affects the demand for schooling, such as child labor (whether a child works for a household farm, did other paid work, or for a household business), child health (whether a child got sick, or visited a doctor or other healthcare professional), child marriage, and decreasing labor market prospects or potential future returns to education. Additionally, fear and intimidation due to having experienced violence might cause a decline in demand for schooling.²⁰

The second group affects the supply of education (the number of primary and secondary schools, whether the time to get to school has increased, the type of school has changed). All these mechanisms are estimated by regressing the treatment variable together with the controls, as above, on the respective outcomes:

$$V_{i,t,j} = \alpha_i + \lambda_t + \beta_1 D_t * occupation_{i,j} + \beta_2 X_{i,t} + \epsilon_{i,t} \quad (3)$$

Where $V_{i,t,j}$ captures dummies for child labor, child health, child marriage; or continuous variables capturing violence, school supply and payoffs of education. Note that if the effect of occupation is correctly identified, it is not expected to find evidence for any of the mechanisms above.

6. Identification

The previous sections elaborated on the selection of the control group, the comparability of the treatment and control group, and laid out the empirical strategy. This section focuses on the identification of the effect, and provides a discussion to what extent and under what conditions the occupation of areas can plausibly be considered to be exogenous. Additionally, various potential threats to the identification of the effect are considered.

I start with discussing the usual assumptions related to DiD estimation. First, it is important that the treatment and control group do not differ significantly with respect to the pre-treatment trends of the outcome variables. Second, I discuss attrition and the potential issue of migration. Additionally, I consider factors that might have contributed to certain areas being occupied, while

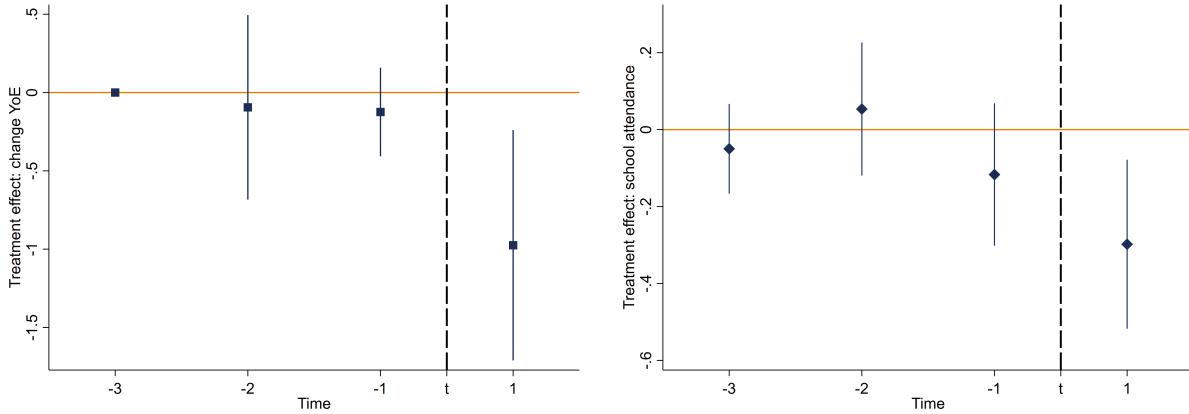
²⁰Though violence targeted at schools is examined as a potential determinant for cooperation with Boko Haram's anti-educational rule, exposure to 'general' violence (attacks on civilians, explosions and remote violence and battles in the vicinity (10km radius) of the household) might be able to explain shifts in behavior as well. Moreover, by examining violence as a potential mechanism it is shown whether violence, and not occupation and subsequent exposure to rebel governance, is the driver behind the effects.

others remained under government control. Such confounding factors are positive sentiment towards Boko Haram among the population that might have allowed the group to occupy certain areas more easily, area characteristics such as ruggedness of the terrain, population density, or the distance to Boko Haram's basecamp in the Sambisa Forest; and community-level variables related to local infrastructure, public good provision, and development.

6.1. Pre-event study

In order to reliably estimate results using a difference-in-differences set up, various assumptions should be considered. First, it is important that the trends of the outcome variables, change in YoS and school attendance, of the treatment and control group do not differ significantly prior to the intervention (in the graphs at time t). The results are presented in figure A.12. There are no significant differences prior to the treatment with respect to either variable.

Figure 3: Pre-event study: change in YoS and school attendance



Note: The graph shows the conditional differences between the change in YoS and school attendance for the treatment and control group for each observed school-year. The confidence intervals are 95%. On the left panel, $t - 3$ (2010/2011 school-year) is the base year. The gap between each observed data point is one school-year, except for the last interval, which spans two school-years.

6.2. Attrition and migration

Attrition is, with the treatment being living in an area occupied by an extremely violent terrorist group, an obvious concern. The attrition rate is twelve percent in the control group, and there is no attrition in the treatment group.²¹ I explore various explanations for this.

²¹About three-quarters of those that dropped out of the sample, did so prior to the last pre-treatment observation (the 2012/2013 school-year), so before the height of the conflict. The survey includes a question for remaining household members about the reason for an individual not being present. Though there are only 26 cases in which this was answered, in 57% of the cases marriage was cited as a reason, in 27% of the cases the individual passed away, and in 12% of the times the individual went to live with a family member elsewhere.

Exposure to violence can lead to attrition through migration. First, there is no evidence that those that drop out of the sample were exposed to more, or different types of, violence compared to those that remained. Second, considering migration as a potential source of attrition, I use data from FEWS, detailing the changes in the population in LGAs in north-east Nigeria in 2014 due to migration spurred on by the violence of the insurgency. The occupied LGAs witnessed a decrease of approximately 16%, and the non-occupied LGAs examined in this study an increase of about 3%. However, across the entire North East, the population of LGAs that were not occupied witnessed an average increase of approximately 12%. Examining the relationship between migration and violence, attacks on civilians seem to be significantly and negatively correlated with migration flows, indicating that these are the events that move civilians to leave areas. Simultaneously, there is a positive correlation between explosions/remote violence, battles, and the number of fatalities due to events, suggesting these attacks were more likely to take place in non-occupied areas. This notion would correspond to the discussion of the types of violence used by insurgents in occupied and non-occupied territory as discussed in section 3. However, since the individuals in our sample do not differ significantly with respect to their exposure to violence and there is no evidence that those who attrited did so in response to violence, this does not seem a plausible explanation for the attrition rates in the treatment and control group.

Furthermore, as mentioned above, the survey design was altered in 2015 in order to adjust to the situation in the North East. Any LGAs that are not continuously included in the survey design are excluded by default, thereby potentially omitting the respondents that might have otherwise been in the treatment group (and have attrited). Second, the higher attrition rate in the control group might be due to various households having the possibility to flee, while this was not an option for those who lived in occupied territories. For example, as discussed in section 2, Boko Haram prohibited inhabitants of occupied villages to leave the area and patrolled roads to ensure civilians could not escape. The lower attrition rate in the treatment group aligns with the findings of Schon (2016) that risk violence along migration routes deters migration. Furthermore, many individuals do not have the option to flee conflict zones as they have no place to go (for example, no family members they can stay with), the refugee camps are not considered a feasible alternative, or fleeing itself is too dangerous (Unicef, 2015).

All the individuals that attrited are removed from the sample. Importantly, there do not seem to be any differences with respect to age, gender, various household characteristics, or exposure to violence between these individuals and those who remained in the sample. To account for the potential differences in exposure to violence, variables capturing exposure to violence in vicinity of the household are included in every analysis.

6.3. LGA-level: Pro-Boko Haram sentiment and other factors

The fact that only specific areas were occupied by Boko Haram might raise concerns that, for whatever reason, it was easier to gain control over these areas than over others. One possible explanation is that there was (heightened) pro-Boko Haram sentiment among the population of certain areas. If this is the case, it is a clear threat to the identification of the effect and exogeneity of the treatment. A shortened explanation of this inherently complex matter is included here: for a full discussion of this matter, the reader is referred to Adesoji (2011), Aghedo (2017), and Archibong (2019).

Boko Haram is not the first fundamentalist Islamic group that carries out violent attacks and incites uprisings in the North East. There is evidence of longer-running grievances and anti-governmental sentiment, often linked to the North having a long tradition of being ruled by a Muslim elite and how this ended under military rule in 1976.²² Considering the current-day impact hereof, Archibong (2019) shows that there is a significant negative association between the precolonial centralization of a region that also had a Muslim majority population, and access to public goods and infrastructure. As mentioned in section 3, the perception of institutions - such as the education system and schools - with respect to their effectiveness and legitimacy can determine local support for insurgents (Arjona et al., 2015). Specific to the case of this study, Brechenmacher (2019) finds that weak service provision and negligence on behalf of the government lead to increased local support for Boko Haram.

The possible presence of higher levels of support in areas that were occupied is addressed in various ways. First, I account for potential differences with respect to the level of support in the propensity score matching procedure as discussed in section 4. Second, variation in the local levels of support will be considered as a source of heterogeneity in the analysis. Additionally, for the areas for which the data is available given the sample, the level of support for Boko Haram given historical grievances and lower levels of provision of public goods by the government is compared: there is no significant difference, though the level seems somewhat higher in the treatment group (see

²²Many scholars refer to the Maitatsine followers and uprisings in the 1980s as drawing on similar anti-Western, anti-secular, and anti-educational sentiment and ideology as Boko Haram (Adesoji, 2011; Aghedo, 2017). This sentiment has its roots in religious and ethnic differences (between the North and South), pre-existing economic conditions, and local governance. For an excellent discussion of these matters and their relationship to current-day local development, see Archibong (2019). Summarizing, Archibong (2019) shows that centralized regions (with a clearly identifiable sovereign) had the ability to bargain with the federal (British) regime to obtain access to public goods or infrastructure in colonial times. In order to be able to bargain, a region had to be compliant – for example, through supporting direct taxation. Moreover, in the northern part of Nigeria, the ruling Muslim elite was granted a significant level of autonomy, especially with respect to matters of religion and tradition (Adesoji, 2011; Aghedo, 2017). This level of autonomy was institutionalized first in the Native Authority Proclamation of 1907, and later again in the Native Authority Law of 1954. The latter ensured that these ethnic regional leaders, in northern areas where the population was predominantly Muslim, had almost absolute power and were able to implement, for example, Shari'a law. In 1976, under military rule and after the civil war, these leaders were removed from politics. This abrupt end to the absolute power of the regional leaders faced strong opposition and contributed to local grievances and anti-governmental sentiment.

table A.10). To address this matter and as a robustness test, I take a qualitative approach to the selection of the control units to specifically account for LGA-level differences (such as local support and historical grievances), and not solely individual-level differences addressed through propensity score matching (the results, robust to this specification, are shown in 9).

Aside from support for Boko Haram additional factors, such as population density, ruggedness of the terrain, and the distance to the Sambisa forest - Boko Haram's initial base - are considered. I find (see table A.10) that the areas that were occupied are more rugged and more likely to be close to the Sambisa forest. The differences in these time-invariant variables are addressed by including fixed effects.

6.4. Community level: development, infrastructure and provision of public goods

Are the communities, villages or towns in the occupied and non-occupied areas comparable? The community-survey data from the NGHS, where respondents from villages are asked about the presence of various public goods and infrastructure, is used to answer this question. Table ?? shows whether public goods are present in the average community in the treatment and control group. In terms of development and local infrastructure the communities that were occupied were similar to those that remained under government control, with the exception of treated areas having a higher number of health centers.

Remaining unobserved structural differences between occupied and non-occupied communities are addressed by including individual, as well as school-year fixed effects in every estimation. As individuals do not move, including these effects captures community-level fixed effects.

7. Results

As Boko Haram's occupation was temporary, it is possible to study the short and long-run effects of exposure to the groups' occupation on educational outcomes. As outlined in section 5, two different dependent variables are used. First, the change in the total number of years of schooling. By estimating the effect of the occupation on this outcome, the result captures whether or not - and how long - children attended school in this time period (the short-run effect). The second dependent variable captures school attendance rates, observed after the occupation had ended. This variable indicates whether schooling behavior was affected after the occupation had ended and the government regained control (the long-run effect).

7.1. During the occupation: change in years of schooling

Column one of table 2 shows the results of the baseline estimation of the short-run effect, capturing changes in schooling behavior during the occupation. Children in areas that were occupied accumulated 0.77 fewer years of schooling, corresponding to about nine months, throughout the occupation compared to children in non-occupied areas, controlling for pre-treatment differences between these groups. This set-back of nine months is incurred in the time period of about two school-years between the last pre-treatment point in the data (March 2013) and the first post-treatment observation (September 2015). As noted in section 3, though the exact duration of Boko Haram's occupation of various areas differs, LGAs were occupied for eleven months on average. To put the number in perspective, the average number of YoS for adults in the sample is 4.90. This implies that the set-back of 0.77 corresponds to about 16 percent of the average educational achievement in the region.

Considering the heterogeneity of this effect provides insight into who was most likely to comply with Boko Haram's anti-educational rule. First, the results indicate that there is no significant difference between genders. However, there is a clear difference between birth cohorts. Younger children, born between 2003 and 2008, are more likely to have accumulated less YoS than children born before 2002. This implies that younger children, who might have just started school, were more likely to stay or be kept at home.

Furthermore, those who share a social identity with Boko Haram – children from Muslim households – are more likely to have significantly lower schooling outcomes at the end of the occupation. Given the evidence that those who broke the Boko Haram's rules were punished (Amnesty International, 2015) and the repercussions of resistance to a group's governance can present negative externalities on the wider population (Arjona et al., 2015), it was expected that those who experience social pressure to conform and/or live in areas with high(er) levels of support for Boko Haram adhere to the prohibition of education. The results indicate that this is the case. Children who lived in areas with positive sentiment towards Boko Haram, and (whose parents or household) might have experienced social pressure to conform, suffer significant negative setbacks compared to children who do not experience this pressure.

Interestingly, there are no (significant) results with respect to exposure to violence. However, note that all variables with respect to violence are lagged by one year to account for last years' violence affecting the current school years' school choices (hence the violence interacted here with the occupation variable accounts for the 2012/2013, and 2013/2014 school years). What the lack of results shows is that there were potentially no significant differences between exposure to school-targeted or general violence for those living in occupied areas. Nevertheless, it is remarkable that neither type of violence seems to be able to explain changes in the school participation of children throughout this time period.

Table 2: The short-run effect: change in years of schooling

| | Baseline (1) | Gender (2) | Birth Cohort (3) | Social identity & pressure (4) | Enforcement of rule (5) |
|--------------------------|---------------------|---------------------|----------------------|-----------------------------------|----------------------------|
| Occupation | -0.769** (0.317) | -0.790** (0.329) | -0.139 (0.367) | 0.190 (0.308) | -0.836** (0.397) |
| Occ.#Female | | 0.043 (0.286) | | | |
| Occ.#Cohort '03-'05 | | | -1.468*** (0.462) | | |
| Occ.#Cohort '06-'08 | | | -1.058*** (0.374) | | |
| Occ.#Identity | | | | -0.834*** (0.212) | |
| Occ.#Pressure | | | | -0.292** (0.126) | |
| School-violence | | | | | -0.369 (0.274) |
| Occ.#School-violence | | | | | -0.058 (0.353) |
| Non-school violence | | | | | 0.349 (0.123) |
| Occ.#Non-school violence | | | | | 0.246 (0.232) |
| μ | 0.589 | 0.589 | 0.589 | 0.537 | 0.589 |
| Controls | Yes | Yes | Yes | Yes | Yes |
| Year FE | Yes | Yes | Yes | Yes | Yes |
| Individual FE | Yes | Yes | Yes | Yes | Yes |
| <i>N</i> | 628 | 628 | 628 | 437 | 628 |

Note: The table shows the results of the estimation of the treatment effect, being exposed to Boko Haram's occupation, on the change in YoS throughout the occupation. Being female, Muslim, ones' birth cohort, and living in an area with positive sentiment towards Boko Haram are time invariant variables and absorbed by the individual fixed effects. The three birth cohorts are defined as children being born between 1998-2002, 2003-2005 or 2006-2008. Controls as laid out in section 5. Conley (1999; 2008) SE's in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

7.2. After the occupation: school attendance rates

When considering the long-term impact of Boko Haram's occupation on school attendance rates, the results indicate that children in the treatment group are 21 percent less likely to be attending school than children in the control group (see column one, table 3). This indicates that potential changes in behavior during the occupation - rejecting education, not attending school - have carried over until after the occupation. Moreover, as it was known that though Boko Haram was expelled from the occupied territories, the group was not fully defeated, fear of Boko Haram returning might have prevented children from returning to school.

When considering the heterogeneity of the effect by gender, it seems to be the case that girls specifically are more likely to drop out of school: 28 percent less likely than boys, to be precise.

Interestingly, there does not seem to be a difference across birth cohorts with respect to school attendance after the occupation. This might imply that the younger children who suffered larger educational set-backs during the occupation continue their education afterwards. They might ‘catch-up’ on missed schooling.

Table 3: The long-run effect: school attendance after the occupation

| | Baseline (1) | Gender (2) | Birth Cohort (3) | Social identity & pressure (4) | Enforcement of rule (5) |
|--------------------------|---------------------|-------------------|----------------------|-----------------------------------|----------------------------|
| Occupation | -0.211** (0.087) | -0.073 (0.070) | -0.235** (0.088) | -0.204** (0.080) | -0.138** (0.062) |
| Occ.#Female | | | -0.277*** (0.103) | | |
| Occ.#Cohort '03-'05 | | | | -0.058 (0.126) | |
| Occ.#Cohort '06-'08 | | | | 0.020 (0.151) | |
| Occ.#Identity | | | | | -0.363*** (0.128) |
| Occ.#Pressure | | | | | 0.202*** (0.050) |
| School-violence | | | | | 0.020 (0.071) |
| Occ.#School-violence | | | | | -0.590*** (0.096) |
| Non-school violence | | | | | 0.058* (0.031) |
| Occ.#Non-school violence | | | | | 0.049** (0.021) |
| μ | 0.515 | 0.515 | 0.515 | 0.518 | 0.515 |
| Controls | Yes | Yes | Yes | Yes | Yes |
| Year FE | Yes | Yes | Yes | Yes | Yes |
| Individual FE | Yes | Yes | Yes | Yes | Yes |
| <i>N</i> | 769 | 769 | 769 | 533 | 769 |

Note: The table shows the results of the estimation of the treatment effect, being exposed to Boko Haram’s occupation, on school attendance rates after the occupation had ended. Being female, Muslim, ones’ birth cohort, and living in an area with positive sentiment towards Boko Haram are time invariant variables and absorbed by the individual fixed effects. The three birth cohorts are defined as children being born between 1998-2002, 2003-2005 or 2006-2008. Controls as laid out in section 5. Conley (1999; 2008) SE’s in parentheses.
* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Children from Muslim households - who experienced potentially the strongest negative effect during the occupation itself - show significantly lower school attendance rates afterwards. Unfortunately, if these children stay out of school, the initial set-back might become permanent and result in definite loss in educational outcomes. Interestingly – when controlling for whether a child is from a Muslim household and faced the occupation – children from areas with heightened social pressure are more likely to be attending school. It might be that the pressure to comply with Boko Harams’ prohibition of schooling diminished in the long-run, resulting in these children returning to school.

Finally, those who have experienced the enforcement of Boko Haram's rule are much less likely to attend school after the occupation has ended. Having experienced significant pressure and intimidation to stay out of school through exposure to school-targeted violence, arguably lead to high levels of fear, keeping children out of school in the long-run. The positive and significant coefficients on variables relating to non-school focused violence can most likely be explained by reverse causality, indicating that children where school attendance rates were higher have also experienced higher levels of violence.

Summarizing, there is evidence that living in an area that is occupied by Islamic insurgents who harbor a strong anti-educational view can have a significant and negative impact on educational outcomes both during, but also after, the occupation. The fact that the heterogeneity of the effect is well-explained through a framework of occupation and rebel governance strengthens the assumption that the effect is correctly identified.

8. Mechanisms

The above focuses on the adjustment of behavior in response to occupation. However, after the occupation ended individuals no longer faced rebel rule: in this time period, "regular" civil war or conflict dynamics might have become more prominent. Considering the potential presence of mechanisms that are not specific to occupation, but conflict, acts as a validity test. If the previously presented results can be well-explained through conflict mechanisms, this would cast doubt upon the identification of the effect of occupation. To this end, various mechanisms affecting the demand for and supply of education are discussed below.

8.1. Demand side mechanisms

8.1.1. Child labor, health status, and marriage

A potential explanation for the decrease in schooling is that the conflict lead to a drop in household income, increasing the need for children to work instead of attending school (Bundervoet et al., 2009; Duryea et al., 2007; Jacoby & Skoufias, 1997; Thomas et al., 2004). The household survey provides data on whether an individual worked outside the household, for a household owned business or on the household farm. Table 4 contains the results. I find no evidence of differences in the labor choices between children in the treatment or control group.

Moreover, I do not find results that suggest that health status might influence whether or not a child attends. This eliminates the possibility that the insurgency worsened the health of children, either through exposure to violence or lack of access to healthcare (Allison, Attisha, et al., 2019). Data from the NGHS on health status and healthcare usage is used to shed light on this matter.

The survey includes questions on whether the child visited a doctor or healthcare professional, was ill, or sustained an injury in the past four weeks. The results are presented in table 4, column four and five.²³

Another well-documented mechanism linking decreased educational outcomes to conflict is child marriage. Child marriage has been shown to be common during insurgencies and civil war due to increased insecurity, and is linked with lower educational attainment and school drop-out (Mazurana et al., 2019; Mourtada et al., 2017; Nguyen & Wodon, 2014; Parsons et al., 2015; Walker, 2013). It is possible that children got married during or after the occupation, leading them to drop out of school. The results are presented in table 4, column six. The rate of child marriage seems to not be affected by the occupation of Boko Haram. The effect (not shown here) is not heterogeneous by gender.

Finally, the household survey offers a way to gain insight into what children are up to when not attending school. When asked for a reason as to why children are not working or studying, those living in areas that were occupied by Boko Haram are 23 percent more likely to indicate that they stay at home in order to perform household and childcare tasks (column 7, table 4). It is noteworthy that the lack level of parental interest cited as a reason for not attending school seems not to be (significantly) affected.

Table 4: Mechanisms: labor, health, marriage, house work and interest in schooling

| | Child labor | | Health status | | Child marriage | | Other | |
|---------------|------------------------------|--------------------------|----------------------|-----------------------------|------------------------|----------------------------|----------------------------------|-------------------------------|
| | (1) Household business | (2) Household farm | (3) Other work | (4) Illness or injury | (5) Doctor visit | (6) Child is married | (7) Household or childcare | (8) (Parental) interest |
| Occupation | 0.018 (0.023) | -0.024 (0.076) | 0.007 (0.009) | -0.031 (0.051) | -0.046 (0.042) | -0.020 (0.013) | 0.259*** (0.087) | 0.099 (0.070) |
| μ | 0.018 | 0.187 | 0.004 | 0.065 | 0.047 | 0.009 | 0.140 | 0.147 |
| Controls | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Year FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Individual FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| N | 778 | 778 | 778 | 479 | 479 | 778 | 778 | 778 |

Note: The table shows the results of the estimation of (3) for various mechanisms. All dependent variables are dummies, equal to one if the answer of the child was "yes" when asked whether s/he performed any tasks, was employed, married, visited a doctor, etc. Conley (1999; 2008) SE's in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

8.1.2. (Un)employment and returns to education

Education is an investment that is more likely to be made if there is an expected likelihood of future returns. Conflict might negatively expect these expectations, resulting in deteriorating schooling outcomes (Chamarbagwala & Morán, 2011; Shemyakina, 2011). In order to examine this mechanism, various factors are considered: whether there are general labor market effects due to

²³There are no differences in the presence of hospitals, health centers or pharmacies in previously occupied communities and those that were not occupied - see table ??.

the occupation, and if the occupation had a differential effect on those that completed primary education, i.e., whether the returns to education have changed. Since especially girls seemed to not return to school in the long-run, the analysis is also run for a sub-sample of women.²⁴

There is some evidence that the occupation had a general negative effect on the labor market (table 5). However, there seems to be an education premium: those with at least primary school education earn relatively higher wages than those without a primary school education. Interestingly, when considering these effects for women only (table 5), the results suggest that the occupation lead to women with a primary school education working fewer hours. (There is not sufficient data on women's wages to estimate the effect.) These results do not directly explain why girls are significantly more likely to stay out of school after the occupation.

Table 5: Returns to education

| | Education premium | | | Education premium (women) | |
|----------------|-----------------------|---------------------|---------------------|---------------------------|-----------------------|
| | Wage (1) | Employment (2) | Hours worked (3) | Employment (4) | Hours worked (5) |
| Occupation | -96.742** (36.054) | -0.406** (0.187) | 1.875 (27.930) | -0.126 (0.255) | 55.686*** (17.512) |
| Occ. * P.educ. | 43.203* (23.006) | 0.017 (0.114) | -23.156 (22.960) | 0.051 (0.160) | -66.021*** (7.409) |
| μ | 36.815 | 0.666 | 40.887 | 0.610 | 38.141 |
| N | 34 | 507 | 180 | 253 | 78 |

Note: The table shows the results of the estimation of (3) for the effect of occupation on (un)employment, labor market prospects, and education premiums. Wage is the average wage (in thousands of Naira) of an employed respondent, employment is a dummy equal to one when the respondent indicates to be employed, and hours worked captures the weekly number of hours worked as reported by employed respondents. P.educ. is a dummy equal to one when a respondent has completed primary education, defined as 6 or more YoS. Conley (1999; 2008) SE's in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

8.1.3. Exposure to violence

Violence is a frequently cited reason for children to be kept home and not attend school (Unicef, 2015), with fear of attacks thereby decreasing the demand for education. Though the heterogeneity of the effect is examined for those experiencing non-school and school-focused violence, a potential difference in exposure to the types of violence close to the household might play a role. In order to examine this possible mechanism, I consider three forms of violence – attacks on civilians, battles, and explosions/remote violence – taking place within a 10km radius of the household are considered. The results are shown in 6. There does not seem to be any evidence suggesting that exposure to violence is a mechanism through which the demand for education decreased, driving the negative effects of the occupation on schooling outcomes.

²⁴The sample is expanded to include individuals that are 15 or older (i.e., older than mandatory school-going age), observed at least once before and after the treatment period, and living in either the occupied or bordering areas are included in this sample.

Table 6: Exposure to violence

| | Attacks on civilians | Battles | Explosions and remote violence |
|------------|-------------------------|-------------------|-----------------------------------|
| Occupation | 0.038 (0.177) | 0.175 (0.1070) | -0.213 (0.166) |
| μ | 0.465 | 0.049 | 0.128 |
| <i>N</i> | 778 | 778 | 778 |

Note: The results above show whether experiencing attacks on civilians, battles, explosions/remote violence within a 10km radius of the household were affected, or more likely, for those living in the occupied areas. Analysis includes controls, individual and school-year fixed effects. Standard errors, clustered on LGA, in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

8.2. Supply side mechanisms

8.2.1. School supply

It has been shown that physical destruction of infrastructure, such as the destruction of school buildings, leads to lower educational outcomes (Akbulut-Yuksel, 2014). Moreover, school accessibility has been found to be positively correlated to schooling (Jayachandran et al., 2002). A low(er) school supply is a logical mechanism behind the decrease in schooling outcomes in the occupied areas. The absence or destruction of schools or other educational facilities might prevent children from going to school. Moreover, school-targeted violence might have lead the destruction of buildings or teachers leaving the area.

I examine the school supply channel in various ways. First, using the community-survey data from the NGHS, I consider the presence of schools in the villages of the respondents in the sample after the occupation (see table A.11).²⁵ There does not seem to be a significant difference between the occupied and non-occupied areas with respect to the presence of primary and secondary schools.

Finally, there are some hints that there was a drop in the number of secondary school teachers.²⁶ However, given that the average age of the sample is nine and most children indicate they attend primary school, it is not likely that this decrease can explain the decrease in educational outcomes. In general, the presence of both primary and secondary schools seem to suggest that children technically had the option to attend school.

Moreover, I do not find evidence that indicates that children who did attend school after the

²⁵The community survey was conducted during the fall of 2015, after the end of Boko Haram's occupation of various LGAs.

²⁶The data from UBEC on LGAs that were previously occupied is very limited (there is only one LGA included in the data) and the results are therefore not conclusive and for this reason not shown here. If one would ignore this blatant shortcoming and consider the impact of the occupation on the number of primary and junior secondary school teachers, there seem to be more junior secondary school teachers, but significantly less primary school teachers. The absence of teachers or a high student to teacher ratio in a primary school might explain part of the drop in school attendance.

occupation were more likely to attend a different type of school, faced higher commuting times, or that the education-related expenditure incurred by the household was higher. The results are shown in table A.12.²⁷ If there would have been results that suggested that any of these changes might have taken place, they could have explained why children in general were less likely to attend school.

As a final test, I examine whether the overall level of development or presence of infrastructure and public goods differed between communities in the occupied and non-occupied areas in the post-treatment period. The results are shown in table ???. There are barely any police stations in the treated areas: this might contribute to lower levels of (perceived) safety, potentially affecting the demand for schooling. However, there are no other differences between the communities.

Summarizing, I find weak to no evidence that supports any of the mechanisms as a plausible explanation for the significant decrease in educational outcomes presented. This diminishes the risk of the estimated effect being driven by conflict, and increases the confidence in the correct identification of the occupation effect.

9. Robustness tests

9.1. Non-binary treatment: duration of occupation

As an expansion of the baseline analysis as well as a test of the validity of the results, I re-estimate the baseline model using a non-binary treatment variable that accounts for the duration of the occupation in each individual LGA. This estimation ensures that the (level of the) treatment varies within each cluster.

More specifically, the treatment variable takes on four different levels: zero for LGAs that were not occupied; one for LGAs that were occupied for half a year; two for LGAs that were occupied for three quarters of a year; and three for LGAs that were occupied for a year. These levels are based on the information on the spread of the occupation as shown in figure A.6.

9.2. Standard errors: varying distance cut-off and time lag

I vary the cut-off value of the geographical distance between observations in the sample, as well as the time lag for the calculation of the Conley (1999, 2008) standard errors. The results are robust to these various specifications.

²⁷A note on the type of school attended in general: the 82 percent of the children in the sample attend federal, state or local government schools, 8.9 percent private schools, 0.7 percent a community school and 8.4 percent a religious school.

Table 7: Results using non-binary treatment variable

| | Change in YoS | School attendance |
|----------------------|----------------------|---------------------|
| Occupation, .5 year | -1.297*** (0.410) | -.144** (0.069) |
| Occupation, .75 year | -0.338 (0.324) | -.081 (0.061) |
| Occupation, 1 year | -1.046*** (0.291) | -.673*** (0.080) |
| μ | 0.589 | 0.515 |
| N | 628 | 769 |

Note: Estimation includes controls, school-year and individual fixed effects. Conley (1999; 2008) SE's in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 8: Standard errors: varying distance cut-off and time lag

| | Change in YoS | School att. |
|------------------------------|----------------------|----------------------|
| Occupation | -0.769** (0.317) | -0.211** (0.087) |
| <i>Cut-off: 20km, lag: 3</i> | | |
| Occupation | -0.769** (0.305) | -0.211** (0.086) |
| <i>Cut-off: 20km, lag: 2</i> | | |
| Occupation | -0.636*** (0.301) | -0.265*** (0.085) |
| <i>Cut-off: 20km, lag: 1</i> | | |
| Occupation | -0.636*** (0.329) | -0.265*** (0.085) |
| <i>Cut-off: 40km, lag: 3</i> | | |
| Occupation | -0.636*** (0.328) | -0.265*** (0.088) |
| <i>Cut-off: 30km, lag: 3</i> | | |
| Occupation | -0.636*** (0.313) | -0.265*** (0.087) |
| <i>Cut-off: 10km, lag: 3</i> | | |
| Occupation | -0.636*** (0.312) | -0.265*** (0.085) |
| <i>Cut-off: 5km, lag: 3</i> | | |
| μ | 0.589 | 0.515 |
| N | 628 | 769 |

Note: The table shows the results of the estimation of the treatment effect, being exposed to Boko Haram's occupation, on the change in YoS and school attendance. Estimation includes individual and school-year fixed effects and controls. Conley (1999; 2008) SE's in parentheses. Different standard errors are shown for different distance cut-off values and time lags. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

9.3. Non-spatial clustering of standard errors

Next, as the treatment is on LGA level, the standard errors are clustered by LGA to examine whether the results are robust to this alternative specification. To again account for potential varying levels of support for Boko Haram, the control group consisting of individuals living in bordering LGAs is used as well. However, due to the small number of clusters (35 and 16, respectively), the standard errors for both specifications rely on the wild bootstrap method from Cameron et al.

(2008).

| | Matched sample | | Bordering LGAs sample | |
|------------|----------------|---------------------|-----------------------|---------------------|
| | Change in YoS | School attendance | Change in YoS | School attendance |
| Occupation | -0.769* | -0.212** (0.097) | -0.709** (0.247) | -0.279** (0.025) |
| N | 631 | 771 | 1121 | 1365 |
| Clusters | 35 | 35 | 16 | 16 |

Note: Estimation includes controls, school-year and individual fixed effects. Robust standard errors, clustered on LGA, in parentheses.* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

9.4. Qualitative sample selection

I take a more qualitative approach to the selection of the control units especially considering potential differences between levels of support for Boko Haram. As the treatment is on LGA level, the control group is also selected based on what LGAs are most suited. Technically, there are a few potential control groups. A first group would consist of the entire North Eastern region of Nigeria. This would clearly form the largest sample, but the differences between the individual regions are obviously larger. For example, not all the states in the North East were subject to the state of emergency. However, solely using the state of emergency as an inclusion restriction would not be sufficient: a large number of the LGAs in these states were not exposed to violence due to the insurgency.

Another option would be to consider only contested LGAs.²⁸ This sample would, however, be too small as only the inhabitants of four LGAs are considered to be contested. Finally, a considerable group of LGAs directly bordered the occupied areas. These areas have been exposed to the violence of the insurgency. Moreover, they were threatened with potential occupation (though none were occupied at any point in time) due to the proximity to Boko Haram's territory. It was therefore unknown to individuals in these LGAs whether they would be "treated" or not. Therefore the control group will consist of the individuals living in a LGA, directly bordering the LGAs that were occupied by Boko Haram (see figure A.11).

Moreover, for all bordering areas (contrary to the full sample used in the analysis), the data from Archibong (2019) is available. This is used to estimate whether the level of support for Boko Haram

²⁸First, Boko Haram occupied vast areas in the North East in almost one swift move, but was pushed back by the military starting early 2015. However, there was some push-back to Boko Haram's territorial aspirations from mid-2014 to early 2015, prior to the task-force moving in. Using ACLED data on both government and Boko Haram's take-over of territory, certain areas are marked as "contested": where, in the same quarter, both Boko Haram and the government took over an area from the others' control (see figure A.9). This provides insight into potential government presence in various areas and where Boko Haram's territorial control was challenged. No territory was contested prior to the third quarter of 2014, or after the first quarter of 2015. The last image shows all contested areas and the areas that were occupied according to the IOM. It is noteworthy that the most southern areas that were contested (at the end of 2014 and early 2015) are not included in set of LGAs that the IOM identified as under Boko Haram control; this supports the notion of (potentially) not fully occupied areas having been excluded from the IOM definition.

differs across the occupied LGAs and the bordering areas. If this would be the case, the positive sentiment might be able to explain why Boko Haram managed to occupy and hold on to certain territories, and was not able to do so with respect to other LGAs that do not share historical similarities. However, the bordering LGAs do not have significantly different levels of support for Boko Haram. Furthermore, the only (significant) difference between these and the occupied LGAs are the level of ruggedness. Model 1 is estimated using this sample. The results are presented in table 9, and are very comparable to the baseline results.

For completion, I also show the results for other control groups. These include solely individuals living in Yobe, Adamawa and Borno (states where the state of emergency was declared), or individuals living in the entire North East. The table below contain the baseline results for the varying control groups. The results are robust to these specifications with larger sample sizes. Moreover, the coefficients get larger with each increase in sample size: this is intuitive, as more potentially less-affected children are added to the sample. Though solely the baseline effects are shown in table 9, the heterogeneous effects are similar to those in tables 2 and 3.

Table 9: Baseline results for varying control groups

| | Bordering LGAs | | State of emergency | | North East | |
|------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| | Change in YoS | School att. | Change in YoS | School att. | Change in YoS | School att. |
| Occupation | -0.636*** (0.170) | -0.265*** (0.083) | -0.759*** (0.200) | -0.248*** (0.089) | -0.821*** (0.210) | -0.264*** (0.084) |
| N | 1230 | 1536 | 2450 | 3081 | 5592 | 6979 |

Note: Estimation of the baseline effect using a qualitatively selected group of control units, consisting of the bordering LGAs. Estimation includes controls, school-year and individual fixed effects. Conley (1999; 2008) SE's in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

10. Concluding remarks

Between one-fourth to one-third of all insurgents occupy territory at some point (Huang, 2016; Stewart, 2018) subsequently exposing civilians to their governance (Arjona, 2016; Rubin, 2020; Stewart, 2018; Wood, 2008). And while the effect of conflict on civilians' behavior has been studied extensively, existing work does not empirically distinguish between exposure to violence and to occupation by insurgents. This study addressed this matter. I examined whether those exposed to occupation adjust their behavior to adhere to the insurgents governance and rule in the short and long-run, and provided an in-depth discussion of channels and mechanisms that drive these effects.

This paper relied on evidence from the case of Boko Haram, an Islamic insurgent group with strong anti-educational stance, that temporarily occupied various areas in North East Nigeria between 2014 and 2015. The temporary occupation of territory by Boko Haram was exploited as a quasi-natural experiment where a certain part of the population was exposed to occupation and conflict, while another part was exposed to conflict but not affected by occupation. The study relied on rich and detailed individual-level panel data and estimates the effects through a difference-in-differences

approach. The control units are selected through propensity score matching to ensure that the sample is balanced and the effect identified correctly. Moreover, to address concerns with respect to spatial dependency or correlation between observations, Conley (1999, 2008) are used.

This research considered what happened *during* the occupation as well as what happened *after* the occupation, thereby evaluating 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 groups' rule. To be precise, these children suffered a set-back in education of 9 months due to the occupation. Moreover, those who share an identity with the governing rebel group might be more likely to stay out of school. Similarly, experiencing social pressure to conform to the occupying groups' rule, as well as by living in an area with heightened levels of support for the rebel group, leads to a decrease in a child's schooling. In turn, being exposed to violent enforcement of Boko Haram's ban on schooling, in addition to their occupation, lead to higher compliance with the groups' rule: those children have significantly lower educational outcomes than others. Interestingly, exposure to 'general' violence, not aimed at schools and education, did not have a similar effect.

Considering the long-term impact of occupation, the evidence suggested that children are 21% less likely to attend school, with especially female children being at risk of permanently dropping out of school. Those who shared an identity with Boko Haram, and during the occupation showed higher rates of compliance with the groups' rule, are more likely than other children to continue to stay out of school after the occupation has ended. When controlling for this effect of shared identity, children from the treatment group that experienced social pressure to conform are more likely to be returning to school in the long-run, after having dropped out in the short-run. Furthermore, having experienced enforcement of the anti-educational rule seems to have lead to intimidation and fear: those who have been exposed to such violence during the occupation are significantly less likely to be returning to school. Importantly, well-documented mechanisms through which conflict and violence affect education did not seem to explain the negative impact on education: this strengthens the notion that the effect of the occupation is correctly identified, and the estimates are not biased by the insurgency in general. Various robustness tests were performed to further support the findings.

Decreasing schooling outcomes can suppress the human capital accumulation of an entire generation and thereby the economic development of states. I demonstrated that school participation can be severely affected by occupation of an (Islamic) insurgent group, on top of the already negative impact of conflict. Moreover, the results showed that the effects of occupation can be not just strong but also persistent, and might remain after the group has retreated and the government has regained control – emphasizing the role that can be played by policy and aid aimed at encouraging and enabling education in conflict settings.

Finally, I showed that the effect of occupation varies across groups and over time, and cannot be explained by well-known mechanisms found in the literature. In doing so, I presented a new approach to considering the various ways that conflict can affect behavior while providing insight into the role that identity, social pressure, and rule enforcement play with respect to how and to what extent various individuals are affected by the occupation. Clearly, to develop efficient peace-building and post-conflict development policies that target and support individuals correctly, more detailed insight into such complex and multi-layered situations is needed. This study forms a first step in that direction.

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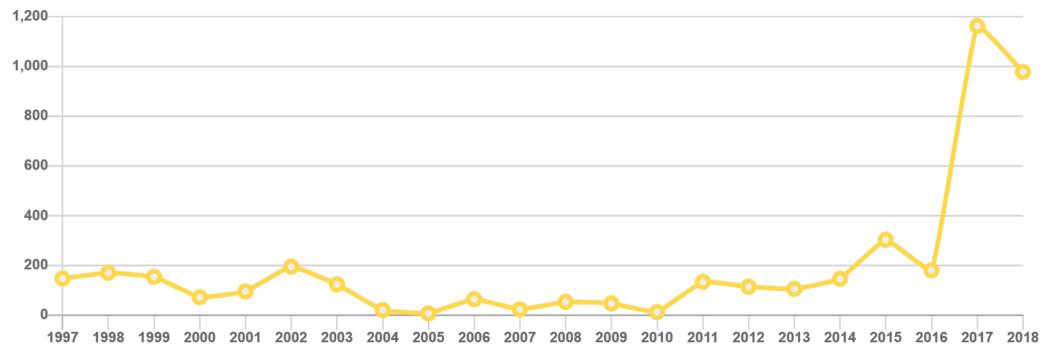
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A. Appendix

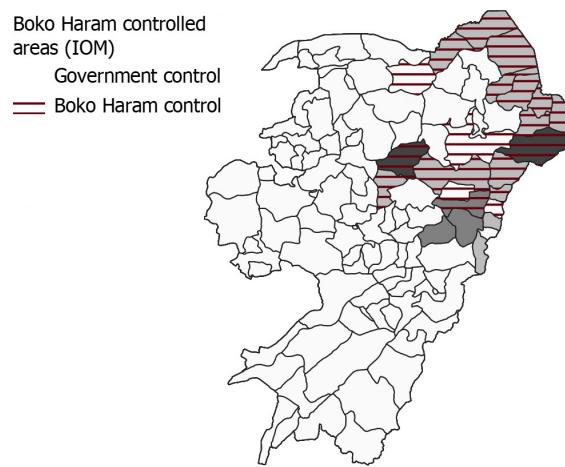
A.1. Figures

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



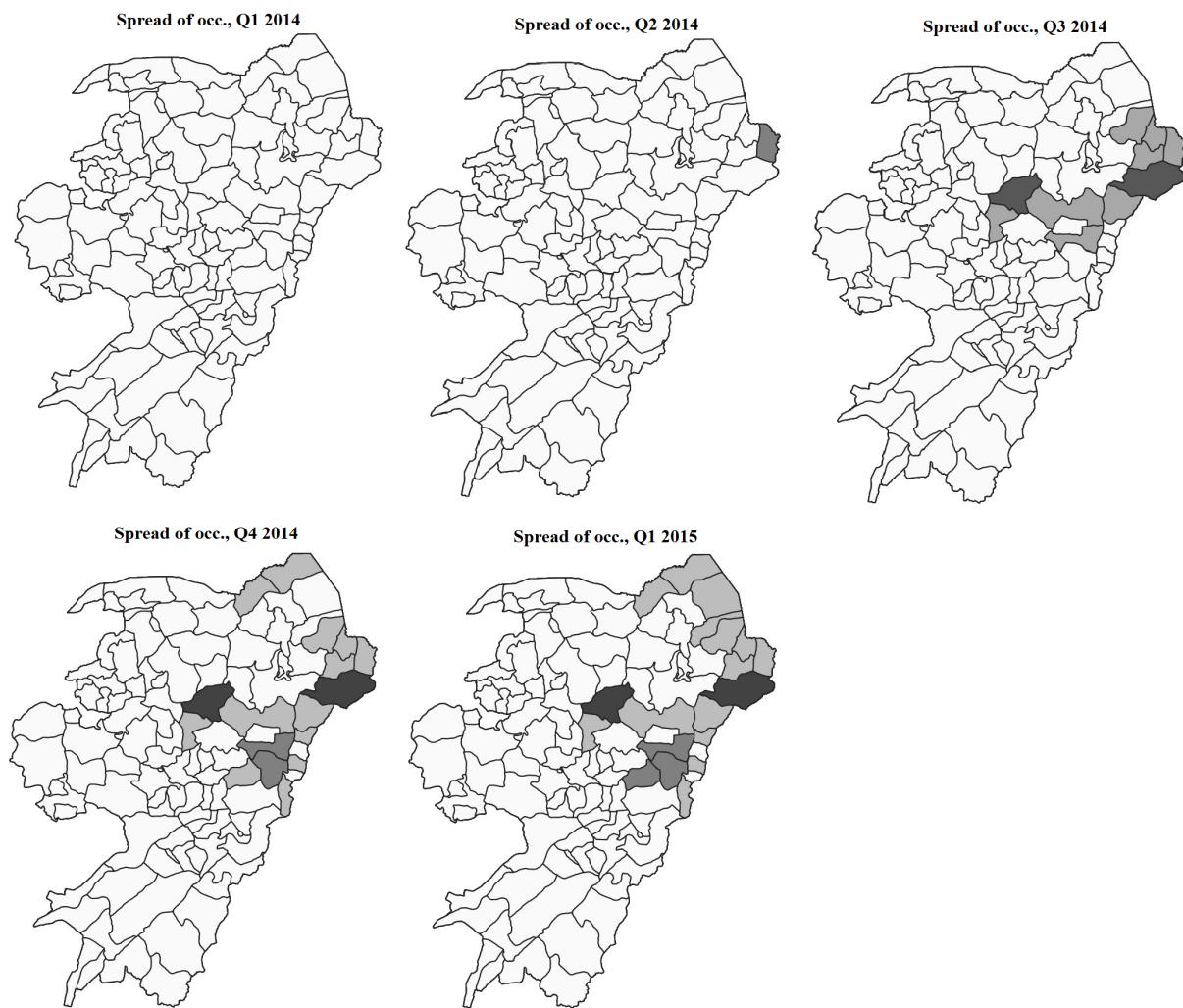
Note: The graph shows the total number of conflict events, per year, where territory was captured by non-state actors. Source: ACLED.

Figure A.5: Occupation of territory by Boko Haram: ACLED and IOM (2015)



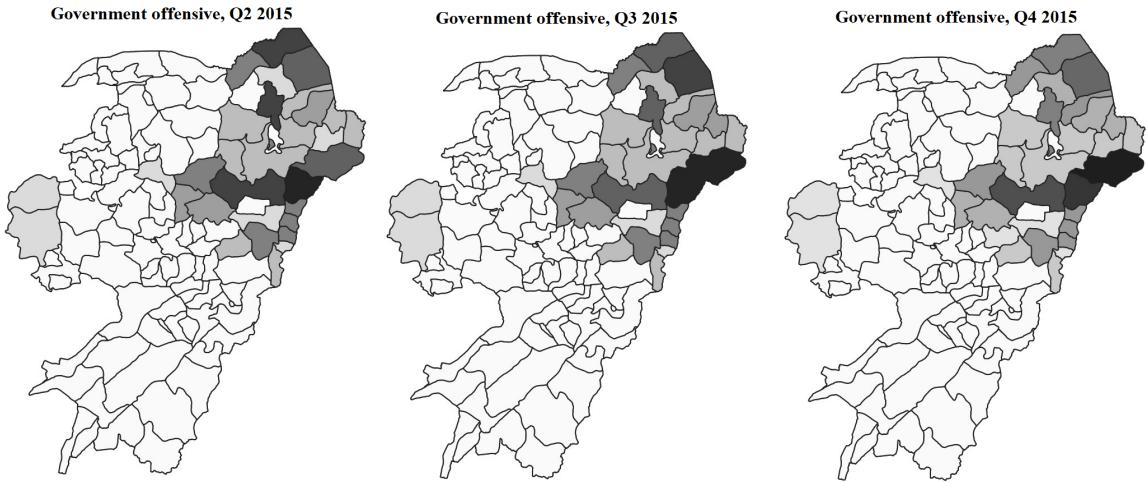
Note: Maps shows the occupation of territory by Boko Haram in Q1 of 2015, the height of the occupation, as well as the areas that were occupied by the group according to the IOM (striped red). The darker, the more events took place where Boko Haram gained control over territory as recorded by ACLED by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

Figure A.6: The progression of the occupation of territory in North-East Nigeria by Boko Haram.



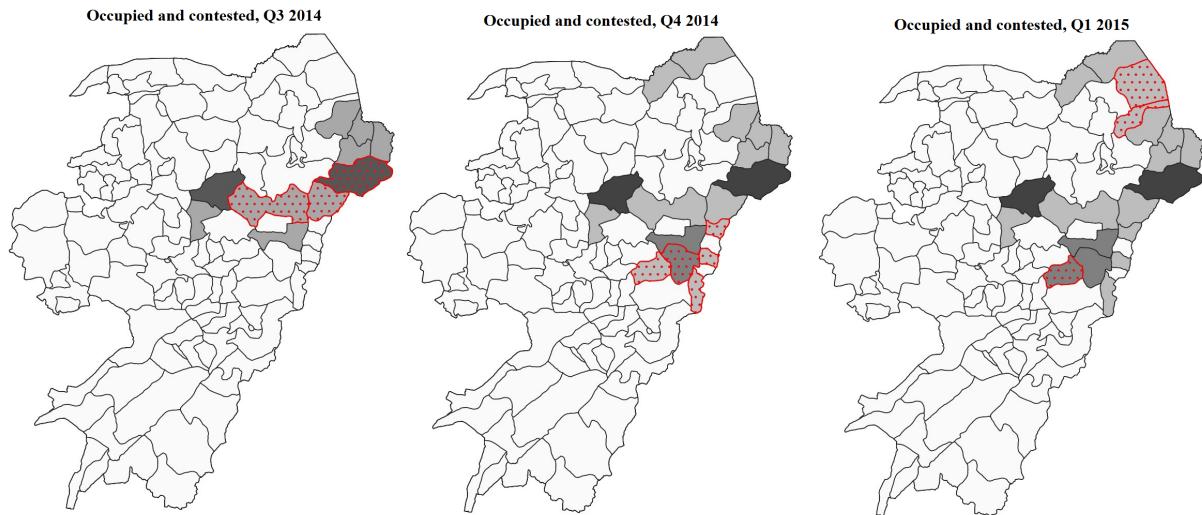
Note: Maps shows the progression of the occupation of territory by Boko Haram. The darker, the more events took place where Boko Haram gained control over territory as recorded by ACLED by quarter/year.

Figure A.7: Government offensives to retake territory



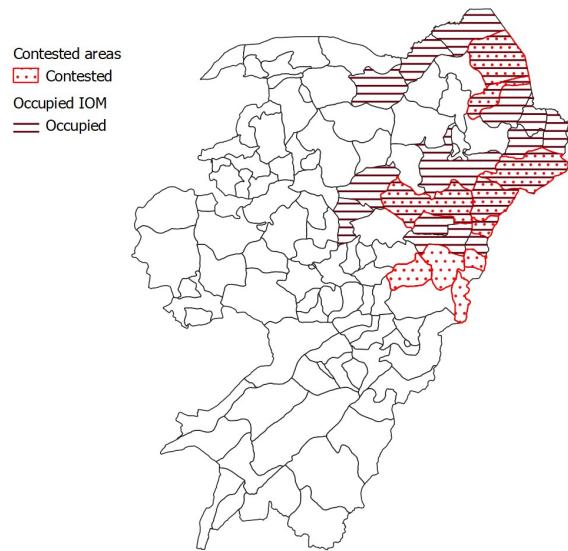
Note: Maps shows the progression of the government offensives to retake territory from Boko Haram. The darker, the more events took place where the government regained control over territory as recorded by ACLED by quarter/year.

Figure A.8: Contested and occupied territory in North-East Nigeria



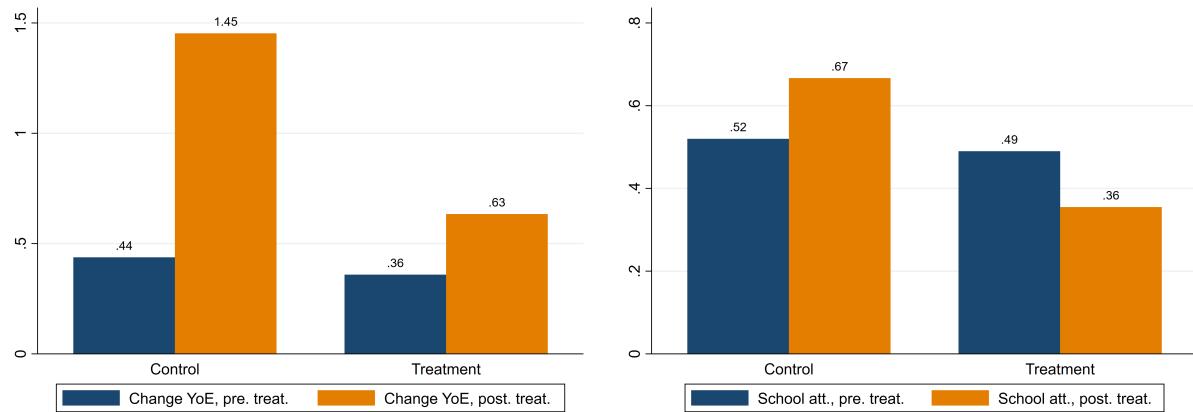
Note: Maps show the number of events, per LGA, where the Boko Haram gained control over territory as recorded by ACLED by quarter/year. "Contested" implies that in that same quarter/year there was at least one event where the government (re-)gained control over territory. The darker the LGA, the higher the number of events that took place in that time period whereby Boko Haram gained control over territory.

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



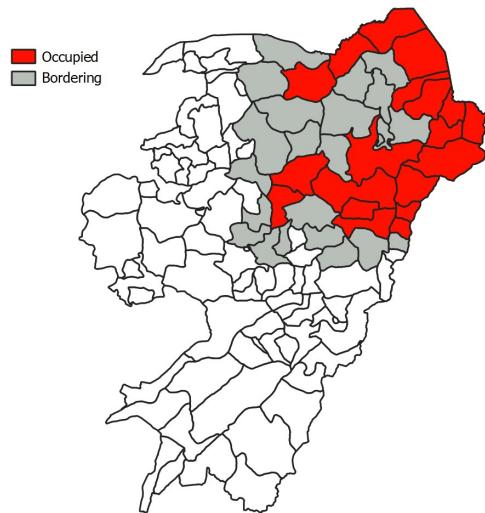
Note: The map shows the areas that were contested based on data from ACLED (see A.8) and the areas that were occupied according to the IOM (2015).

Figure A.10: Change in YoS and school attendance



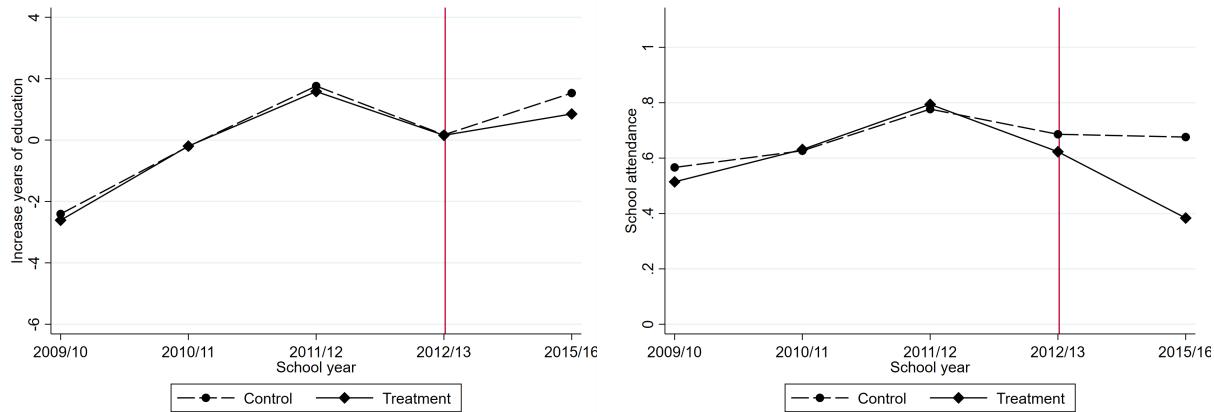
Note: Sample averages of the two main dependent variables of this study, change in YoS and school attendance, for the treatment and control group.

Figure A.11: Control group: bordering areas



Note: The maps show various bordering LGAs (in grey) that make up the control group and the treated LGAs (in red) that were occupied by Boko Haram.

Figure A.12: Pre-event study: change in YoS and school attendance



Note: The conditional trends for school attendance and change in YoS for the control (dashed line) and treatment (solid line) group.

A.2. Tables

Table A.10: Community level differences, pre-treatment

| Variable | Control | Treatment | Difference | T-test |
|--------------------------------------|----------|-----------|-------------|-----------|
| Support Boko Haram, indicator | .2222222 | .5 | -.2777778 | -.8633317 |
| Population, % of pre-insurgency tot. | 103.2836 | 85.85679 | 17.42677*** | 4.533852 |
| Distance to Sambissa | 250.1398 | 150.5 | 99.63983*** | 4.51406 |
| Ruggedness | 26267.09 | 5698025 | -5671758** | -3.191918 |
| Population density | 277.868 | 70.05977 | 207.8082 | .9426281 |
| Primary school | .9256198 | 1 | -.0743802 | -1.125586 |
| Secondary school | .8760331 | .9375 | -.0614669 | -.7155343 |
| Health center | .6222222 | 1 | -.3777778* | -2.021519 |
| Public hospital | .2325581 | .5 | -.2674419 | -1.388996 |
| Pharmacy | .2 | .3333333 | -.1333333 | -.7264545 |
| Post office | .1666667 | .4285714 | -.2619048 | -1.600895 |
| Bus stop | .4871795 | .8571429 | -.3699634 | -1.836198 |
| Bank | .1219512 | 0 | .1219512 | .893237 |
| Market | .5581395 | .875 | -.3168605 | -1.700184 |
| <i>N</i> | 137 | | | |

Note: The table indicates whether, on average, a public good is present in the community (0 = not present, 1 = present) prior to the occupation. Difference between the means in column four, t-test in column five. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A.11: Community level differences, post-treatment

| Variable | Control | Treatment | Difference | T-test |
|------------------|----------|-----------|------------|-----------|
| Primary school | .9354839 | 1 | -.0645161 | -.7320933 |
| Secondary school | .6025223 | .5 | .1025223 | .5526263 |
| Health center | .64 | .75 | -.11 | -.4159921 |
| Public hospital | .04 | 0 | .04 | .3939193 |
| Pharmacy | .32 | 0 | .32 | 1.323834 |
| Post office | .28 | .25 | .03 | .1202998 |
| Bus stop | .08 | .25 | -.17 | -1.019253 |
| Bank | .72 | .75 | -.03 | -.1202998 |
| Market | .24 | 0 | .24 | 1.084455 |
| <i>N</i> | 70 | | | |

Note: The table indicates whether, on average, a public good is present in the community (0 = not present, 1 = present) prior to the occupation. Difference between the means in column four, t-test in column five. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A.12: Mechanism: schooling

| | Change school | School commute | School expenses (Naira) |
|------------|-------------------|-------------------|-------------------------|
| Occupation | -0.098 (0.117) | -0.153 (0.287) | -75.674 (881.395) |
| μ | 2.623 | 2.004 | 1561.669 |
| N | 427 | 226 | 634 |

Note: The table shows the whether having lived through Boko Haram's occupation caused children to change the type of school they attended, the time spent travelling to school or the education-related expenses (in Naira) for the household. Estimation includes controls, school-year and individual fixed effects. Conley (1999; 2008) SE's in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A.13: Qualitative sample selection, bordering LGAs: community differences

| Variable | Control | Treatment | Difference | T-test |
|--|----------|-----------|-------------|-----------|
| Centralization # Muslim super-majority | .9022135 | 1.219907 | -.3176939 | -1.227645 |
| Ruggedness | 10103.79 | 3798684 | -3788580*** | -3.769546 |
| Pop. density | 438.7812 | 70.05977 | 368.7215 | 1.310628 |
| Primary school | .9318182 | 1 | -.0681818 | -1.063817 |
| Secondary school | .8409091 | .9375 | -.0965909 | -.9645967 |
| Health center | .65 | 1 | -.35 | -1.868162 |
| Public hospital | .35 | .5 | -.15 | -.6418346 |
| Pharmacy | .2222222 | .3333333 | -.1111111 | -.5244044 |
| Post office | .2 | .4285714 | -.2285714 | -1.173935 |
| Bus stop | .5882353 | .8571429 | -.2689076 | -1.2592 |
| Bank | .1578947 | 0 | .1578947 | 1.017349 |
| Market | .65 | .875 | -.225 | -1.177471 |
| N | 60 | | | |

Note: The table indicates whether, on average, a public good is present in the community (0 = not present, 1 = present) prior to the occupation. Difference between the means in column four, t-test in column five. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.