Rebel governance, conflict, and educational outcomes

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Abstract

This study shows that civilians' behavior can be severely affected by territorial control by an insurgent group, and that these effects can persist after the government regains control and the occupation ends. I consider a framework of civilian behavior under insurgent rule, where civilians have the option to cooperate with, or resist, rules imposed by insurgents. I exploit the temporary occupation of territory in Nigeria by Boko Haram, an insurgent group with a strong anti-educational stance, as a quasi-experiment. Behavior is measured through school participation among children. Using individual-level panel data, I compare children exposed to the insurgency with children exposed to both the insurgency and occupation. The main results show (i) an immediate, negative effect on school participation, especially for those sharing a social identity with the insurgents, exposed to violent rule enforcement, and facing social pressure to conform, (ii) these negative effects persist in the long-run for the first and second group only. The effects cannot be explained by well-documented mechanisms linking conflict to lower school participation, demonstrating the need to account for occupation, and not solely violence, when considering the impact of insurgencies on civilians.

JEL classification: I24, D74, O10

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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 – even though the two concepts differ fundamentally. In the absence of conflict and territorial control by a non-stage actor, 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; Z. Mampilly, 2021; Maynard, 2019; Yakter & Harsgor, 2022). By using evidence from a quasi-experiment, I am able to disentangle the effect of exposure to territorial control by insurgents from the effect of exposure to violence, addressing the gap in the literature. In this paper I analyze the immediate and persistent effect of occupation by rebels on civilians' behavior and examine various sources of heterogeneity and potential mechanisms driving the effects.

The setting I focus on is the case of Boko Haram, an 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 enables the comparison of those exposed to the insurgency to those exposed to the insurgency and the occupation, disentangling the effect of occupation from the effect of violence. Second, the temporary nature of the group's occupation allows to me study whether potential behavioral changes in response to the group's rule were temporary or persistent, out-lasting the occupation. Third, Boko Haram imposed its anti-educational rule on individuals living in these places. This explicit anti-educational stance and the prohibition of schooling being at the core of the group's governance provides a clear outcome for measuring 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. In this study, this specifically implies 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). There are various factors that affect whether individuals are more likely to cooperate with rebels during territorial control: (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 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 group's governance and continue schooling.

The analysis relies on panel data on children of school-going age from the Nigerian General Household Survey (NGHS). The treatment group consists of children exposed to the insurgency and Boko Haram's occupation, and the control group is restricted to children that were only exposed to the insurgency. I show that the pre-treatment trends in school participation of the treatment and control group do not differ significantly, and address concerns regarding migration and attrition. A variety of factors that could threaten the identification strategy are discussed. 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. To address why Boko Haram might have gained control over certain areas or areas and not others, pre-existing positive sentiment towards the group, earlier fundamentalist conflicts, and historical evidence for rejection of the secular state in the region is considered, as well as the rapid advancement and sudden halt of the group's occupation when pushed back by the Nigerian military.

Being confronted by rebel rule and territorial control by insurgents can lead to changes in behavior that are temporary or more persistent, remaining after the occupation has ended and the government regained control. The analysis includes two different outcomes to estimate these short and long-run effects. First, I construct a variable that captures the

difference between the total accumulated years of schooling (YoS) of a child prior to, and after, the occupation. This outcome indicates whether and for how long a child attended school during the occupation. The second outcome captures school attendance in the school-year after the occupation. An effect of the treatment on this outcome indicates whether a child is attending school after the occupation ended and whether potential initial effects persisted in the longer run.

The results indicate that the territorial control by Boko Haram had a temporary and persistent negative effect on school participation. During the occupation, children in the treatment group accumulated about 7.5 fewer months of schooling than their counterparts. To put this in perspective, the average adult in the region has approximately five and a half years of schooling. The initial loss of schooling corresponds to about eleven percent of the total years of schooling of an average adult in the region. Additionally, these children are 42 percent less likely to attend school after the government had regained control. The fact that many children do not return to school suggests that they are at risk of turning this initial set-back into a permanent loss in education. Additional findings suggest that girls are less likely than boys to return to school. The results are robust with respect to different specifications of the spatially-clustered standard errors and alternative control groups.

I examine the results further. My analysis leads to several findings, that I interpret in the light of the determinants of potential compliance with insurgents' rebel governance as suggested by the literature. First, social identity theory posits that those sharing identity markers – such as 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. Second, pre-existing support for Boko Haram can cause social pressure to adhere to the group's rule. I find that while children that live in areas with relatively higher support for Boko Haram suffer larger set-backs in schooling during the occupation, they are more likely to attend school in the long-run. Third, insurgent groups often use violence to enforce rules within their territory (Arjona et al., 2015; Olson, 1993). Distinguishing school-targeted from non-school targeted violence, the results show that experiencing being exposed to

anti-educational violence while facing the occupation has a persistent, negative effect on school participation. Importantly, this result does not hold for exposure to non-targeted violence.

It is important to emphasize that I study the impact of territorial control within a context of insurgency, violence and conflict. A reasonable concern is that the results are driven by these matters, and not occupation per se. To address this concern I examine various well-documented mechanisms that drive lower school participation in response to conflict.[1] I find weak to no evidence that any of these mechanisms offer a plausible explanation for the significant and large decreases in school participation.

The baseline analysis is extended in various ways. First, I select the control group using propensity score matching and additionally use two other control group specifications. Second, I estimate the model using a non-binary treatment variable that accounts for the duration of the occupation in different areas. The results indicate that the longer the duration, the stronger the effects on school participation. Finally, though data is limited, I show that, aside from school participation, educational attainment is also negatively affected by the occupation.[2]

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

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[1]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).

[2]Moreover, the results are not affected by employing different clustering methods such as the wild bootstrap approach of Cameron et al. (2008) nor by varying the specification of the Conley (1999, 2008) standard errors used in the baseline analysis.

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 he identification strategy. Section 6 contains the results, and section 7 the mechanisms behind the effects. Finally, section 8 concludes.

Literature

The results of this study demonstrate the need for accounting for occupation, and not solely violence, when considering the impact of insurgencies on the behavior of civilians. 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 the behavior of 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 am able 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; Z. C. Mampilly, 2012; M. A. 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, additionally presenting evidence that suggests 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 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). Furthermore, this paper further illustrates the usage of public goods by insurgents to suppress, influence and coerce the local population, and how this affects the behavior and attitudes of those they rule (Berman, 2003; Kalyvas,

2006; Z. Mampilly, 2021; Maynard, 2019; Yakter & Harsgor, 2022).

By studying the relationship between insurgents' rebel governance and occupation on education 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).

2 Institutional background

2.1 The case of Boko Haram

Boko Haram is one of the largest militant groups in Africa and predominantly active around the Lake Chad basin in North East Nigeria (CFR, 2022). The insurgent group rejects all secular aspects of Nigerian society and strives to establish an Islamic state in Nigeria with Shari'a criminal courts (Anugwom, 2018; Center for International Security and Cooperation, 2018; CFR, 2018; Omenma et al., 2020; Thurston, 2016). 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).

Boko Haram insurgency started in 2009, when the group started an armed rebellion against the Nigerian government. The following years the frequency, size and impact of Boko Harams' attacks drastically increased. In response to the escalating situation the government declared a state of emergency in Borno, Adamawa and Yobe in May 2013. Though this led to increased military presence in the area, Boko Haram gained control over various local government areas (LGAs) in the months that followed, and declared its caliphate in August 2014.[3]

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[3]Figure 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 Maidiguri (the capital of Borno) and more south towards the northern borders of Damboa and Bama (see OCHA).

According to interviews conducted by Amnesty International (2015) with former inhabitants of the caliphate, the group enforced rules aligned with its goal to implement a strict Shari'a law, and which were based in its strong anti-democracy and anti (Western) education sentiment.[4] However, the territory under Boko Harams' control was vast which complicated controlling all civilians living in its territory at all times. To aid in ruling the caliphate, Boko Haram installed Emirs (often someone from the area that supported Boko Haram) in some of the towns it controlled. The Emir was responsible for ensuring that Boko Haram's rules were followed. This created some discrepancies between which rules and how strictly these rules were enforced. For example, in various villages Boko Haram imprisoned people or placed them under constant guard; in others, civilians were allowed to move freely, but fighters patrolled the streets and areas between villages to ensure no-one escaped Boko Harams territory (Amnesty International, 2015). For our study, this implies that though schooling was (in general) strictly forbidden, there might have been cases where children received some education.

Boko Haram continued to expand the area under its control into early 2015. In January 2015, an African task-force to counter Boko Haram was created. The offensive started in February, and Gwoza - considered the headquarters of Boko Haram - was captured in March 2015, marking the end of Boko Harams' control over the region.[5] 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.[6]

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[4]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. Civilians that did not follow the rules risked being trialed and punished. In order to deal with such cases, Boko Haram installed institutions such as a courts where civilians' cases were judged (Amnesty International, 2015).

[5]See figure A.7.

[6]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 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 Reliefweb (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.

2.2 Education in North East Nigeria

Per the Compulsory, Free Universal Basic Education Act implemented in 2004, nine years of (primary and junior secondary) education are free and obligatory. Nevertheless, Nigeria 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 between the population of North East and the education system. Afzal (2020) cites four reasons for this. First, there is a lack of support in the north for the education system that is seen as post-colonial, Western and imposed by the state. 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, given these low educational outcomes, the system is blamed for joblessness and low educational premiums. Finally, Western education is linked to Nigerian state's corruption, as many state officials are Western-educated. This sentiment contributed to Boko Harams' platform as a group with clear anti-educational stance.

3 Framework and mechanisms

Boko Harams' territorial control took place within a setting of conflict. In order to estimate the effect of exposure to Boko Harams' rule I will compare those who are exposed solely to the conflict, with those who are exposed to the conflict *and* Boko Harams' territorial occupation. This implies that there are 'two types' of mechanisms or drivers present: those relating to the ways in which exposure to an occupying force and its ideology can affect attitudes and behavior, and mechanisms relating to conflict, civil war and violence. If the effect of occupation is identified and estimated correctly, I should not find evidence supporting the conflict mechanisms and solely for the first group of drivers. However, I examine whether the effect can be explained through well-documented mechanisms relating to conflict as a robustness test.

This paper builds on work on rebel governance as 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 immediate as well as the persistence 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 Exposure to ideology: social identity, pressure and enforcement of rule

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). The territorial control of Boko Haram, proclamation of its caliphate in these areas, and the group's actions towards civilians under their rule are considered within this framework. Lower schooling outcomes imply that an individual adhered to Boko Haram's anti-educational rule, i.e., cooperated with Boko Haram – and vice versa, with resistance leading to higher schooling outcomes. As noted, individuals face a choice between cooperation or resistance when facing rebel rule. The literature identifies various determinants that might cause sub-groups to be more likely to comply with an occupying force: sharing a social identity (Stets & Burke, 2000), experiencing social pressure to conform (Bursztyn & Jensen, 2017; Panagopoulos, 2014), having (pre-existing) positive sentiment towards the rebels (Arjona et al., 2015; Brechenmacher, 2019) and/or experiencing enforcement of rule (Arjona et al., 2015).

First, sharing a social identity can lead to a heightened sense of belonging or shared identity among people. 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" (Stets & Burke, 2000, p. 4). Religion is an important identity marker (Knott & Lee, 2020; Seul, 1999). Having a religion in common can lead to a more positive sentiment or higher level of support, compared to those who do not share a religion. Based on this, I posit that individuals that share a religion with Boko Haram and have been confronted with Boko Harams' rule are likely to converge in terms of behavior and

attitudes (i.e., rejection of education) than those who faced the groups' rule but did not share a religion.

Building upon shared identity, the extent of compliance among the local population can be due to pro-Boko Haram sentiment among the population. Given the anti-Western education sentiment in the North East (Afzal, 2020), it is possible that some were receptive to Boko Haram's viewpoints: it has been shown that weak service provision lead to increased local support for Boko Haram (Brechenmacher, 2019), and that especially "those who perceive their institutions as illegitimate or ineffective may welcome change" (Arjona et al., 2015, p. 186). Crucially, rebel control in areas with low government service provision enhances social cohesion within villages (M. A. Rubin, 2020). Increased cohesion implies higher levels of pressure to conform to (social) rules: individuals who experiences social pressure or perceive they are being watched (as was the case in villages controlled by Boko Haram) are more likely to engage with pro-social behavior and compliance with rules (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). I hypothesize that those who live in an environment where there is stronger pro-Boko Haram sentiment and the occupation lead to higher levels of social pressure to conform to rules, will experience lower schooling outcomes.[7]

According to Olson (1993), insurgents in control of territory (stationary bandits) often strive for 'peaceful order'. Violence aimed at the civilians living under rebels' control is often used to punish disobedience or defiance of group's governance (contrary to in non-occupied areas, where violence is aimed at instilling fear, looting, extracting resources, or conquering more territory). 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). Given the case of Boko Haram, I will focus specifically on violence aimed at enforcing the anti-educational rule. I expect that those who experience such enforcement are more likely to adjust their

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[7]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. Relying on the strong link between weak provision of public goods by the government and support for Boko Haram (Brechenmacher, 2019), I use the data from Archibong (2019) to create a measure of support for Boko Haram, and consecutive heightened pressure to conform to Boko Haram's rule (discussed more in-depth in section 5.) to examine potential heterogeneity of the treatment effect.

behavior (i.e., have lower schooling outcomes) compared to those who are not exposed to such violence.

3.2 Conflict and civil war

As a robustness test and to confirm that the effect is identified correctly, I examine whether the effect can be explained through well-documented mechanisms relating to conflict, civil war and violence.

There is an oft recorded negative relationship between educational outcomes and conflict.[8] I focus on various well-documented explanations for a 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 (Duryea et al., 2007). Second, decreasing access to healthcare and exposure to 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 has been shown to be common during insurgencies and civil war due to increased (economic) uncertainty, 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). Additionally, conflict can decrease the expected education premiums. The cost of attending school might then not out-weigh potential benefits, causing children to drop out of school (Chamarbagwala & Morán, 2011; Shemyakina, 2011).

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. Finally: violence. Violence serves a different purpose in occupied versus non-occupied territory. According to Olson (1993), in non-occupied territory insurgents act as roving bandits and violence is aimed at looting and extracting resources. This type of violence

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[8]For an excellent overview, see Justino (2011).

can affect school participation through fear of attacks. Various forms of violence will be examined to consider this mechanism. Note that this type of violence is not aimed at enforcing rules, contrary to the violence used in occupied areas.

4   Data

I combine data from various sources to create a panel data set on individual-school-year level, spanning 2009 – 2016. Survey 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). Respondents are asked about their school participation covering the 2009/10, 2010/211, 2011/12, 2012/13, and 2015/16 school-years. The survey does not cover the period during which Boko Haram controlled large swathes of territory (2013/14 and 2014/15).

The survey data is supplemented with various other data. First, the NGHS includes a community component, where community members are surveyed on the presence of various public goods. 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 is from ACLED (Raleigh et al., 2010).[9] I focus on events categorized as violent (excluding, for example, peaceful protests) and that are initiated by Boko Haram. Since both ACLED and the NGHS are geo-referenced data sources, it is possible to construct variables that capture individual-level exposure to violence. Data on the locations of schools is from Archibong et al. (2015), and is used to first determine what school(s) are in the vicinity of a household, and then determine whether these were attacked by Boko Haram. All variables measuring violence are lagged by one year, as to allow last years' events to affect the observed years' decisions on schooling. By doing so, any violence that occurred during the occupation (2014/2015) is accounted for in the

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[9]ACLED 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.

analysis.

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 is obtained from the World Bank, and information on migration flows from FEWS.

Finally, data on precolonial centralization and local ethnic majorities is taken from Archibong (2019) and is used to create a measure for the sentiment towards Boko Haram. Discussing the full complexity of the long-running anti-governmental sentiment in northern Nigeria, long tradition of being ruled by a Muslim elite, and the military rule is beyond the scope of this paper. I refer the reader to Adesoji (2011), Aghedo (2017), and Archibong (2019) for excellent discussions of the matter. Summarizing, Archibong (2019) creates a measure for compliance and non-compliance of ethnic region leaders based on the historical share of the Muslim population, and shows that there is a significant negative association precolonial centralization and the current-day provision of certain public services. Simultaneously, Brechenmacher (2019) finds that weak service provision and negligence on behalf of the government lead to increased local support for Boko Haram. Combining these notions, I assume that areas with lower levels of government provision have higher levels of pro-Boko Haram sentiment.

Only individuals born between 1998 and 2008 are included in the sample as to ensure they were of 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 from 2013 onward. Any individuals living in these regions are excluded from the sample, as they would not have been observed prior to the treatment. However, this is an inclusion restriction that might have affected the attrition rates – this is discussed in section 5.3.

4.1 Data structure and measuring school participation

As the survey was not conducted during Boko Harams' control, there is a gap of two full school-years between the last pre-treatment observation and the (only) post-treatment observation (see figure 1). This study examines school participation during the occupation as well as after the occupation. As can be seen in figure 1, school participation *after*

the occupation, or in long(er) run, is directly observed in the data. However, school participation *during* the occupation, or in the short run, cannot be directly observed. It will therefore be captured by the difference in years of schooling as reported by the individual between each observed school-year (change in years of schooling, or ΔYoS):

$$(1) \qquad \Delta YoS_{t,i} = YoS_{t,i} - YoS_{t-1,i}$$

In other words, YoS in time t captures the amount schooling that individual i accumulated since the last observed time period $(t-1)$, measured in years.
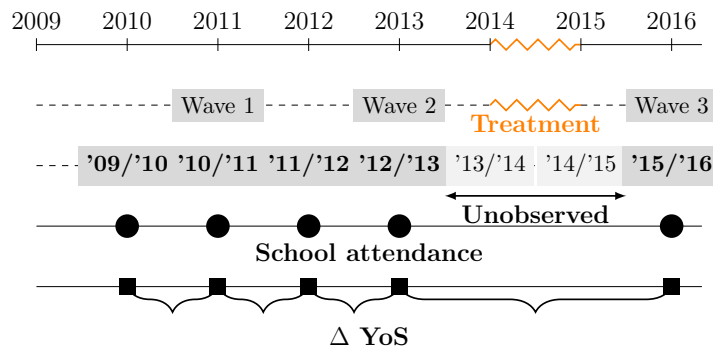

FIGURE 1. DATA STRUCTURE: INDIVIDUAL PANEL DATA FOR FIVE SCHOOL-YEARS

Notes: The diagram explains the data structure. The timeline shows the period considered in this study; the occupation (treatment) took place between 2014 and 2015. 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.

4.2 Treatment and control group

The treatment is defined as being exposed to Boko Haram's temporary occupation that occurred between 2014 and 2015, i.e., living in an LGA that fell under Boko Harams' control in that time period.[10] The occupied areas are identified using two different data sources. First, data from ACLED is used to examine where and when (non-)violent

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[10]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.

transfer of territory to Boko Haram occurred. Second, the data from ACLED is cross-referenced with maps of the IOM (2015). These maps depicts 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.[11] All LGAs that have experienced an (violent) event during which Boko Haram gained control over territory according to ACLED, and were deemed 'inaccessible' (due to Boko Haram presence) or 'under control of Boko Haram' according to the IOM, are defined as occupied for the purpose of this study. Individuals in the sample that live in one of these areas are considered to be treated.

The purpose of this study is to isolate and estimate the effect of an insurgent group's territorial control and (anti-educational) governance on school participation. In order to correctly identify the effect, selecting the correct control group is crucial.

First, only individuals living in LGAs where no events took place during which Boko Haram gained control over territory (according to ACLED) and were identified by the IOM (2015) as 'fully accessible' or 'under control of government forces' are eligible. Second, the control group should be comparable to the treatment group, specifically with respect to conflict exposure. In addition, the anticipation of falling under Boko Harams' control can affect behavior and choices. It is important that those in the control group lived close enough to the occupied areas in order to reasonably assume that the individuals were similarly threatened with potential occupation, though none were occupied at any point in time. For these reasons the control group will consist of the individuals living in a LGA directly bordering the areas occupied by Boko Haram (see figure A.11).

As robustness tests, I vary the control group to include the entire North East or only the three states where the state of emergency was declared. Importantly, I also select the control group using propensity score matching (PSM) as a more 'data driven' approach to ensure a balanced panel. The full analysis and results are shown in the appendix.

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[11]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 reason, these will also be considered occupied in this study.

Descriptive statistics There are 333 treated and 1263 control observations, resulting in a final sample of 1596. As shown in table A.4, the main significant differences between the two groups are with respect to the number of daughters in the household, distance to a violent event, and general exposure to violence. These differences will be addressed in the estimation by including controls and individual level fixed effects. Moreover, exposure to violence will be examined as a mechanism driving potential 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, it is easy to spot the large difference between the treatment and control group with respect to the change in YoS after the treatment. 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 approximately a year.[12] Throughout these two years the children in the control group witnessed an average increase of 1.54 years in YoS, while children in the treatment group increased their education with just half a year. Considering school attendance (right panel): children in the treatment group had higher school attendance rates than children in the control group prior to Boko Haram seizing control. Children in both groups are less likely to attend school after the occupation – however, treated children seem on average even less likely to attend school. 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).[13]

Given the nature of the treatment, it is crucial that not solely the individuals but also the communities and areas that individuals in the treatment and control group live in are comparable. Table A.5 shows the descriptive statistics for the towns in LGAs that fell under Boko Harams' control, and those in LGAs that directly bordered the occupied territory for the time period considered. Comparing the occupied and bordering

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[12]These two years spanned roughly two school-years, 2013/2014 and 2014/2015.

[13]Following the survey on which' data this study is based, I do not distinguish between types of school attended by children. But it is interesting to examine the type of schools attended by the children in the sample: in the treatment group, 96 percent of the children attend a school run by the state or local government. 1 percent of the children reports to attend a religious school, and 3 percent a private school. This differs somewhat from the control group, where 85 percent of the children attend a school run by the state or local government, 1 percent a religious, and 13 percent a private school. There is no significant difference in the likelihood of a child in the treatment or control group attending a religious school. In the section on the results I consider whether children switched schools in response to the occupation.

communities, it is clear that the bordering areas have been exposed to similar levels of violence. Though the difference (column 3) is considerable, it is not significant as the standard variation of these measures is large. Moreover, the distances from a community within an LGA to the location of the violent event (last two rows) are additionally not significantly different.[14] Most importantly, the bordering LGAs do not have significantly different levels of support for Boko Haram – this would have been a likely explanation for certain areas being occupied and/or pre-existing attitudes towards education. The only (significant) difference between these and the occupied LGAs are the number of health centers in the community, and the change in the population on LGA level due to migration. I will discuss the matter of migration and the effect this might have had on the sample and data used in this study in section 5.3. Any potential time invariant differences will be captured by including individual-level fixed effects in the analysis.

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:

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

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.[15] 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,

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[14]I return to exposure to types, levels, and distances to violent events on both individual and LGA level in section 5.3 and 7.

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

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).[16]

All estimations include school-year and individual-level fixed effects, as to capture remaining unobserved structural differences between occupied and non-occupied communities. As individuals do not move, including these effects captures community-level fixed effects. Moreover, 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 cutoff for 20 kilometers and a time-lag of three school-years. In section A.2.2, I vary the cutoff value for the geographical distance between observations in the sample, as well as the time lag for the calculation of the Conley (1999, 2008) standard errors.

Heterogeneity of the effect   Given the setting, it is likely that the effect differs by gender and birth cohort. For example, though differential effects of civil war and conflict with respect to gender are highly context-specific (Buvinić et al., 2014), it is known that Islamic insurgent groups often strongly oppose girls' education.[17] 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.

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[16]Violence 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).

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

5.2 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 effect as outlined above, it is important to consider what mechanisms drive the effects.

In this study I distinguish two groups of mechanisms: first, those relating to rebel governance and ideology affecting attitudes and behavior (see section 3.1) and second, as a robustness test, those relating to conflict (see section 3.2). With respect to the first, though I will refer to these as mechanisms, they are sources of explained heterogeneity and will be estimated as such. The second will be estimated in the more traditional sense, i.e., estimating how the occupation affected each potential mechanism.

Rebel governance, ideology and attitude As mentioned in section 3, a growing strand of the literature considers ideology, identity and social norms as important matters and drivers of change during conflict and of cooperation and behavioral change in response to rebel governance. Various drivers of cooperation are considered.

First, 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. This is estimated by interacting the treatment variable with a dummy for whether or not the household is Muslim. Second, I consider social pressure to conform to Boko Harams' rules, measured by pre-existing pro-Boko Haram sentiment among the population. 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.[18] Finally, 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

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[18]I.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.

by a variable capturing attacks to the school closest to the household.[19]

All the mentioned factors potentially leading to a heterogeneous effect – social identity, social pressure, school-focused violence, captured below by $W_{i,j,t}$ – are interacted with the treatment variable in equation 3.

$$(3) \qquad Y_{i,t,j} = \alpha_i + \lambda_t + \beta_{i,j,t}(D_t * occupation_{i,j} * W_{i,t,j}) + \sigma_{i,j,t}X_{i,j,t} + \epsilon_{i,j,t}$$

These 'mechanisms' are estimated as a form of explained heterogeneity, as a measure for each mechanism is interacted with the treatment variable. This allows me to examine the extent to which each mechanism affected the effect of occupation on both school participation during and after the occupation independently.

Robustness: conflict mechanisms   To confirm the correct identification of the effect, conflict mechanisms are considered. These mechanisms relate to 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, 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] Moreover, conflict mechanisms also explain how the supply of education was affected (the number of primary and secondary schools, whether the time to get to school has increased, the type of school has changed). These mechanisms are estimated by regressing the treatment variable together with the controls, as above, on the respective outcomes:

$$(4) \qquad V_{i,t,j} = \alpha_i + \lambda_t + \beta_1 D_t * occupation_{i,j} + \beta_2 X_{i,t} + \epsilon_{i,t}$$

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[19]Intuitively, a driver of lower schooling outcomes would be the fear that schools and/or students might be the target of attacks. Using data on the location of schools in 2012 from Archibong et al. (2015), households, and violent attacks, it is estimated whether the school closest to the household has been exposed to violent events within a 5km radius. This radius is chosen as to capture potential areas that children have to pass by or through on their way to school. The occurrence of such an event is interacted with being occupied.

[20]Though 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.

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

Estimating equation 4 will explain to what extend the occupation affected schooling through each mechanism. Due to the nature of the survey data and structure, I cannot estimate whether mechanisms relating to child labor, health, and 'other' factors (marriage, household duties, parental interest) are responsible for a potential effect *during* Boko Harams' territorial control, but only after the occupation.[21] Nevertheless, these results are indicative of these mechanisms explaining the immediate and persistence of the effect and, importantly, whether the results of model 2 can be attributed to ideology or conflict.

5.3 Identification

I addressed potential threats to the exogeneity of the treatment such as local support for Boko Haram, differences in infrastructure or development on LGA or community/town level, and elaborated on the selection of the control group, the comparability of the treatment and control group, and detailed how the empirical strategy accounts for potential unobserved con-founders. What remains is to address the usual assumptions related to difference-in-difference 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.

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 2. There are no significant differences prior to the treatment with respect to either variable.

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[21]The survey asks about children's work, health, etc. during the past month.
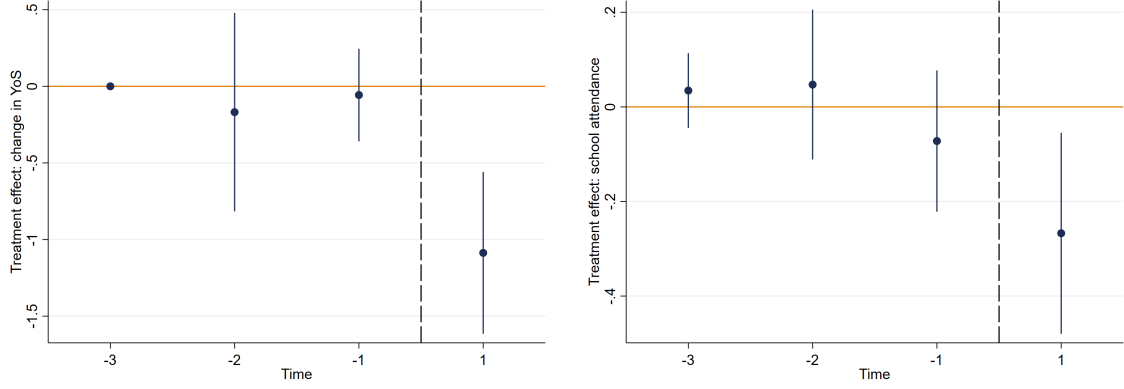
FIGURE 2. PRE-EVENT STUDY: CHANGE IN YoS AND SCHOOL ATTENDANCE

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.

Attrition and migration   The attrition rate is seven percent in the control group, and six percent in the treatment group. There do not seem to be any differences with respect to age, gender, various household characteristics, or exposure to violence between individuals who dropped out and those that remained in the sample.

These rates seem rather low given the situation at hand. However, 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, 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 (relatively low) attrition rate in the treatment group aligns with the findings of Schon (2016), that risk of violence along migration routes deters migration. This is supported by anecdotal evidence from Unicef (2015) from the specific case of Boko Haram, as individuals reported to not consider refugee camps as a feasible alternative. Many also indicated that fleeing itself is too dangerous or not possible since they do not have a place to go (for example, no family members they can stay with) (Unicef, 2015).

Nevertheless, attrition remains an obvious concern. I examine 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.[22] 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 cause civilians to leave certain areas. Simultaneously, there is a positive correlation between the relative change in population due to migration and the occurrence of explosions/remote violence, battles, and the number of fatalities, suggesting 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. Moreover, this is a similar pattern visible in the control and treatment group's exposure to violence, with the control group being exposed to more violence than the treatment group (see table A.4).

6   Results

As Boko Haram's occupation was temporary, it is possible to study the short and long-run effects of exposure to the group's 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).

Column one of table 1 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 0.62 fewer years of schooling, corresponding to approximately half a year, throughout the occupation compared to children in non-occupied areas, controlling for pre-treatment differences between these groups. This set-back of 7.5 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

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[22]The occupied LGAs witnessed a decrease of approximately 16 percent, and the non-occupied LGAs examined in this study an increase of about 30 percent.

(September 2015). To put the number in perspective, the average number of YoS for adults in the sample is 5.48. This implies that the set-back of 0.62 corresponds to about 11 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 during the occupation. 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 2006 and 2008, are more likely to have accumulated less YoS than children that were older at the start of the occupation. This implies that younger children, who might have just started school, were more likely to stay or be kept at home, or delayed the start of school.

TABLE 1—MAIN RESULTS

| | Short-run effect | | | Long-run effect | | |
| | Change in YoS | | | School attendance | | |
	(1)	(2)	(3)	(4)	(5)	(6)
Occupation	-0.62***	-0.57**	-0.39	-0.27***	-0.14**	-0.22***
	(0.19)	(0.21)	(0.27)	(0.08)	(0.06)	(0.08)
Occ.#Female		-0.15			-0.28***	
		(0.21)			(0.11)	
Occ.#Cohort '03-'05			-0.53*			-0.07
			(0.32)			(0.13)
Occ.#Cohort '06-'08			-0.31			-0.07
			(0.25)			(0.12)
$\mu_{control}$	0.78	0.78	0.78	0.64	0.64	0.64
N	1232	1151	1232	1536	1436	1536
Controls	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓
Individual FE	✓	✓	✓	✓	✓	✓

Notes: 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 (column 1-3) and school attendance after the occupation (column 4-6). Being female and ones' birth cohort 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) SEs in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

When considering the long-term impact of Boko Haram's occupation on school attendance rates as percentage deviation from the mean, the results indicate that children in the treatment group are 42 percent less likely to be attending school than children in the control group (table 1, column four). This indicates that potential changes in behavior during the occupation - rejecting education, not attending school - have carried over until after the occupation.

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: 44 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.

7   Mechanisms

The above focuses on the general adjustment of behavior in response to occupation. I first examine whether the effect can be explained through various channels relating to ideology, social identity and pressure, and enforcement of rule. To examine the robustness of the identification of the effect I turn to the mechanisms relating to conflict, specifically those that might have affected the demand for schooling from an individual perspective (child labor, health, marriage, returns to education, and exposure to violence) and those affecting school supply (presence of and type of schools and teachers).

7.1   Exposure to ideology

Three different sources of explained heterogeneity or ideology-related mechanisms are a shared social identity (religion), social pressure, and enforcement of rule. The results are shown in table 2. First, those who share a social identity with Boko Haram are negatively affected by exposure to Boko Harams' rule, both during and after the occupation. These children from Muslim households who experienced a very strong negative effect during the occupation also show significantly lower school attendance rates after the occupation has ended.[23] Unfortunately, if these children stay out of school, the initial set-back in accumulated YoS might turn into a permanent loss in educational outcomes.

Second, 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

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[23]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 is not heterogeneous for children of Muslim households (Bertoni et al., 2019).

TABLE 2—IDEOLOGY AND OCCUPATION

| | Short-run effect | | Long-run effect | |
| | Change in YoS | | School attendance | |
	(1)	(2)	(3)	(4)
Occupation	0.15	-0.51**	-0.28***	-0.20***
	(0.20)	(0.23)	(0.08)	(0.05)
Occ.#Pressure	-0.42***		0.19***	
	(0.12)		(0.5)	
Occ.#Identity	-0.85***		-0.35***	
	(0.21)		(0.13)	
Occ.#Sch.viol.		-0.59		-0.54***
		(0.44)		(0.08)
Occ.#Non-sch.viol.		0.01		0.06**
		(0.18)		(0.03)
School violence		0.58		-0.01
		(0.40)		(0.03)
Non-school violence		0.28**		-0.01
		(0.11)		(0.01)
$\mu_{control}$	0.78	0.78	0.64	0.64
N	924	1232	1153	1536
Controls	✓	✓	✓	✓
Year FE	✓	✓	✓	✓
Individual FE	✓	✓	✓	✓

Notes: 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 (column 1-2) and school attendance after the occupation (column 3-4). Being Muslim and living in an area with positive sentiment towards Boko Haram are time invariant variables and absorbed by the individual fixed effects. Controls as laid out in section 5. Conley (1999; 2008) SEs in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

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 a significant negative educational setback compared to children who do not experience this pressure. However, these kids seem relatively more likely than others who faced Boko Harams' rule to attend school after the occupation has ended. Third, there do not seem to be any short-run effects relating to enforcement of rule (school focused violence).[24] However, the positive and significant coefficient on variables relating to non-school focused violence can most likely be explained by reverse causality, indicating

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[24] 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 indicates is that there were potentially no significant differences between exposure to school-targeted violence for those living in occupied and non-occupied areas.

that children in areas with higher school attendance rates have experienced higher levels of violence, and were especially likely to be exposed to that during the occupation.[25] Considering the long-run effect, 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.

Summarizing, there is evidence that living in an area that is occupied by 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. Moreover, 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 of exposure to rebel rule is correctly identified.

7.2 Robustness: conflict-related mechanisms

Results with respect to the mechanisms discussed in section 3.2 are shown in table A.8. There are no significant differences between children that have been exposed to the occupation and children that do not with respect to child labor, health status or marriage. Moreover, a lack of parental interest is not more likely to be cited as a reason for not attending school. However, the household survey offers a way to gain insight into what children 'do' 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 almost three times more likely to indicate that they stay at home in order to perform household and childcare tasks (column 7, table A.8).

Education is an investment that is more likely to be made if there is an expected likeli-

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[25]It is important to consider who drops out of school. Are the effects due to the occupation, or driven by an underlying structure in the data – i.e., are the children that drop out of school the ones that completed more years of education prior to the occupation and were they actually 'done' with school? To examine this possibility I focus on the children that do not return to school in the 2015/2016 school-year that live in the previously occupied areas. Corresponding to the main results, children who drop out are more likely to be female and those who live in areas with relatively higher support for Boko Haram are more likely to return to school. Moreover, children that drop out of school seem to have experienced mildly more violence: again, this can be explained by considering the long run effects of enforcement of rule as discussed above.

hood 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 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.[26]

There is some evidence that the occupation had a general negative effect on the labor market (table A.9). However, there seems to be an education premium: those with at least primary school education earn relatively higher wages and are more likely to be employed than those without a primary school education.

A difference in exposure to the types of violence close to the household might be able to explain the effect, especially since 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. I examine the potential role of violence as a mechanism relating to fear – not enforcement of rule in occupied territory, as distinguished from 'other' violence in non-occupied territory or general conflict settings by Arjona et al. (2015) and Olson (1993). 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. There no differences with respect to the types violence between the the treatment and control group (see table A.10).

Finally, one of the most important mechanisms to consider is 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

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[26]The sample is adjusted to only 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.

from the NGHS, I consider the presence of schools in the villages of the respondents in the sample after the occupation (see table A.7).[27] 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.

Moreover, there might have been a lower number of secondary school teachers.[28] 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 occupation were more likely to change to a different type of school, faced higher commuting times, or that the education-related expenditure incurred by the household was higher. Importantly, children are not more or less likely to attend Quaranic school due to the occupation. The results are shown in table A.11.

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. Importantly, the fact that these mechanisms cannot explain the main result suggests that the effect is not solely driven by the conflict in general, but by exposure to territorial control by a rebel group and its ideology and the different dynamics this entails. Additional robustness tests (varying control groups and specification of the Conley (1999, 2008) standard errors) can be found in the appendix.

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

[28]The 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 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 decrease in school attendance.

8   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; M. A. 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 both during and after the occupation, 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 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 group consists of individuals living in areas directly bordering the territory that fell under Boko Harams' control. 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 group's rule. To be precise, these children suffered a set-back in education of 7.5 months due to the occupation. Moreover, those who share an identity with the governing rebel group might be more likely than others to stay out of school. Similarly, experiencing social pressure to conform to the occupying group's 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 group's rule: those children have significantly lower educational outcomes than others. Interestingly, exposure to 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 42 percent 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 group's 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 enforces 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 and thereby the economic development of states. I demonstrated that school participation can be severely affected by occupation of an 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 remain after the group has retreated and the government has regained control. This emphasizes the role that can be played by policy and aid aimed at encouraging and enabling education in (post-)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 is a first step in that direction.

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A   Appendix

A.1   Extending the baseline analysis

A.1.1   Non-binary treatment: duration of occupation

As an expansion of the baseline analysis and 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. 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. The results are shown in table A.12.

A.1.2   Educational outcomes

As mentioned above, the lack of data in addition to the availability of only one post-treatment period does not allow me to consider the (long-term) impact of the occupation on educational outcomes. However, relying on the data that is available, I find that children that are exposed to the occupation complete about 1.63 grades less (on average children are in the fifth grade). There are no age or gender differences with respect to the educational attainment of children. The results are shown in table A.13

A.2   Robustness

A.2.1   Specification of control group: propensity score matching

The purpose of this study is to isolate and estimate the effect of an insurgent group's 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 con-

trol 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, and the propensity scores will be used in the estimation as weights (see section 5). Using propensity score matching reduces dependence on the outcome model specification, as it is done without using the (value of the) outcome variable, reducing bias and leading to more robust inferences (Ho et al., 2007; Rosenbaum et al., 2010; D. B. Rubin, 2007). This is especially relevant when using propensity score matching with difference-in-differences estimation, as is the case in this study. I refer the interested reader to Stuart et al. (2014), for an excellent discussion.

I match on the two nearest neighbors, without replacement. There is no match for five treated observations, and these individuals are dropped from the sample.[29] Various characteristics are used to match on, including household size, religion, gender, whether the household is an agricultural household, age, and exposure to violence, and the pre-treatment averages of the outcome variables. 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). By including these 'true confounders' that predict both the likelihood of treatment and the

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[29]The children were on average 10 years old, but did not have any schooling yet; they had zero change, on average, in their YoS but did attend school (most likely for the first year). They were slightly less likely to be Muslim, but did not differ in another way.
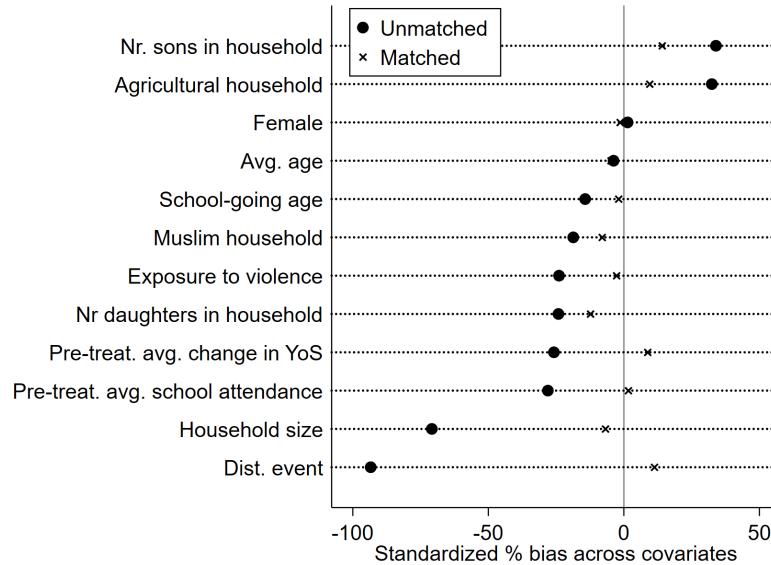
FIGURE A.3. BALANCING THROUGH PROPENSITY SCORE MATCHING

Notes: The graph shows the results for the propensity score matching. The x-axis shows the reduction in the bias, in percent, due to the matching procedure. The circles show the unmatched scores; the crosses show the bias of the matched sample.

outcome variable in the matching procedure I increase the precision of the estimators (Austin, 2011).

A.2.2   Descriptive statistics

There are 318 treated and 518 control observations, resulting in a final sample of 836. The treatment and control group have very similar characteristics, as shown in table A.4. 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.

A note on the type of schools attended by the children in the sample: in the treatment group, 95.3 percent of the children attend a school run by the state or local government, and 1.16 percent a religious, and 3.49 a private school. This differs somewhat from the control group, where 87.92 percent of the children attends a federal, state or local government school, 2.68 percent a religious, and 9.40 a private school. There is no significant difference in the likelihood of a child in the treatment or control group attending a religious school.

Variable	Mean control group	Mean treatment group	Diff.	T-test
Nr. sons in household	0.28	0.31	-0.02	-1.44
Agricultural household	0.07	0.09	-0.01	-0.71
Female	0.49	0.49	0	0.19
Avg. age	8.70	8.63	0.07	0.27
School-going age	0.67	0.66	0.01	0.26
Muslim household	0.73	0.66	0.06*	1.98
Nr. daughters in household	0.24	0.20	0.03*	2.17
Exp. to violence	0.76	0.78	-0.02	-0.15
Dist. event	89.70	91.73	-2.03	-0.50
Δ YoS	0.30	0.36	-0.06	-1.58
School attendance	0.44	0.49	-0.05	-1.34
N	518	318		

Notes: 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. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

A.2.3 Alternative sample selection

I take an alternative approach with respect to the selection of the control units. Since the treatment is on LGA level, the control group is 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.[30] This sample would, however,

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[30]First, 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 the 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.

be too small as only the inhabitants of four LGAs are considered to be contested.

A.2.4 Standard errors: varying distance cutoff and time lag

I vary the cutoff 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 (see table A.15).
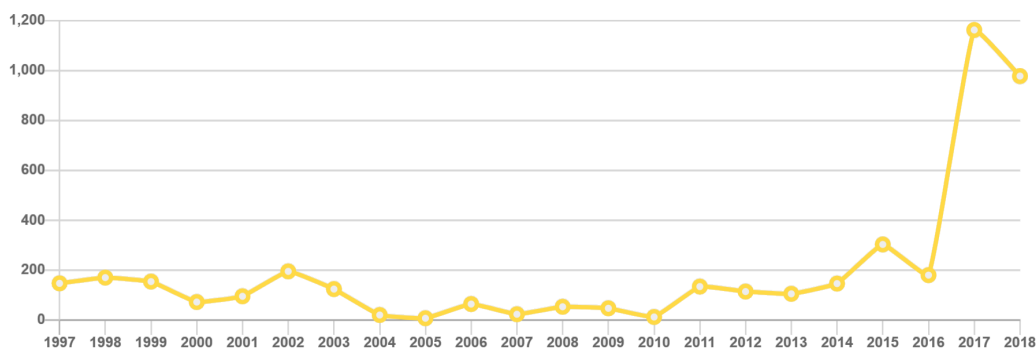
A.3 Figures

FIGURE A.4. NUMBER OF CONFLICT EVENTS WHERE TERRITORY IS CAPTURED

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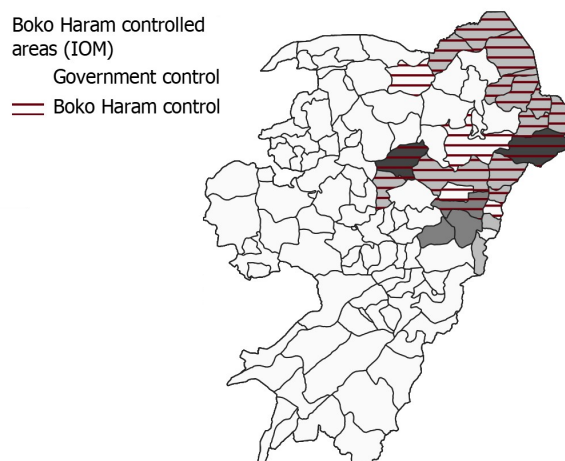

FIGURE A.5. OCCUPATION OF TERRITORY BY BOKO HARAM: ACLED AND IOM (2015)

Notes: Maps shows the occupation of territory by Boko Haram in Q1 of 2015, the height of the occupation, as well as the areas that were occupied by the group according to the IOM (striped red). The darker, the more events took place where Boko Haram gained control over territory as recorded by ACLED by quarter/year.
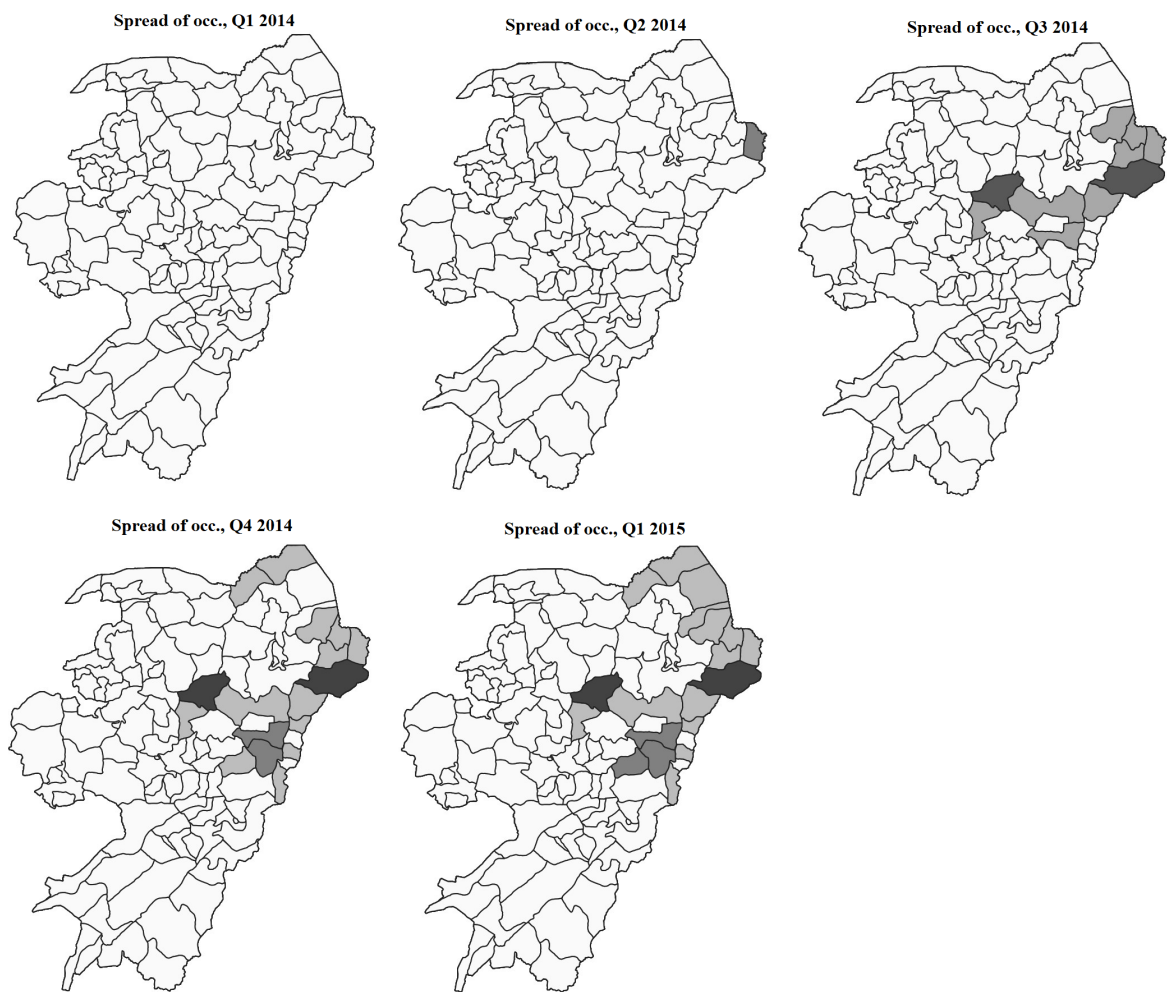
41

FIGURE A.6. THE PROGRESSION OF THE OCCUPATION OF TERRITORY IN NORTH-EAST NIGERIA BY BOKO HARAM.

Notes: 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.
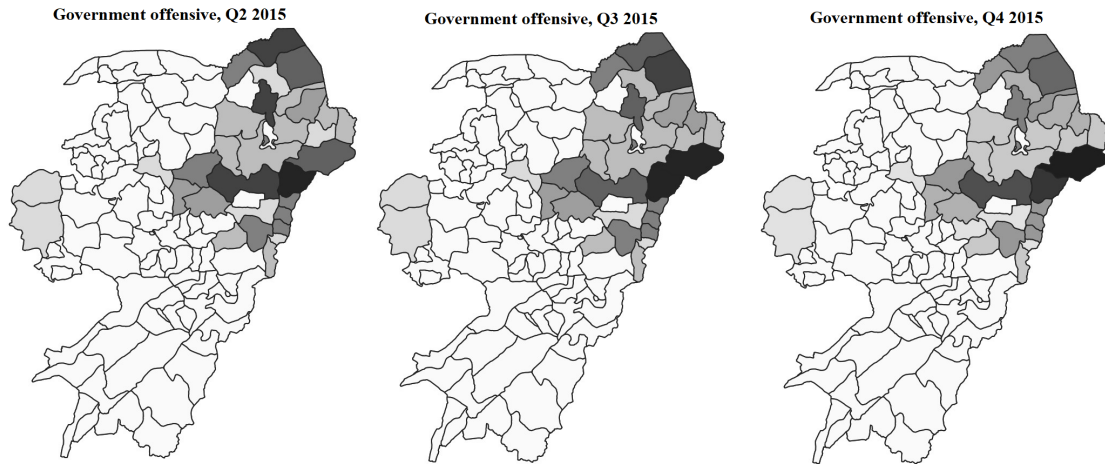
FIGURE A.7. GOVERNMENT OFFENSIVES TO RETAKE TERRITORY

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.
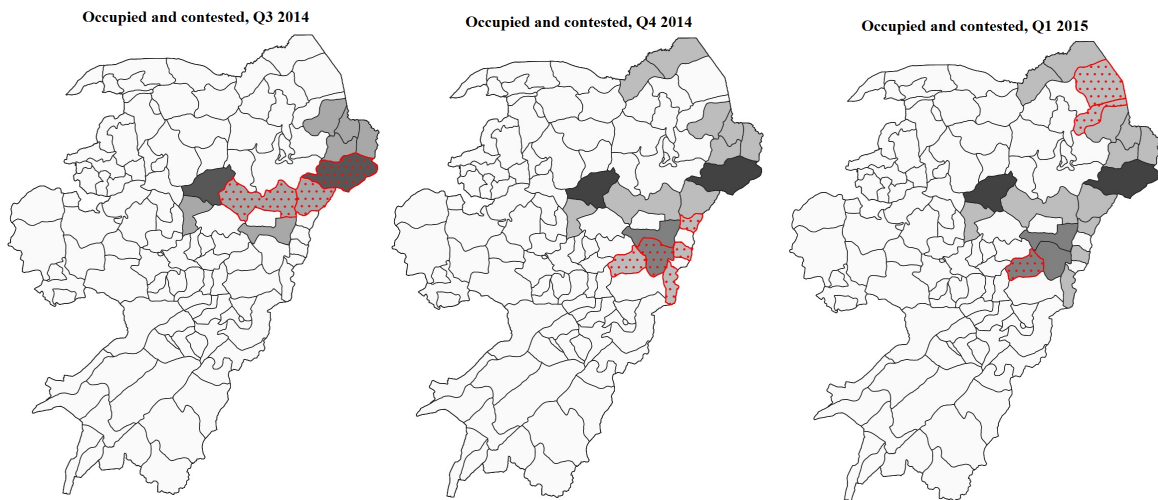
FIGURE A.8. CONTESTED AND OCCUPIED TERRITORY IN NORTH-EAST NIGERIA

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.
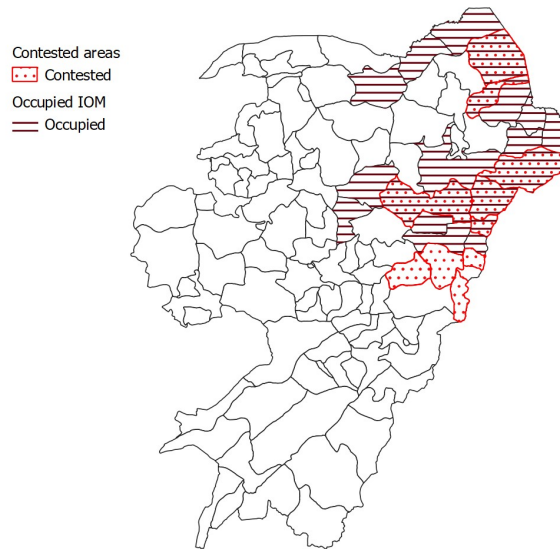
FIGURE A.9. CONTESTED AND OCCUPIED TERRITORY IN NORTH-EAST NIGERIA

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).
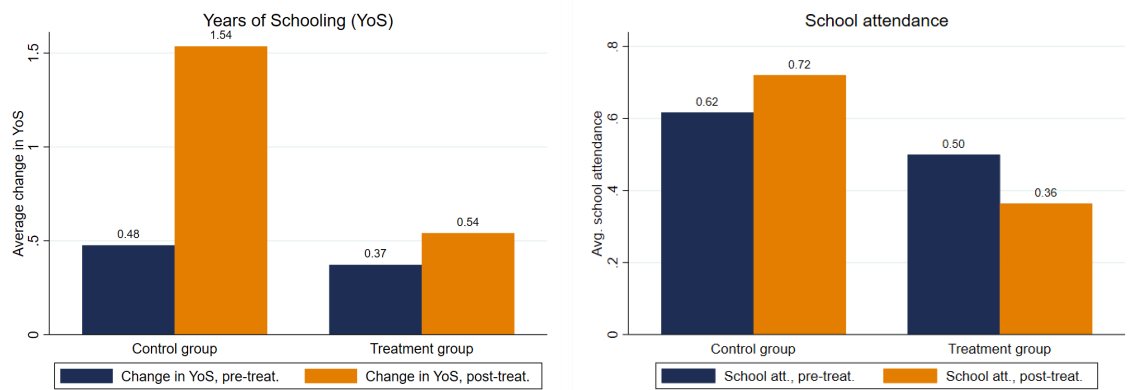
FIGURE A.10. CHANGE IN YOS AND SCHOOL ATTENDANCE

Note: Sample averages of the two main dependent variables of this study, change in YoS and school attendance, for the treatment and control group.
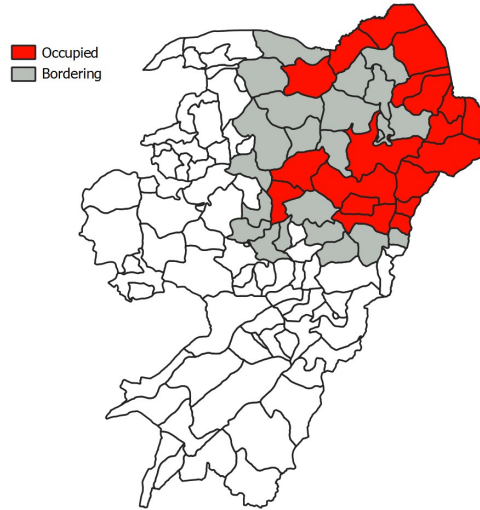
FIGURE A.11. CONTROL GROUP: BORDERING AREAS

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.
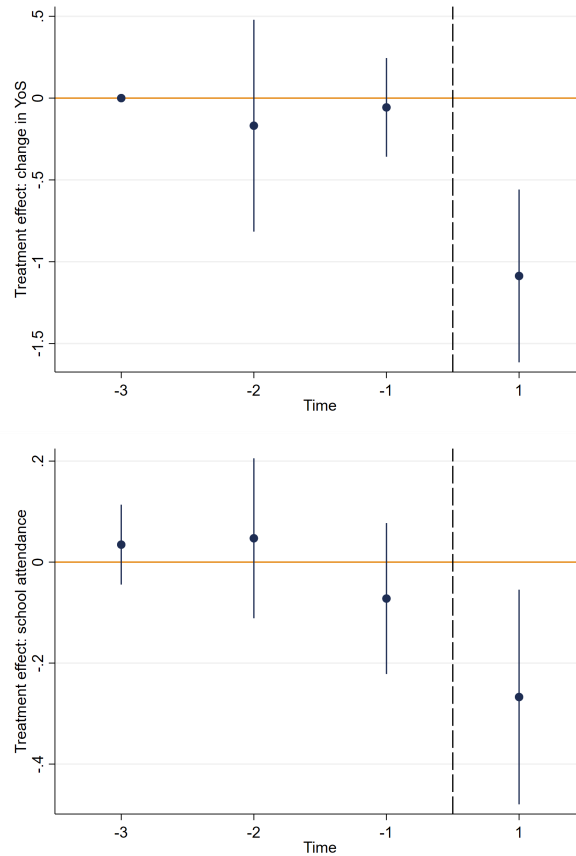
FIGURE A.12. ROBUSTNESS: CHANGE IN YoS AND SCHOOL ATTENDANCE

Note: The treatment effect for the change in years of schooling (YoS), and school attendance, considering the bordering and occupied areas.

A.4 Tables

TABLE A.4—DESCRIPTIVE STATISTICS OF TREATMENT AND CONTROL GROUP

Variable	Mean control group	Mean treatment group	Diff.	T-test
Nr. sons in household	0.28	0.30	-0.02	-1.84
Agricultural household	0.06	0.08	-0.03	-1.69
Female	0.44	0.49	-0.06	-1.84
Avg. age	8.88	8.75	0.13	0.56
School-going age	0.71	0.66	0.05	1.79
Muslim household	0.69	0.64	0.05	1.66
Nr. daughters in household	0.24	0.20	0.04***	3.37
Exp. to violence	9.12	0.79	8.33***	7.62
Dist. event	76.25	89.87	-13.62***	-5.44
N	1263	333		

Notes: 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. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

TABLE A.5—QUALITATIVE SAMPLE SELECTION, BORDERING LGAs: COMMUNITY DIFFERENCES

Variable	Control	Treatment	Difference	T-test
Centralization #	.5185185	.6666667	-.1481481	-.4472136
Muslim super-majority				
Population, % of pre-insurgency tot.	129.9874	85.85679	44.13063**	3.26814
Distance to Sambisa Forest	164.4651	150.5	13.96512	.7537047
Ruggedness	8419.834	3798684	-3790264	-1.932175
Pop. density	429.7331	68.21202	361.5211	1.338271
Primary school	.9333333	1	-.0666667	-1.11575
Secondary school	.8444444	.9444444	-.1	-1.069586
Health center	.65	1	-.35*	-2.124132
Public hospital	.35	.375	-.025	-.1202184
Pharmacy	.2222222	.25	-.0277778	-.1491403
Post office	.2	.3333333	-.1333333	-.7569308
Bus stop	.5882353	.7777778	-.1895425	-.945708
Bank	.1578947	0	.1578947	1.178511
Market	.65	.9	-.25	-1.463104
Violent events	8.659473	.875	7.784473	1.5471
Fatalities	53.949	15.125	38.824	1.537929
Dist. violent events	181763.8	177983.7	3780.14	.2387781
Dist. closest event	80666.52	88178.24	-7511.724	-.5763514
N	63			

Notes: The table indicates whether, on average, a public good is present in the community (0 = not present, 1 = present) prior to the occupation. Violent events and fatalities are measured as the average exposure for individuals in a community within 10km radius of their household. Difference between the means in column four, t-test in column five. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

TABLE A.8—MECHANISMS: LABOR, HEALTH, MARRIAGE, HOUSE WORK AND INTEREST IN SCHOOLING

	Child labor			Health status		Other		
	Household business (1)	*Household farm* (2)	*Other work* (3)	*Illness or injury* (4)	*Doctor visit* (5)	*Child is married* (6)	*Household or childcare* (7)	*(Parental) interest* (8)
Occupation	-0.02	-0.06	0.01	0.03	0.01	-0.02	0.24***	0.08
	(0.03)	(0.07)	(0.01)	(0.03)	(0.03)	(0.01)	(0.09)	(0.06)
$\mu_{control}$	0.02	0.14	0.01	0.07	0.06	0.003	0.09	0.11
N	1592	1592	1592	908	908	1592	1592	1592
Controls	✓	✓	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓	✓	✓
Individual FE	✓	✓	✓	✓	✓	✓	✓	✓

Note: The table shows the results of the estimation of (4) 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) SEs in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Variable	Control	Treatment	Difference	T-test
Support Boko Haram, indicator	0.24	0.50	-0.26	-0.77
Population, % of pre-insurgency tot.	103.13	85.86	17.27***	4.33
Distance to Sambisa Forest	233.07	150.50	82.57***	4.05
Ruggedness	25393.86	5698025	-5672632*	-3.04
Population density	300.25	70.06	230.19	0.97
Primary schools	0.91	1	-0.09	-1.22
Secondary schools	0.87	0.94	-0.07	-0.80
Health center	0.59	1	-0.42*	-2.18
Public hospital	0.24	0.50	-0.26	-1.31
Pharmacy	0.21	0.33	-0.12	-0.66
Post office	0.18	0.43	-0.25	-1.52
Bust stop	0.50	0.86	-0.36	-1.77
Bank	0.13	0	0.13	0.92
Market	0.56	0.88	-0.31	-1.68
N		121		

Notes: 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.7—COMMUNITY LEVEL DIFFERENCES, POST-TREATMENT

Variable	Control	Treatment	Difference	T-test
Primary school	0.93	1	-0.07	-0.79
Secondary school	0.58	0.50	0.08	0.43
Health center	0.65	0.75	-0.10	-0.37
Public hospital	0.04	0	0.04	0.41
Pharmacy	0.35	0	0.35	1.41
Post office	0.26	0.25	0.01	0.04
Bus stop	0.09	0.25	-0.16	-0.94
Bank	0.74	0.75	-0.01	-0.04
Market	0.22	0	0.22	1.01
N	62			

Notes: 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.9—RETURNS TO EDUCATION

	Education premium		
	Wage	*Employment*	*Hours worked*
	(1)	(2)	(3)
Occupation	-96.742***	-0.406**	1.875
	(36.054)	(0.187)	(27.930)
Occ. * P.educ.	43.203*	0.25***	-23.156
	(23.006)	(0.08)	(22.960)
$\mu_{control}$	36.815	0.666	40.887
N	45	48 507	180
Controls	✓	✓	✓
Year FE	✓	✓	✓
Individual FE	✓	✓	✓

TABLE A.10—EXPOSURE TO VIOLENCE

	Attacks on civilians (1)	Battles (2)	Explosions and remote violence (3)
Occupation	4.61	2.38	1.82
	(3.05)	(1.89)	(1.20)
$\mu_{control}$	4.59	2.10	2.44
N	1592	1592	1592
Controls	✓	✓	✓
Year FE	✓	✓	✓
Individual FE	✓	✓	✓

Notes: 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. Conley (1999; 2008) SEs in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

TABLE A.11—MECHANISM: SCHOOLING

	Change school (1)	Quaranic school (2)	School commute (3)	School expenses (4)
Occupation	-0.09	-0.04	-0.12	-738.35
	(0.11)	(0.03)	(0.22)	(1007.53)
$\mu_{control}$	0.33	0.05	2.41	2464.58
N	973	1592	512	1319
Controls	✓	✓	✓	✓
Year FE	✓	✓	✓	✓
Individual FE	✓	✓	✓	✓

Notes: The table shows the whether having lived through Boko Haram's occupation caused children to change the type of school they attended, the likelihood of attending Quaranic school, the time spend travelling to school or the education-related expenses (in Naira) for the household. Estimation includes controls, school-year and individual fixed effects. Propensity scores used as sampling weights. Conley (1999; 2008) SEs in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

TABLE A.12—RESULTS USING NON-BINARY TREATMENT VARIABLE

	Change in YoS	School attendance
Occupation, .5 year	-1.07***	-0.17***
	(0.27)	(0.05)
Occupation, .75 year	-0.13	-0.13**
	(0.28)	(0.05)
Occupation, 1 year	-0.76***	-0.70***
	(0.15)	(0.07)
$\mu_{control}$	0.78	0.64
N	1180	1453
Controls	✓	✓
Year FE	✓	✓
Individual FE	✓	✓

Notes: Estimation includes controls, school-year and individual fixed effects. Propensity scores used as sampling weights. Conley (1999; 2008) SEs in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

| | **Educational attainment** | | |
| | Baseline | Gender | Birth cohort |
	(1)	(2)	(3)
Occupation	-2.33***	-2.33*	-2.55**
	(0.64)	(1.23)	(0.10)
Occ.#Female		0.14	
		(1.16)	
Occ.#Cohort '03-'05			-0.40
			(1.86)
Occ.#Cohort '06-'08			1.09
			(1.96)
$\mu_{control}$	14.85	14.85	14.85
N	916	859	916
Controls	✓	✓	✓
Year FE	✓	✓	✓
Individual FE	✓	✓	✓

Notes: Estimation includes controls, school-year and individual fixed effects. Propensity scores used as sampling weights. Conley (1999; 2008) SEs in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

TABLE A.14—BASELINE RESULTS FOR VARYING CONTROL GROUPS

| | State of emergency | | North East | |
	Change in YoS	School att.	Change in YoS	School att.
Occupation	-0.80***	-0.25***	-0.90***	-0.26***
	(0.23)	(0.09)	(0.25)	(0.09)
$\mu_{control}$	0.71	0.55	0.79	0.60
N	2249	2787	4975	6127
Controls	✓	✓	✓	✓
Year FE	✓	✓	✓	✓
Individual FE	✓	✓	✓	✓

Notes: 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. Propensity scores used as sampling weights. Conley (1999; 2008) SEs in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

TABLE A.15—STANDARD ERRORS: VARYING DISTANCE CUTOFF AND TIME LAG

	Change in YoS	School att.
Occupation	-0.72***	-0.28***
cutoff: 20km, lag: 3	(0.21)	(0.09)
Occupation	-0.72***	-0.28***
cutoff: 20km, lag: 2	(0.20)	(0.09)
Occupation	-0.72***	-0.28***
cutoff: 20km, lag: 1	(0.20)	(0.09)
Occupation	-0.72***	-0.28***
cutoff: 40km, lag: 3	(0.21)	(0.09)
Occupation	-0.72***	-0.28***
cutoff: 30km, lag: 3	(0.21)	(0.09)
Occupation	-0.72***	-0.28***
cutoff: 10km, lag: 3	(0.20)	(0.09)
Occupation	-0.72***	-0.28***
cutoff: 5km, lag: 3	(0.20)	(0.09)
$\mu_{control}$	0.78	0.64
N	1100	1355
Controls	✓	✓
Year FE	✓	✓
Individual FE	✓	✓

Notes: 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. Propensity scores used as sampling weights. Conley (1999; 2008) SEs in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.