Precolonial Centralization, Koranic Education and School Participation in Nigeria

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By

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Abstract

Several studies have documented the persistence of economic development outcomes across space and over a long period of time. Other studies have argued that there has been a reversal of fortune over time and space. Since different areas of current Nigeria were once under the rule of states with different degrees of political centralization and later investment in Koranic education, this study sought to explore whether areas or districts under more centralized political system are more likely to participate in large-scale school expansion programmes such as the 1976 Universal Primary Education (UPE) and 1999 Universal Basic Education (UBE). To check for evidence of reversal of fortune, we determine whether degree of state centralization on school participation was more or less in areas that have large investments in Koranic education. The important motivation for this study was the observation that participation in the tuition-free large-scale school expansion programmes implemented nationwide have not closed the disparity in school participation across the various regions of Nigeria. Even more surprising is that regions, such as the North-West and North-East, which fell under pre-colonial states with complex political arrangements have fallen behind in the education race relative the South-East, often regarded as a stateless society, and to some extent the South-South region which had a less complex political structure. This is contrary to the findings of several studies which show a positive relationship between this historical measure of state centralization and several indices of contemporary development outcomes. To explain this special case, we hypothesized that regions that had intensive and extensive contacts with Islamic culture and by extension Koranic education before the onset of Christian missionaries were unlikely to reap the full benefits of pre-colonial centralization. Ordinary Least Squares (OLS) results showed that while the index of state centralization has a positive and significant impact on enrolment in UPE and UBE programmes, the effect is negative and statistically significant for those with heavy investment in Koranic education (measured by district fraction of 1914-1946 cohorts with Koranic education). The results are robust to an adding extensive range of explanatory variables and a range of other specification tests. While the structure of the economy at the onset of Islamic activities in Nigeria may have made investment in Koranic education worthwhile, the contemporary world does not require Koranic education to make either regional or national advancement possible. Thus, there is a clear case of mismatch between the demands of modern economic life and the skills possessed by a large-section of it. Thus, well thought out policies are required to address this mismatch and accelerate inclusive economic development.

1. Introduction

Institutions are the fundamental long run determinant of economic development (Acemoglu and Robinson, 2005). The initial set of studies (AJR 2001, 2002; Hall & Jones, 1999) concentrated on the role of institutions that protect individual property rights and prevent political leaders from expropriating public resources for private ends. However, some later studies have started to focus on institutions that can explain much of within as well as between country disparities in development outcomes. This set of studies have examined the relationship between the complexity of historical political institution (also referred to as political centralization) and economic development. Some studies, for example, Gennaioli and Rainer, (2007); Michalopoulos and Papaionnou (2013) have demonstrated a strong positive relation between the degree of state centralization and economic development, especially as it relates to Africa. The evidence from these studies suggests that ethnic groups or locations long exposed to centralized state rule should not only have better current development outcomes but should be more inclined to participate in activities that promote economic development. In Nigeria, ethnic groups from the North-West (NW) and North-East (NE) that grew under highly centralized states are poorer today than the Ibo ethnic group of the South-East and South-South that grew under a weaker state structure or states without any complex organizational structure. More concerning is the fact that children from North-East and North-West regions are less likely to participate in Federal School expansion programs such as the 1976 Universal Primary Education (UPE) and the 1999 Universal Basic Education (UBE). Empirical evidence from the 2006 Nigeria census school enrolment rates for 10–14-year-old cohorts was as high as 98 % in some Local Government Areas (LGAs or district) of the South and below 10 percent in other LGAs of the North.

This is particularly puzzling because many primary schools were disproportionately provided in both the north-east and north-west during the 1976 UPE programme implementation (Osili, 2008). Furthermore, much weaker evidence exist (Lincove, 2009; Antonomis, 2014) that reducing distance to schooling facility will increase school enrolment rates especially when education is free. Thus, merely building more schools may not necessarily increase school participation in a significant way. Participation of the north-east and north-west have not significantly improved under a democratic dispensation that again reintroduced the 1976 UPE programme as in 1999 as Universal Basic Programme, which by constitutional provision is not only free, but unlike the 1976 programme, also compulsory.

Previously, Adewole (2022) has provided evidence that individual participation in large scale school expansion programmes such as UPE and UBE is strongly affected by ethnic identity. Surprisingly, ethnic groups with ancestral origins of north-east and north-west extractions report much lower school attainments even when living among ethnic groups with high school enrolment rates, conditional on controls for socio-economic background variables. To shed some light on this reversal of fortune situation for areas with current low school participation rates that used to operate under highly centralized states, we hypothesized that districts with a long history of exposure to Islam and Islamic education are less likely to participate in programmes such as UPE and UBE, even when these areas were once under highly centralized states. This study took advantage of the fact that current districts of contemporary Nigeria were once under pre-colonial political systems with varying degree of political centralization and investment in Koranic education. Since all areas are presently under the same contemporary national institution, our econometric specifications can easily sweep out the potential effects of national institutions on chosen measures of school participation. This offers a good setting to test whether evidence of persistence or reversal or both hold in the Nigerian context.

We posited that the environment created by heavy investment in Koranic investment could be the channel creating resentments toward participation in formal education. This would be possible if this investment in Koranic education induce preference change away from formal education. A similar argument was made by Archibong (2019) who observed a negative relationship between the interaction variable of state centralization/Islamic religion affiliation and public goods is essentially because leaders from North-East and North-West regions with centralized states failed to align with federal authorities.

For this kind of study, the combination of Koranic education and state centralization could affect educational outcomes in two important ways. First, it could have created an environment that inhibited participation in formal education, especially the absence of public goods that could facilitate participate in the formal school system. To pursue this possibility, we sought to explain the district level school enrolment, not in terms of the quantity of public schooling infrastructure available in the district, but in terms of the interaction between state centralization and prior investment in Koranic education. The hypothesis that, while state centralization might be beneficial to participation in human capital improving public programmes, the results are negative for those with prior history of heavy investment in alternative Koranic education. This approach captures the potential effect of the external environment on district level school enrolment. To implement this, we used parts of the district level summary of school enrolments from the Nigeria's 2006 census and parts of the data collected by Archibong (2018, 2019). We use the district level enrolments or UPE and UPE cohorts, for whom education is free, and asked whether state centralization as well as the interaction of state centralization and Koranic education (for 1916-1946 cohorts) can explain the degree of school enrolments. Second, the resentment towards formal education could be due to assimilated norms which are passed from one generation

to the next. This approach would require that we explore the intergenerational transmission of values by exploring whether individuals whose ancestors lived under highly centralized state and had intensive exposure to Islam are also less likely to participate in large-scale school expansion programmes (UPE and UBE). This would be an alternative explanation for the "reversal of fortune" hypothesis put forward by Archibong (2019) as to why citizens whose ancestors grew in highly centralized states are poorer than those who did not[1].

Our empirical results indicated that state centralization might be somewhat positively correlated with school participation for both UPE and UBE cohorts. The interaction variable suggested that state centralization might have a strong adverse impact on school enrolments for cohorts exposed to free basic education. While our empirical results stand in sharp contrast with findings from previous empirical studies (Gennaioli and Rainer, 2007), they also failed to find a strong role for infrastructure non-functionality in explaining school enrolment outcomes. One take-away from our findings is that cultural factors might be important in accounting for poor school participation and for many out-of-school children currently. For example, while Indonesia's large-scale tuition-free school expansion program raised school enrolment for boys and not girls Duflo (2001), a recent re-examination of Duflo's study by Ashrat, et al (2020) found that the programme increased enrolment for girls whose ancestors embraced the culture of bride price. This is drawing increasing attention to the need to understand the cultural context of an environment before launching expensive large-scale government programmes (World Bank, 2015).

This study contributes to our understanding of our cultural environment overlaps with historical index of state capacity to undermine development outcomes today. Previous studies have established that cultural traits such as son preference, inheritance practice, patrilocal residence and polygamy significantly affect human capital development efforts (Jacoby, 1995; Levine and Kavane, 2003; Tertilt, 2005, 2006; Gaspart and Platteau, 2010; La Ferrara and Milazzro, 2011; Bau, 2014; Jayachandran and Pandre, 2017).

Second, the results of this contribute to an ongoing debate on whether economic development is persistent or there is reversal at some point in time. Some studies (Bockstette, et al, 2002; Comin et al, 2010; Huillery, 2009; Putterman and Weil, 2010; Chanda et al, 2013) have demonstrated empirically that societies which had more advanced technology, institutions and economic performance a couple of centuries ago are still more developed today. This is at variance with the findings of Acemoglu et al (2002) and Nunn (2008) who found reversal of fortune do occur through the entrenchment of extractive institutions and institutionalization of widespread slavery across Africa. Our findings confirm the presence of persistence but only for districts with lower investment in Koranic education. However, reversal occurs in areas, which, although they have complex precolonial political structures, they have nevertheless invested heavily in Koranic education. Our findings are similar to conclusions reached by Easterly and Levine (2016) that associated reversal of fortune with the fact that new immigrants brought advanced educational skills and culture which facilitates

economic development. In a cross-country econometric specification that include variables of persistence and reversals (Nunn, 2017), both variables were strongly and positively correlated with current measure of economic performance.

Third, our study showed how religion specifically affects economic development. In a few studies, the general conclusion is that religious customs and rules have a strong impact on individual or group behaviour (Iannaccone, 1998; Iyer, 2016). Empirical studies confirm strong relationship between religion/ religious customs and fertility (Iyer, 2002; Norris and Inglehart, 2004), reduced Church attendance and donations (Gruber and Hungerman, 2008), health (Bhalotra, et al 2010), education (Lee, 2013), increased fertility (Stonawski, et al 2016), women marital outcomes (Efobi, 2024) and child mortality (Alfano, 2022).

Fourth, we associated the reversal of fortune in districts with strong pre-colonial state capacity to later investments in Koranic education, which still impedes participation in formal education system that could have facilitated upward economic and social mobility. The reversal of fortune study by Acemoglu et al (2002) established that countries that were more prosperous in 1500 had become poorer today because colonizers established extractive institutions where the hostile environment made it difficult for large-scale permanent settlement. This is the same descriptive evidence offered by Engerman and Sokoloff (1997, 2002), who argued that land suitability for large-scale plantation agriculture led to the extractive institutions that created vast wealth inequality in Latin America.

Finally, this study amplifies the documented history of constant struggle for power between Federal authorities and emirs in states with centralized and considerable Muslim population (Mustapha, 2006; Tonwe and Osemwota, 2013; Hickey, 1984). The 1976 Local Government Reform (LGR) that formally barred traditional rulers from participating in politics is viewed as an attempt by the Federal Government to erode the powers of traditional rulers, especially those in north-east and north-west of Nigeria (Mustapha, 2006; Tonwe and Osemwota, 2013). With this law came the creation of the local government area (LGA) as the third layer of government, pushing traditional rulers into mere advisory roles. Resistance against the law was strongest in the core North, where emirs had near absolute control over the people (Hickey, 1984; Mustapha, 2006; Tonwe and Osemwota, 2013). By 1980, violent uprisings were being recorded in the states of Kano, Bauchi, Kaduna and Borno states.

The theoretical argument is that citizens whose ancestors were under a culture that emphasized Koranic education might penalize individuals who invest in alternative forms of education, even when they are free. Fryer (200) theoretical argument indicates that groups maintain their culture by imposing one form of social sanction or another in order to maintain group conformity or cohesion. For example, the black oppositional cultures of acting white discourage educational investment by an average black man in the US. There is ample evidence that the core Northern part in Nigeria invested in Koranic education disproportionately relative to other kinds of skills that enhance labour market success. According to Aluiaigba (2009:20), there were 30,411 Islamic schools in 1921, and about 7 million males were being recruited into these schools

by 2006. Regions in the southern and the north-central parts of Nigeria seem to have gone in the opposite direction. A 2009 survey (NPEC, 2011) conducted by National Primary Education Commission (NPEC) indicated that about three times as many pupils were being recruited into Islamic schools than in formal schools. Surveys carried out by the Federal Ministry of Education (FME, 2008)[2] and United Nations International Children Fund (UNICEF, 1999) observed similar patterns. While Koranic education remains dominant in the North, formal schooling remains popular in the three geo-political regions of the South and, to a large extent, in the north central.

While our study is closely related to that of Archibong (2019), it is different in several ways. First, we investigated how the interaction of district historical state centralization and Koranic education affect enrollment of UPE and UBE cohorts. Second, our study was exclusively on cohorts for whom the direct cost of education (schools, tuition fee and distance) was significantly reduced. We used data the 2009/2010 HNLSS to construct district level measures of the 1916-46 cohorts with Koranic education as our historical measure of exposure to Koranic education, and not the state measure of non-compliance used by Archibong (2019).

Third, we treated state level measure of resistance to Federal Government as a cultural phenomenon used by Archibong (2019), replacing that variable with district level of 1916-46 cohorts with Koranic education. Fourth, the dependent variables in Archibong (2019) econometric specification are regarded as mechanisms through which the interaction of state centralization and Koranic Education affect school enrollment.

In district level regressions, with controls for other relevant factors, availability of functional public schooling was not significantly correlated with school enrollments of either UPE and UBE cohorts. However, while district exposed to strong centralized states have higher school enrollment, districts whose ancestral state centralization status overlap those with a strong structure of Koranic education reported poorer participation in tuition-free public education for both UPE and UBE cohorts. For example, been a centralized district increase school enrollment by between 3.41 and by 3.68 % for UPE and UBE cohorts respectively. Nevertheless, regression estimates from the interaction variable of district historical state centralization status and Koranic education (measured by percentage of districts whose 1916-46 cohorts have Koranic education) suggested that districts with high state centralization status reported lower school enrollment for UPE and UBE cohorts when they had a high rate of Koranic education. They reduce school enrollment by between 3.9% and 5.2 % for UPE and UBE cohorts.

However, these findings suggest that the interaction of state centralization and Koranic education can explain participation in large-scale school expansion programmes, there are other potential explanations yet to be accounted for. For this reason, we control for geographical factors such as rainfall (Yang and Mancini, 2009) are known to affect human capital outcomes, especially when there is significant deviation. For this reason, our specifications control for district level rainfall and temperature fluctuations. Again, our key results remain robust to the

inclusions. Second, we acknowledged that district level natural resources may boost or impede investment in schooling (Fenske & Zurimendi, 2017). To account for this, the econometric of the study controlled for the presence of gold, lootable gold[3] and crude oil within the district. The inclusion of these controls did not undo our estimates of interest. Third, we also ensured that other district level historical factors were not driving results by accounting for these variables in our econometric specification. Again, we concluded that the interaction of state centralization and Koranic education had negative effect on enrolment.

Research findings from studies by Dreher et al (2019) and Anaxagorou et al (2020) indicate that China-financed aid projects in Africa are skewed towards locations when the head of the country originate from. Thus, excluding variable to measure Chinese aid to specific districts might create spurious relationships between school enrollment and state centralization and Koranic investment dummy reaction. Yet, the estimates of this interaction variable are not undone by inclusion of Chinese district level aid support.

Altogether, our findings illustrated how beneficial state centralization structure can be undermined by another cultural aspect a location's history. In the mode of several studies (Gennaioli and Rainer, 2007; Michalopuolos and Papaionnou, 2013; Osato-Kwaako and Robinson, 2013; Alsan, 2015; Fenske, 2014; Bandyopadhyay and Green, 2016; Larcon, et al, 2016; Lowes et al, 2017), this study demonstrated how historical forces can shape contemporary outcomes, especially that with something to do with state centralization. This study is in the same leagues as others (North, 1990, Acemoglu, et al (2001), Acemoglu et al, (2014), Ogundiran (2005), Herbst (2000), Mamdani (1996); Manning (1990) and Iyer (2010) that emphasized the long-term impact of historical institutions on contemporary outcomes. Finally, the results of this study are similar to those Acemoglu, et al. (2002) that some kind of historical incursion can have damaging effects on development outcomes. The rest of the paper is organized as follows. Section 2 discusses the history of Islamic and Koranic education in Nigeria, starting from the 11th century. The details of data used in this study are described in Section 3. In Section 4, econometric models and estimation strategies are laid out. Discussion of results from baseline regressions and other robustness checks are outlined in Section 5. Conclusions are drawn in Section 6.

2. History of Islamic and Koranic Education in Nigeria

2.0.1 Islam and Islamic Education in Nigeria

Islam first reached the Savannah region of western Africa around the 8th century A.D, some 1000 years before Christian missionaries first set their foot on the shores of Nigeria. The spread of Islam in this region brought in its wake extensive commercial relationship with North Africa (Fafunwa, 1991). With the established religious and trade relationship between the savannah region of West Africa and North Africa, new cultural experiences, which include the development of new intellectual and literacy skills which later made the region the hub of intellectual activities for many centuries, began to emerge.

Through the efforts of Islamic cleric and scholar, Hamed Muhammed Mani, Islam was introduced to the ruler of Kanem Bornu between 1085 and 1097 (Fafunwa, 1991). Subsequently, Kanem established a relationship with Tunisia, culminating in the setting up of an embassy in Tunisia in 1257 AD. Around the same time period, a college and a hostel were established in Cairo, which at the time was the centre of Islamic learning. Scholars from Kanem-Bornu went to Cairo to acquire more knowledge about Islam. By the end of the 13th century, Kanem itself had transformed to a centre of Islamic learning, and renowned Islamic teachers from Mali often visited to teach. Five to six decades later, around mid 14th century, Kanem had established wider contacts with many Muslim countries, and even established embassies in many of them. These networks of relationships yielded much results, so that by the 14th century, many scholars and poets from Kanem-Bornu have achieved or acquired advance learning in classical Arabic language, including the ability to write in the Arabic form. Deep knowledge of the Islamic legal system began to take roots, although real and extensive Islamization of Kanem-Bornu only began to take place during the 1570-1602 reign of Mai Idris Alooma. Islamic schools were also been established across the landscape.

From Kanem-Bornu, traders and scholars took Islam to Hausa land by early 14th century during the reign of Ali Yaji. From 1452 to 1463 period, books on Islamic theology and jurisprudence were introduced to Hausaland by Fulani scholars (Fafunwa, 1991). During the 1463-99 reign of Muhammed Rumfa in Kano, Islam became firmly established and many Islamic learning centers were established. At this time, Islamic scholars from Timbuktu also came to taught and preached Islam in Kano.

Islam later spread to Katsina in the 15th century, with Katsina receiving pilgrims from Mecca and Timbuktu scholars, with latter groups from Timbuktu often visiting with books on Islamic divinity and etymology. Katsina itself produced its fair share of Islamic scholars, with these scholars interacting frequently interacting with the Timbuktu centre of learning.

From Timbuktu, Islam was introduced to Yorubaland towards the close of the 19th century (Johnson, 1966), although before 1627, this area was already known to the Muslim, when Ahmed Baba identified Yorubaland as a location where paganism was prevalent and Islam had no root (Fafunwa, 1991). Learned Islamic scholars formally brought Islam to Yorubaland through Ilorin in 1830. Some of these scholars made contacts with Ibadan, just about the time the town was established, and later with Ijebu-Ode and Abeokuta. Ilorin became a centre of Islamic learning with many basic and advanced schools established to teach Islamic religion. Ilorin often received famous Islamic scholars from Katsina, Kano and from the south-west. With the passage of time, Ibadan became a renowned centre of excellence in Islamic education, with the construction of many mosques and Islamic schools to encourage spread of Islam.

The learning system just before the British Colonial came to Nigeria involved Islamic scholars taking students as apprentice learners, and at the end of the learning period, giving each student a certificate (Alkali, 1967). Teaching Arabic, the medium through which Islamic education is delivered, is a method of spreading the religion itself (Doi, 1970). It is for this reason that basic Arabic schools in Nigeria were referred to as Koranic schools. Often, both Arabic language and Islam are taught together. Understanding of the language promotes the understanding of the religion of Islam through its holy book, the Koran. Teaching Islam to others was considered an obligation for which there were no expected material rewards. For this reason, Islamic teachers then and now in northern Nigeria were reduced to mere beggars, who depended on the charity of others in the community to make a living (Alkali, 1967). Where financial and non-financial contributions of members of the community were barely sufficient to guarantee basic necessities of life, these Islamic clerics often sent students under their tutelage out to beg for alms. These students are often referred to as “almajiri” (Alkali, 1967). The Islamic scholar of higher cadre, called the *ulama*, with advanced learning in the science of the Koran, Hadith Islamic theology and etymology were and are still highly regarded in northern Nigeria. Rulers of Muslim empires in Nigeria usually employed these *ulamas* as administrators, since they were useful in sustaining diplomatic relationships with the Muslim rulers of North Africa.

With the passage of time, reforms were introduced to Islamic education in Nigeria. The most extensive set of reforms started in the Jihadist era of Uthman Dan Fodio. Fodio attempted to purge Islam of the practice of syncretism and encouraged the education of women. His advocacy of women’s Islamic education led to the resurgence of literacy activities (Hodgkin, 1960). His two daughters were highly educated in Islamic education, and elder of the two made presentations on Islam, Islamic law and jurisprudence. The younger sister was a famous poetess. Fodio accommodated women at the venues of his preaching and lectures.

Inspired by what he saw in the Middle East and Saudi Arabia in 1934, Alhaji Abdullahi Bayero set up was then was called the Northern Provinces Law School, to train the *alkalis*. *Alkalis* served as judges in the Shariah courts. In 1947, school was renamed School for Arabic Studies and was brought under government control. At this time the brief extended beyond teaching Islam and Arabic related subjects to covering subjects such *arithmetic* and English language.

The School for Arabic Studies became the centre for training many unqualified teachers of junior primary school, so that between 1954 and 1961, nearly 70 % of recruited primary teachers have been upgraded though this school. Before the establishment of Abdullahi Bayero College, the School for Arabic Studies had in 1960 instituted a post-secondary programme in Islamic and Arabic studies. The Northern Region Ministry of Education and Abdullahi Bayero College of Kano actually worked out a comprehensive programme to integrate Islamic and Arabic studies into mainstream Western education curricula.

However, bolder steps were undertaken in the South West, where the Muslim community faces stiffer competition with the unrestricted presence of Christian missionaries. They realized quickly the need to have broader education beyond what Koranic schools could offer without necessarily surrendering the faith. They needed to have lawyers, doctors, engineers and other professionals to fill positions in government (Fafunwa, 1991). To this end, many Islamic organizations were inaugurated at the turn of the century. The Ansar-Ud-Deen Society, perhaps the largest and most successful of these organizations, was established in 1923. With Christian missionaries dominating the Nigerian educational sector before this time, there were only about 2 or 3 Muslim schools before 1923. The Islamic organisations pressured the colonial government to provide secular schools devoid of Christian education, so that by the early 1930s, the colonial government had built several schools. Aside from this, the Ansar-Ud-Deen Society, alongside many other Islamic organizations, created many primary and secondary school across several areas of the South West. Both Arabic/Islamic and secular subjects of Western schools were taught together. Some of these schools were established in eastern Nigeria as well.

Generally, current Islamic education can be classified into two types (Antonomis, 2014). The first, called the traditional method, can be further sub-divided into two other categories. There is the Tablet-School, where learners gather at a convenient location (under the tree, teacher's apartment, mosques etc.) and write with chalks on black slates. The teachers (or Malams) of these informal schools are paid stipends by learners or depend on donations from members of the community. Because of the informal structure, learners could attend these Koranic schools in the evening after attending secular schools in the morning. The second variant is the Tsangaya method, where *malams* move from one place to another with their pupils. The motivation for this type of approach is that it guarantees greater level of concentration (Modibbo, 2012), and learners these schools were called *muhajirun* (corrupted as *almajiri*), migrants in search of knowledge. This type of approach to the organization of learning is often incompatible with acquiring secular education, although attempts in the form of nomadic education have been directed at this and other categories of migrants.

The second method of Islamic education called the Islamiyya approach was in part a response to the challenge of secular education (Antonomis, 2014). It began to take roots in Nigeria in the 1950s, following the approach adopted by many Muslim countries seeking to modernize Koranic education in response to intense competition from the secular education of the Western world. Unlike the traditional approach, the Islamiyya schools had a formal structure (Antonomis, 2014), and covered other Islamic subjects beyond the mere memorization of the Koran (Bray, 1981; Umar, 2001). These schools were privately organized, either by individuals or the community. Some of these schools, either because of ideological or resource constraints, do not offer secular subjects. Others, called the Islamiyya Integrated type offer secular subjects by raising resources on their own or by getting subventions from the governments.

Thus, attempts at integrating both Koranic/Islamic education and Western education seemed to have started much earlier in the south west than the north-western and north-eastern regions of Nigeria. The government takeover of virtually all primary and secondary schools in the years after independence in 1960 as the post-colonial elites in power tried to establish control, perhaps to allay the fears of those who believed sending the children to mission schools would result into their conversion to Christianity.

In the spirit of the Integrated Islamiyya method of teaching both Islamic and secular subjects, in the 1970s the government took two important steps to provide universal secular primary education. During the implementation of the 1976 UPE programme the Federal Government of Nigeria (FGN) took over many of these community-owned Islamic schools in northern Nigeria (Baba, 2010). In more recent years, the second approach has involved both state and federal government instituting policies seeking to make religious schools in the north a part of Western school system. Under the policy, states were expected to provide incentives for this integration process. This could be by funding the teaching of secular subjects in these schools in form of paying salaries of teachers taking secular subjects and providing learning facilities. The support was conditional on the fact that these Islamiyya schools teach secular subjects such as mathematics, English, Hausa, basic science and social studies.

Given that Muslims in Nigeria, especially those from the north, are still behind their Christian counterparts in terms of actual school enrolment and years spent in school, it is important to determine whether Koranic education is standing in the way of formal Western in the country, and how it interacts with the pre-colonial centralization status of different districts of the country. From the 2010 Harmonized National Living Standard Survey (HNLSS) data, the years of formal Western education for the 6–30-year-old cohorts is 4.365 years. However, the average schooling attainment is 2.722 and 6.093 years for Muslims and Christians respectively. This implies that Christians spent more than twice the number of years spent by Muslims in Western schools. In the south west where both religions are split in nearly equal halves, the schooling attainment is 5.680 years for Muslims and 6.793 years for Christians, a difference of more than a year.

Efforts at integrating koranic education presuppose that this type of education cannot on its own deliver economic development. This is surprising because Islam has made immense contributions to modern civilization as we know it (Fafunwa, 1991). This religion of the Arabs made significant contributions to science. The Arabs, before the Europeans and Romans, established global centres of scientific learning. They played pioneering roles in the field of mathematics through the invention of Arabic numerals, geometry, algebra and trigonometry (Wells, 1972). They established great prominence in the field of physics, with fundamental contributions to optics and astronomy. Their contributions extended to the building of observatories and construction of astronomical instruments. They made notable contributions to chemistry, discovering substances such as potash, nitrate, nitric and sulfuric acids. They made phenomenal contributions to architecture, building masterpieces in mosques, palaces, tombs and cities, including the Taj Mahal if India, one of the seven wonders of the world. They designed glass, pottery and were involved in paper manufacturing. In agriculture, they used scientific farming methods such as irrigation. They were at the frontiers of medical practice, making great advances in medicine at the time the Church outlawed the practice of medicine (Davidson, 1959).

However, it is unlikely the Islam and Koranic education that came into northern Nigeria in the 8th century had much scientific content. In the 8th century, the contributions of the Arab scientific community had declined considerably, with Islamic religious publications outpacing her scientific contributions (Chaney, 2016). According to Chaney (2016) the political ascendancy of the theocratic elite led to the decline of scientific output in the Arabic world. Thus, it could be argued that northern Nigeria and the south-western part of it had contacts with materials from these theocratic elites. However, it appears that this kind of contacts might have promoted opposition to Western education, and might have reversed the gains that state centralization at the highest level could have offered. A colonial government report on northern Nigeria indicates that there were 25,000 Islamic clerics with over 250,000 students (Clarke, 1978) in 1919. The number of malams in northern Nigeria had doubled to about 50,000 with estimated 27,000 Koranic schools (Tukur, 1963, Eastmond and Adamu, 1965) in 1960. While 80 % of primary school aged children were enrolled in southern Nigeria in 1958, only 9 % of children from the north were enrolled (Mustapha, 2006). Even as at the late 1990s, traditional Koranic schools had more pupils than were enrolled in the Western-styled primary schools (USAID 2003).

3. Data Sources and Description

3.1. School Enrollment Data

Our dependent variables, the fraction of UPE and UBE cohort reported to have enrolled in schools, were taken from the district level summary of the Nigeria's 2006 census which contains a variety of relevant information. We restricted ourselves to cohorts, who by virtue of age should have participated in the universal primary or basic education programme. For UPE cohorts, this included those reported to be in the 35-39 and 40-44years age brackets. Similarly, those in the 6-9 and 10-14years age bracket for UBE cohorts were included in this study. The choice of these cohorts is primarily due to the fact that post-1970, the number of schools more than doubled (Archibong, 2019). The number of schools remain unchanged at about 35,000 to 1989, and again increased to about 69,979 (Archibong, 2019) by 2010, a period of 11 years after the re-introduction of UPE as UBE, with basic education becoming free, and for the first time compulsory. The slash in the cost of education, coming from direct reduction in tuition fee and access to schooling facilities was required to increase educational attainment.

3.2. Explanatory Variables

Murdock's (1967) Ethnographic Atlas is the source for state centralization data and other relevant data of historical importance. We matched Murdock's Ethnographic data by using the information available in Archibong (2019), who had identified which of the historical variables could be matched to the 774 districts or LGAs. The Atlas provides descriptions of the spatial distribution of ethnic groups across Africa, and for much of Africa, the data capture pre-colonial attributes of these ethnicities, although they were sampled in the 20th century (Murdock, 1967; Michalopoulos, 2012; Obikili, 2016). Murdock constructed historical variables and the political complexity of each ethnic group using both primary and secondary sources, including other 59 historical variables beside the political complexity of state centralization. Murdock's 243 ethnic locations out of 1265 fall within the African continent, 117 are currently within Nigeria. While at the most, over three ethnic groups would overlap a given district today, they tend to share the same level of state centralization or political complexity value.

Following Gennaioli and Rainer (2007) and Michalopoulos (2012), Alesina,

et al (2013) and Archibong (2019), we adopted Murdock's 1967 information on "Jurisdictional Hierarchy beyond the Local Community Level". This measure ranges from 0 to 4 starting from absence of hierarchical authority to 4 levels or layers of authority. This measure tries to describe the complexity of political systems that allows pre-colonial states deliver on the provision of social services and collect taxes.

For our benchmark model, we chose for additional historical variables depicting various degrees of political and economic development. First, was the Ethnographic Atlas that describes the complexity of human settlement, namely nomadic or fully migratory-; semi-nomadic-; semi-sedentary-;, compact but impermanent settlement-; neighbourhood of dispersed family homesteads-; separated hamlets forming a single community-; compact and relatively permanent settlements-; and complex settlements. Values range from 1 to 8 in order of complexity. Second, the ethnographic variable 40, depicting the use of large animals by ethnic groups inhabiting the 774 districts in Nigeria. The seven categories are the absence or near absence of large domestic animals (1); pigs are the only large domestic animals (2); sheep and goats without larger domestic animals (3); equine animals such as horses & donkeys (4); deer (5); camels or alpacas, or llamas (6) and bovine animals & cattle, Mithun, water buffalo, yaks (7). The variable for use of large animals was constructed by assigning 1 to locations with ethnic groups that falls within categories 2 to 7, and 0 otherwise.

Third, we use an indicator variable constructed from Murdock Ethnographic Atlas v39 indicating whether groups inhabiting any district in our sample were using animal plough at the time of observation whether plough existed before contact. Four, the historical variable indicating the intensity of agricultural practice. This was taken from v28 of the Murdock Ethnographic Atlas, with the following categories of intensity: no agriculture-; casual agriculture-; extensive or shifting agriculture-; horticulture-; intensive agriculture; and intensive irrigated agriculture. It ranges from 1 to 6, with higher values showing greater intensity.

The final historical variables in our baseline specification were the extent to which districts had groups that mainly hunting and herding large animals as a form of subsistence. The hunting variable taken from v2 and the herding variable is from v4 of the Murdock Ethnographic Atlas. The level of dependence for hunting and animal husbandry is graded as 0-5%,6-15%, 16-25%, 26-35%, 36-45%, 46-55%, 56-65%, 66-75%, 76-85% and 86-100%.

More Historical Variables

Because present day level of school enrolment could have been influenced by contact (or lack of it) with Europeans, we introduced several historical variables that reflect this experience, and could serve as a confounding factor if not accounted for.

We included a variable measuring the number of Christian mission stations (Protestant and Catholic) per square kilometre as at 1924 for each of the 774 districts. Alternatively, we introduced a variable measuring the number of mission schools measured as at 1925. Using data originally provided by Century Company (1911) and

used by Nunn and Wantchekon (2011)[4] *to construct a dummy variable assigning 1 to every district which had a European explorer passing through it, otherwise zero*. Using the century map again, we constructed an indicator variable for every district with colonial rail passing through it.

District Geographic Controls

Beyond the variables listed in our benchmark specification, we introduced several geographic controls. First, we used district terrain ruggedness index obtained from Nunn and Puga (2012). This geographic variable measures the extent to which land could be worked upon or the extent to which it facilitates or impedes access to certain localities including schools and other public facilities.

Second was the extent of temperature experienced in a district. It was constructed by including in our specification temperatures at the time of birth for UPE and UBE cohorts. The data are from Geoaid (Goodman, et al). This is because drought, prompted by high temperature and water shortage, can impede several activities (Mancini and Yang, 2009), including participation in formal education. Third, we constructed include district rainfall variables for UPE and UBE cohorts time of birth the same way we did for the temperature variable. Fourth, we included the presence or otherwise of gemstone (21 types of gemstones) in each of the 774 districts. The presence of gold and crude oil was also included in our extended econometric specifications. Fifth, various dimensions of conflict were added to our specification because conflict can affect enrolment (for UBE because of data used).

Sixth, distance variable***s***, which can affect school enrolment, are included into our augmented specifications. This includes mean distance to coast, water bodies, roads, country borders, major cities, lootable gold locations, gemstone deposits areas, drug cultivation and on-shore crude oil exploration sites[5]. This summary statistics for dependent variables and selected baseline variables are presented in Table 1.

4. Empirical Model

To determine the separate or interactive effects of state centralization and Koranic Education on school enrolments of UPE and UBE cohorts, we adopted Archibong (2019) model to determine the relationship between each of these important explanatory variables and observed school outcomes. Model 1 below captures the essence of our approach.

$$S_{ds} = \beta_0 + \lambda_1 SCentra_d + \lambda_2 Kor_d + \lambda_3 (SCentra_d)(Kor_d) + X_d^h \alpha + X_d^g + S_{fe} + \varepsilon_{ds}$$

The study dependent variable (S_{ds}) is the school enrollment rate for UPE cohorts (born after 1969) and UBE cohorts (born after 1992). $Centra_d$ is our measure of district historical state centralization index Kor_d represents district fraction of 1916-46 cohorts having Koranic education. The key variable of interest is the interaction variable [$(SCentra_d)(Kor_d)$] allows us to determines the impact of state centralization on school enrolment is when a district has two standard deviations higher investments than other districts. X_d^h is a vector of baseline historical variables reflecting district complexity of human settlements, use of large domestic animals, use of animal-drawn plough, and degree of dependence on hunting and herding. Other historical variables were added to check the robustness of estimates of our key explanatory variable of interest $(SCentra_d \, X \, Kor_d)$ and are included alongside other district level geographic variables that will be added to the Model 1 specification later. X_d^g vector of district geographic variables, also added as robustness checks on our main results. S_{fe} is state fixed effects, and should capture time invariant factors operating at state level that affects enrolment.

We address spatial autocorrelation issues by clustering at the state level. Ordinary Least Squares (OLS) used throughout, and because of endogeneity issues we do not make any claim that our regression results represent causal relationship between each of the key explanatory variables and school enrolment rates.

5. Discussion of Results

In starting our regression analysis based on Model 1, we include separately the three key variables of interest: pre-colonial centralization, Koranic education dummy and the interaction of pre-colonial centralization and Koranic education variables. Table 2 (column, Panels A and B) regression includes only centralization for UBE and UPE cohorts respectively. The estimate shows a strong and statistically significant relationship between pre-colonial centralization capacity and school enrolment for UBE cohorts (Panel A). That is, 1976 tuition-free primary education programme which started, with substantial reduction in access costs due to large scale school construction, has greater effects in districts with historical exposure to state centralization. That is, residents in districts which were once under highly centralized states are the ones more likely to enrol those in districts with less centralized status.

The regression estimates shows that a unit increase in centralization increases UBE and UPE school enrolment by 4.7211 and 4.3496 % respectively, and the estimates are statistically significant at 1 %. Alternatively, we can say one standard deviation increase in centralization leads to 0.2606 increases in UBE cohorts' school enrolment and 0.2327 for UPE-cohort school enrolment measure. Table 2 (column 2) shows results when the Koranic education variable is added to our model. The effect of historical Koranic education is negative and statistically significant, reducing school enrolment by approximately 42 and 41 % for UBE and UPE cohorts respectively. Better put, a standard deviation increase in Koranic education leads to reduction in school enrollment by 0.64 and 0.61 for UBE and UPE respectively. The coefficient of determination in Table 2, is higher than that shown in column 1. This implies that Koranic education has greater explanatory power than the centralization variable in explaining variation in school environment. The more important interaction variable included in column 3 is also strong and negative, indicating that residents in highly centralized districts with heavy investment in Koranic education are less likely to be enrolled in school, and that is true for both UBE and UPE cohorts. The estimate is statistically significant at 1%.

We simultaneously added the three variables to the specification in column 4. Both Koranic education and the interaction variable are still statistically significant, and pre-colonial centralization is not. With the three variables, the explanatory power increases, with Koranic education and interaction variable giving our model greater explanatory power. Panel B Table 2 regression results for UPE cohorts are similar.

The strong negative relationship between centralization and Koranic education variable and school environment indicates that anytime, reversal of economic fortune can occur when critical intervention of great importance occurs. This is in line with reversal of fortune documented in Acemoglu, Johnson, and Robinson (2002) though contested by Putterman and Weil (2010). The results presented here are in sharp contrast with findings in the literature about the relationship between state centralization and development outcomes. (Gennaioli and Rainer, 2007; Osato-Kwaako and Robinson, 2013). Negative reversal of fortune has also been associated with African slave trades (Nunn, 2008; Nunn and Wantchenkon, 2011; Obiliki, 2016) and Tsetse prevalence (Alsan, 2015) and the rapid growth in Islamic literature relative to scientific works (Chaney, 2013, 2016). There are also positive reversal of fortune from well implemented health and education programmes that have led to significant improvement in socio-economic status (Bleakley, 2007, 2010; Lucas, 2010; Cutler, et al, 2010; Feyrer, et al 2017; Ager, et al, 2018; Duflo, 2001). Altogether, the three variables can explain change in school enrolment for both UPE and UBE cohorts.

Since districts governed under a highly centralized system might also be more developed along other dimensions, we introduced in column 5 (Table 2) Murdock's historical variables depicting complexity of its settlement system (use of animal plough, herding, hunting intensity and intensity in agricultural practice). The relevant estimate was barely changed by the inclusion of these variables, and actually increased slightly. The population density variable, 1975 district population for the UPE cohorts and 1990 district population density for the UBE cohorts were included in the column regression, yet, neither Koranic education nor the centralization-Koranic education variable change in terms of statistical and economic significance though estimates dropped modestly. Because of unobservable effects, time invariant factors that affect school enrolments at the level of the State, the regression shown in column 7 includes state fixed effects. This inclusion does not affect estimate of the interaction variable or the Koranic education variable, each remaining statistically significant at 1 %. Alternatively, introducing district fixed effects that can capture across variations in school quality and other unobservable factors did not change estimates of the Koranic education and centralization-Koranic interaction variables (column 8). Even when we account for the fact that certain time-invariant factors affect school enrolment differentially across states and districts with the introduction of district-state fixed effects, centralization still has negative effects on school enrolment in locations with heavy Koranic education investment (column 9).

Overall, district pre-colonial centralization increases school enrolment only marginally in specifications that include all baseline variables, both for UPE and UBE cohorts. Moving from value of 2 to 3, a percentage increase of 50%, increases school for UPE by 4.8 % and UBE by 5.5%. Similarly, districts with 2 standard deviation higher level of investment in Koranic education reported reduced school enrolment of 23% for UPE cohorts and 22 % for UBE cohorts. Furthermore, an increase in district pre-colonial centralization from two to three nevertheless reduces school enrolment in districts with 2-standard deviation higher level of investment in Koranic than

in districts with lower investments. If we consider the mean values of dependent variables relative to the regression estimates of Koranic education and interaction variables reported in column 9 (Table 2), they are considerable when considered separately or in combination.

5.0.1 Robustness Tests: Sample Selection and Influential Observations

Although the estimates of the three key explanatory variables are statistically significant at 1 % with baseline control variables, there are concerns that specification issues due to influential observations from these explanatory variables might be at play. For this reason, we ran regressions that account for the presence of extreme values. Results are reported in Table 3. First, we eliminate districts with centralization index greater than three (four is the highest level). Second, we removed districts with centralization index lesser than one (zero is the lowest) and those greater than three. Third, we excluded districts with no investment in Koranic education. Four, we also removed districts with than two-third of the 1914-1946 district cohorts having Koranic education. Results are reported for both UPE and UBE cohorts in Table 3. Columns 1-8 show that most of the estimates are economically and statistically significant for our three key variables.

We used the more standard methods of accounting for influential observations. First, we use Student-T residuals that eliminated observations with plus or minus 2.0, 2.5 and 3.0 values. Second, we use Cook-Distance (based on d=4/771) to remove influential observations. Table 4 reports results of the estimates. All estimates were economically significant, and are statistically significant at *1 %.* Furthermore, we use DFIT and DFBETA[6] methods of checking for outlying observations. Table 5 (columns 1-4) indicate that the presence of influential observations had no perceptible effects on our dependent variables. Based on RREG and QREG econometric methods[7], we ran regressions that correct for influential observations. Again Table 5 (columns 5-8) show that estimates for the three variables were barely changed, remaining economically and statistically significant.

Finally, we attempted using dummy variables for the three core variables. The Koranic education dummy was constructed assigning 1 to districts with equal or higher mean vales (lga_kor46>=0.3), otherwise zero. For state centralization index dummy, we assigned 1 to district higher than 1 level of political authority (v33>=2). The interaction variable is constructed using the product of Koranic and State Centralization dummies. The results are all significant (results not shown but available).

5.0.2 Alternative Explanations for Observed School Enrollment

1. European Influence

Since colonization, many countries have experienced different levels of economic development. While countries like Canada, Australia, New Zealand and United States have become some of the most successful economies today, others such as Nigeria, Ghana, Tanzania and Democratic Republic of Congo, Guinea-Bissau, Malawi, and Tanzania, have become the backwater of economic development. Some scholars (Engerman and Sokoloff, 1997; Acemoglu et al, 2001; Glasser et al, 2004; Galor, 2011; Easterly and Levine, 2016) have pinned this down to colonial institution or human capital. However, differential contacts of Europeans through their different cultural traits with subjects within their colonies have also been used to explain vast within country regional variation in economic development. Before the onset of colonization in Nigeria, both European explorers and Christian missionaries had established contacts with different sections of the Nigeria society. These contacts were instrumental to the operation of the colonial government. In Nigeria for example, Christian missionaries were never allowed to spread their evangelical work and establish schools in the far north (Ade Ajayi, 1958). This, the observed relationship between the interaction variable of state centralization and Koranic and school enrolment for UPE and UBE cohorts might be because we excluded variables that account for European influence, before and after colonization.

For this reason, we constructed several district level variables that directly capture European before and after colonial period. Using information from Century Company (1911) on where rail lines were located, we constructed an indicator variable indicating whether colonial railway networks pass through the district. Using the same Century Company map, we constructed a dummy variable that assigns one to district if a European explorer had ever passed through the district. Third, we used a variable measuring the degree of contact between European Christian missionaries in every districts of the federation. This was calculated as the number of Catholic and Protestant mission stations for every square kilometre of the district. This information was obtained from early twentieth century map constructed contact by William R. M. Roome (1924). Table 6 (columns 1-4). Adding these variables to our econometric specification did not change the statistical significance and economic value of estimates of state centralization, Koranic education and the interaction variable.

2. Conflict

Many studies have been explored the microeconomic effects of internal conflicts on various indicators of educational achievements (for a review see Justino (2012)). These span from completion of primary and mandatory schooling. Other studies (such as Justino, et al, 2013; Shemyakna, 2011; Verwimp and Bavel, 2013; Vicente, 2014) have explored the impact civil conflicts on basic and compulsory education. Others have investigated the effects of conflicts on primary school attendance (Di Maio and Nandi, 2013), schooling attainment (Akbulut-Yuksel (2014); Akresh and de Walque (2008); Chamarbagwala and Moran (2011); Dabalen and Paul (2014); Leon (2012); Pivovarova and Swee (2015); Swee (2015); Singh and Shemyakina (2016)), test score performance (Bruek, Di Maio and Miaari, 2014); school completion (Rodriguez and Sanchez, 2012); and grade completion (Bundervoet, 2012). In virtually all of these studies, the effects of civil conflicts have been negative and significant. This is irrespective of whether repeated cross-sectional or panel data (Monteiro and Rocha, 2017; Bruek, Di Maio and Miaari, 2014; and Michaelsen and Salardi, 2018; and Rodriguez and Sanchez, 2012) are used in the regression analysis. For this reason, we drew on Armed Conflict Location and Event Data (ACLED) district level data, starting from 1997 to control for effects of conflicts on school enrolment of UBE cohorts. This is important because if conflicts are more prevalent in districts with higher level of Koranic education, estimates of Koranic education will be biased upward. Similarly, if districts previously under a more centralized state rule are less prone to conflicts due to better state capacity to handle conflicts, simple OLS regressions will bias centralization variable towards zero. Under this circumstance, the direction of bias is difficult to predict for the interaction variable. Introducing district level conflict variables (from 1997-2005), did not change the estimates of Koranic education and interaction variable (column 5 Table 6). Using other variants of conflicts hardly changed anything (Panels A and B columns 6-8 Table 6).

3.0 Rainfall and Temperature

Dramatic fluctuations in rainfall and temperature have now become a permanent feature of modern life. Approximately 1 billion people inhabit places where there is not enough water to meet their needs, with subsequent knock-on effects on sanitation activities. More damaging effects are experienced in terms of agricultural output, nutritional sufficiency and more rapid spread of diseases such as diarrhoea. Generally, studies (Mancini and Yang, 2009 for example) have revealed that large fluctuations in rainfall and temperature, either at the time of birth or in utero, have significant effects on birth weight, gestation period, infant mortality, cognitive development and school outcomes later in adult life. Beyond rainfall and temperature, rugged terrain could impede development creating several challenges that make such areas unsuitable for habitation, difficult to walk through, hard to farm, make irrigation water

more difficult to control, and cause erosion to become a serious hazard (Nunn and Puga, 2012). Based on the report by Food and Agriculture Organization (1993), land preparation costs outweigh the benefits when the slopes are more than 2 degrees and beyond 6 degrees, as land cultivation cannot be implemented under such conditions. Due to prohibitively expensive costs of land preparation, building in locations with rugged terrain can be very costly (Rapaport and Snickars, 1999; Nogales, et al., 2002). Therefore, our specification controlled for fluctuations in rainfall and temperature, first at the time of birth and then at the time that matches their school going age (6-12). Fluctuations were estimated by calculating deviations from long term mean annual rainfall and temperature from 1901 and 2006. Since UPE beneficiaries were born between 1966 and 1975, we constructed 10 rainfall variables and 10 temperature variables. Since those between 1966 and 1975, would have basic primary between 1972 and 1987, we construct rainfall and temperature deviations for those years. Similarly, we constructed four rainfall and temperature variables each for UBE cohorts (aged 6-9) in our dataset, for both year of birth and school going years. Eventually, we used the averages of these fluctuations as variables in our specification. Table 7 (Panels A and B) shows the regression results. Accounting for these variables in our econometric model did not affect estimates of the three important explanatory variables.

4. Natural Resources

The magnitude and quality of natural resources have not always resulted into rapid economic development across all societies and countries. If at all, the presence of natural resources has been associated with economic distortion and stagnation, sometimes through the mechanism of human capital and institutional quality. (Gylfason, Herbertsson, Zoega, 1999; Gylfason, 2001). While the macroeconomic effects of resource endowment are still being debated, it is much less clear how within country spatial differences in the distribution of natural resources affect development, especially school enrolment. If the presence of these resources improves the economic conditions of nearby residents, this could improve school enrolment. Otherwise, it could reduce school enrolment if the opportunity cost of child labour rises dramatically in these areas. To account for the potential effects of natural resources on school enrolment, we introduced indicator variables for the presence of gold, crude oil and gemstone within the district as additional covariates in our specification. Results in Table 7 (Panels A and B column 3) indicate that the economic and statistical significance of our variables of interest remains unchanged.

5. Biased Chinese Foreign Aid

In many economic studies, much attention has been paid to whether foreign development assistance has been effective or not in promoting economic development. However, within country power structure is also important in determining aid

effectiveness, especially when foreign aid donors pander to the whims and caprices of head of governments. During the Cold War era, non-military aid was deployed to specific strategic use. A significant proportion of foreign development assistance was channelled into the private pockets of executive leaders (Deaton, 2013; Marantidou and Glosserman, 2015). While these transfers have abated since the end of the Cold War regime, Chinese official development assistance have since replaced Cold War aid package, but with the aid been funneled to the home region of the executive leader. Although, there was no Chinese foreign aid from the 1970s to the mid-90s, sub-national aid data are available from around 1997. Depending on the relationship between Chinese foreign aid and school enrolment, and between Chinese aid and Koranic education and Koranic-Centralization, omitting the district foreign aid package might lead to over or understating the combined effects of Koranic education and Koranic-Centralization on school enrolment. Therefore, we introduced a control for Chinese foreign aid package per capita over 1997-2005 period to determine whether their absence could be driving observed results. Panels A and B column 4 (Table 7) include specification that control for this variable. As reported before, the introduction of this variable into our specification barely had an impact on the estimates of our key explanatory variables.

6. Distance to Centers of Economic Activity

Most often, the introduction of large scale school expansion programmes is accompanied by the construction of many schools (Osili and Long, 2008; Archbong, 2019) with the hope that considerable reductions in distance to school as well as elimination of tuition fees will reduce schooling costs and increased enrolment (World Bank, 2015). Although distance to school matters for school participation, the impact on school enrolment is economically small for Nigeria (Lincove, 2010; Antonimis, 2014). In the case of Chad with 26 % of 6-14 year-old cohorts reported to be in school, estimates by Filmer (2007) showed that even if pupil distance to school were reduced to zero, school enrolment would increase by just 6 % points. However, the indirect costs of schooling, such as the value of alternative activities that school age children might be involved in, is to some extent dependent on their proximity to zones of economic activities such national borders, major cities, major roads, and gold or crude oil production area. Because the effects of proximity to these locations on school enrolment are *a priori* ambiguous, we basically included in our specification variables measuring average district resident distance to major roads, cities, national borders, crude oil production area, gold production area and gemstone production location. The inclusion of this vector of distance covariates had little or no effect on our key estimates (Table 7 Panels A and B column 5).

7.0 *Diseases*

While malaria has been existing for several centuries, the disease still affects approximately 300 million people today, killing 1 million each year (Gallup and Sachs, 2001). Despite years of global efforts at eradicating malaria, it still remains a global scourge, Nigeria being one of the endemic countries. While a study conducted by Gallup and Sachs (2001) showed that malaria prevalence has negative effects on economic growth across countries, Acemoglu and Johnson (2007) provided empirical evidence to the effect that a series of international global health interventions that brought many debilitating diseases to an end did not have any significant positive effects on the per capita income. However, a few within country studies have demonstrated that large scale interventions to eradicate widespread diseases such as malaria hookworm and even iodine deficiency goitre) have produced an impact on school enrolment and labour market performance (Leighton and Foster, 1993; Aikins 1995, Brooker, et al 2000; Jukes et al, 2006, Clarke et al 2008; Bleakley, 2010). Furthermore, some studies have also shown that tsetse fly have had detrimental effects on economic development in Africa by limiting the use domesticated animals as sources of draft power on farms (Nash, 1969; Diamond, 1997; Alsan, 2015). This has made transportation overland much more difficult and has prevented the generation of agricultural surplus. In fact, Alsan (2015) argued that ethnic groups more severely affected by tsetse are unlikely to develop centralized states and are more backward today than less affected groups. To be sure the absence of variables measuring the intensity of malaria and tsetse fly did not generate spurious results, we included controls for malaria and tsetse fly (data drawn from Archibong, 2019 and Alsan, 2015). Including these key variables did not significantly change the statistical significance of our key explanatory variables (Table 7 Panels A and B column 6). With these additional explanatory variables, running regressions separately for male and female folks (Table 7 Panels A and B columns 7-8) and UBE cohorts in 10-14 age category did not change results in any materially significant way.

5.0.3 Using Selection on Observables to Assess the Bias from Unobservables

So far, regression results from our baseline model and robustness checks performed have shown that state centralization have negative effects on school enrolment in districts where Koranic educational investment has been well above the average. The results still hold when many explanatory variables that could impact on school enrolment are included in our econometric model. Because we do not know whether our model is correctly specified, we can still assert that one or two relevant explanatory variables strong enough to undermine the observed empirical relationships have

not been included in our econometric specification. In other words, our reported regression estimates may be biased by unobservables strongly correlated with our key explanatory variables as well as school enrolment. In this concluding part, we try to estimate the extent to which unobservables might be driving observed results.

First, we followed the approach first suggested by Altonji, Elder, and Taber (2005) and adopted by Nunn and Wantchekon (2011) that it is possible to determine bias arising from unobservables through the use of selection on observables. Through their method, it is possible to determine how strong selection on unobservables has to be compared to observables, in order for observed results become unacceptable. The method by Altonji, et al (2005) was applied to the situation where the main explanatory variable is a dummy variable while a similar technique by Bellows and Miguel (2009) is useful for regressions whose explanatory variable is continuous. We basically applied Altonji et al (2005) approach this to Koranic education variable as well as Koranic-Centralization

Following Nunn and Wantchekon (2011), we selected for each of these key explanatory variables two regressions, one containing a limited set of control variables and the other with full set of covariates. For this exercise, we used symbol L to denote regressions with limited set of variables and F symbol for regressions with full set of covariates. We applied the $\beta^F/(\beta^L - \beta^F)$ to estimate what we call the Altonji ratio. A declining ratio implies that unobservables are becoming more important relative to observables in explaining the observed results. Generally, ratios above 1 indicate that variables not controlled for in our specification are not important enough to undo our results.

To implement this strategy, we picked two sets of limited regressions and two sets of full regressions for each of the two vital explanatory variables. For limited sets, we considered those indicated in Table 2 (columns 1-3 and 4). For the full set of regressions, we used those reported in the first and last columns of Table 3. These four combinations are used to calculate the Altonji ratios for Koranic-Centralization and Koranic education variables. (results are available but not shown). The results showed that out of 12 ratios, not a single one is less than 1. The estimates were in the range of 2 to 4 with mean and medium values of 2.8 and 2.4 respectively. To explain away the statistical significance of the estimates of both Koranic education and Koranic-Centralization variables in our specification**,** selection on unobservables should at the minimum be two times greater than selection on observables.

Although, results from applying the selection on unobservables method provides credible evidence against the bias due to omitted variables, Oster (2019) observed that Altonji et al (2005) method is based on implicit assumptions about the covariance properties of the two sets. It is specifically assumed that the Omitted Variable Bias (OVB) problem can be determined based on the premise that observing the relationship between treatment (which in this case is Koranic education and Koranic-Centralization variables) and covariates added to the specification, we can recover the relationship between treatment and unobservables (Murphy and Topel, 1990; Altonji et al, 2005, 2011). As noted by Oster, the stability of coefficient estimates as more covariates are added to the specification are not sufficient to estimate bias arising from unobservables, even under the most optimistic assumption. Therefore,

Oster suggests that in addition to the consideration of change in coefficient stability as more explanatory variables are included in our econometric specification, we must note the movement in coefficient of determination (R-squared) parameter as well. This indicates that added variables are not noise, they help improve the explanatory power of our model. Thus, it is highly unlikely that other variables not included in the model could undo the results reported here (Oster, 2019). Since the coefficients of determination increased as we move from limited sets of regressions to the full sets, we are sure that the additional explanatory variables included in this model are not noise. Since the Oster condition is also fulfilled in this case, it is highly unlikely that OVB is a serious in our specification.

6. Conclusion

The important motivation for this study was the observation that participation in tuition-free large-scale school expansion programmes implemented nationwide in 1976 as Universal Primary Education (UPE) and in 1999 as Universal Basic Education (UBE) have not closed the disparity in school participation across the various regions of Nigeria. It is even more surprising that regions, such as the North-West and North-East, which fell under precolonial states with complex political arrangements had fallen behind in the education race relative the south-east, often regarded as a stateless society, and to some extent the south-south region which had a less complex political structure. This is contrary to the findings of several studies which showed a positive relationship between this historical measure of state centralization and several indices of contemporary development outcomes. To explain this special case, we hypothesized that regions that had intensive and extensive contacts with Islamic culture and by extension Koranic education before Christian missionaries arrived in Nigeria are unlikely to reap the full benefits of pre-colonial centralization. The OLS results show that while the index of state centralization had a positive and significant impact on enrolment in UPE and UBE programmes, the effect was negative and statistically significant for those whose older cohorts (Born 1914-1946) invested heavily in Koranic education. The results are robust to adding an extensive range of explanatory variables and other specification tests. While the structure of the economy at the onset of Islamic activities in Nigeria may have made investment in Koranic education worthwhile, nevertheless the contemporary world does not require Koranic education to make either regional or national advancement possible. Thus, there is a clear case of mismatch between the demands of modern economic life and the skills possessed by a large section of it. Thus, well-thought out policies are required to address this mismatch and accelerate inclusive economic development.

TABLES OF PRECOLONIAL CENTRALIZATION, KORANIC EDUCATION AND SCHOOL PARTICIPATION IN NIGERIA

Table 1: Summary Statistics: Dependent Variables and Baseline Variables

Variable	Variable Description	OBS.	Mean	Std. Deviation	Minimum	Maximum
Enrol6_9t	Enrollment Rates for UBE Cohorts Aged Between 6-9 Years in 2006	774	46.7405	22.56239	0.8398606	95.2381
enrol35_39t	Enrollment Rates for UPE Cohorts Aged Between 35-39 Years in 2006	774	61.69573	23.27299	6.899872	97.14136
v33	Jurisdictional hierarchy beyond local community as measure of state centralization	774	2.219638	1.245256	0	4
v30	District complexity of settlement pattern	774	5.731266	2.364601	0	8
V39	District ever used plough, before and after contact with Europeans	774	0.9069767	0.2906528	0	1
v2	Degree of dependence on hunting	774	0.4082687	0.51496	0	2
v28	Intensity of Agriculture	774	3.255814	1.383393	0	6
pop75km	District population per square km in 1975	774	428.3484	1328.088	0	14209.84

Table 2: OLS Regression: Dependent Variable: Enrolment Rate

Panel A 6-9 Cohorts	**All**	**All**	**All**	**All**	**All**	**All**	**All**	**All**
State centralization	4.7211[a] (0.5610)			5.6998[a] (0.5908)	5.8077[a] (0.7344)	5.0429[a] (0.7170)	5.4496[a] (0.7233)	5.4966[a] (0.7199)
Beta coefficient	0.2606[a]			0.3156a	0.3216a	0.2792[a]	0.3017[a]	0.3043a
Koranic education		-41.8017[a] (1.7456)		-28.2092[a] (3.0730)	-23.5352[a] (3.6201)	-24.366[a] (3.4914)	-21.9052[a] (3.5734)	-21.7796[a] (3.5552)
Beta coefficient		-0.6355[a]		-0.4289[a]	-0.3578[a]	-0.3705[a]	-0.3330[a]	-0.3311[a]
State centralization X Koranic Education			-0.1004[a] (0.0072)	-0.0575[a] (0.0119)	-0.0633[a] (0.0142)	-0.0626[a] (0.0136)	-0.0674[a] (0.01374)	-0.0677[a] (0.0137)
Beta coefficient			-0.4153[a]	-0.2379[a]	-0.2619[a]	-0.2587[a]	-0.2786[a]	-0.2801[a]
Historical Variables					Yes	Yes	Yes	Yes
1975 LGA Population Per Square Km						Yes	Yes	Yes
State Fixed Effects							Yes	No
District Fixed Effects								Yes
F-statistics	70.83	573.46	192.69	255.36	120.80	121.47	111.97	112.03
Observations	774	771	771	771	771	771	771	771
R-squared	0.0679	0.4039	0.1725	0.4548	0.4796	0.5269	0.5346	0.5363
Panel B 35-39 Cohorts								

State centralization	4.3496[a] (0.5932)			4.5277a (0.6537)	5.1150[a] (08111)	4.2618[a] (07913)	4.7931[a] (0.7946)	4.8422[a] (0.7913)
Beta coefficient	0.2327[a]			0.2433[a]	0.2749[a]	0.2290[a]	0.2576[a]	0.2602a
Koranic education		-41.0934a (1.8787)		-32.2812[a] (3.3923)	-25.8258[a] (3.9057)	-26.7525[a] (3.7584)	-23.5386[a] (3.8075)	-23.4445[a] (3.7895)
Beta coefficient		-0.6064a		-0.4764[a]	-0.3811[a]	-0.3948[a]	-0.3474[a]	-0.3460[a]
State centralization X Koranic education			-0.0958a (0.0082)	-0.0356[a] (0.0139)	-0.0472[a] (0.0158)	-0.0464[a] (0.0151)	-0.0527[a] (0.0150)	-0.0530[a] (0.0150)
			-0.3845[a]	-0.1428[a]	-0.1896[a]	-0.1862[a]	-0.2113a	-0.2127[a]
Historical Variables					Yes	Yes	Yes	Yes
1975 LGA Population Per Square Km						Yes	Yes	Yes
State Fixed Effects							Yes	No
District Fixed Effects								Yes
F-statistics	53.76	478.44	135.43	196.45	98.06	99.26	93.55	93.29
Observations	774	771	771	771	771	771	771	771
R-squared	0.0542	0.3677	0.1478	0.4014	0.4323	0.4879	0.5002	0.5023

OLS method is used in the regressions reported here. Standard errors indicated in parenthesis are clustered at the district level. District (or LGA) is the unit of observation. CS is the enrolment rate for children whose in 2006 were in the 6-9 age category. Historical variables include complexity settlement patterns, use of animal plough, intensity of agriculture and degree of dependence on hunting. [a] Significant at 1 % level [b] Significant at 1 % level, [c] Significant at 1 % level

Table 3: Robustness Checks: Sample Selection & Influential Observations

Dependent Variable: Enrolment Rate

Panel A Cohorts	**6-9**	**35-39**	**6-9**	**35-39**	**6-9**	**35-39**	**6-9**	**35-39**
Exclude Sample	Centralization>3	Centralization>3	v33>0 & v33<4	v33>0 & v33<4	LGA_KOR46<0	LGA_KOR46<0	LGA_ KOR46>0.627	LGA_ KOR46>0.627
State centralization **Beta coefficient**	4.0910[a] (1.1673)	3.2296[b] (1.28811)	3.3575[b] (1.3921)	2.014457 (1.5098)	7.2322[a] (1.0922)	7.1664[a] (1.2785)	5.4325[a] (0.7643)	4.9063[a] (0.8229)
Koranic education **Beta Coefficient**	-14.962[a] (3.6470)	-15.2723[a] (3.9017)	-13.924[b] (6.9696)	-19.7625[a] (6.7736)	-10.102b (4.3857)	-8.4539c (4.9438)	-43.5744a 7.735804	-52.0093a (8.3942)
State centralization X Koranic education	-0.1060[a] (0.0164)	-0.0968[a] (0.0175)	-0.1095[a] (0.0280)	-0.0783[a] (0.0274)	-0.0776[a] (0.0165)	-0.0683[a] (0.0186)	-0.0838[a] (0.0310)	-0.0729[b] (0.0346)
Historical Variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
1975 LGA Population Per Square Km	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
District Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
F-statistics	91.10	91.70	77.53	78.27	68.06	51.30	68.36	58.47
Observations	621	621	537	537	480	480	599	599
R-squared	0.5562	0.5533	0.5504	0.5569	0.5079	0.4355	0.4985	0.5013

Notes: Same as Table 2.0

Table 4: Robustness Checks: Sample Selection & Influential Observations: Scientific Methods

Dependent Variable: Enrolment Rate

Panel A Cohorts	**6-9**	**35-39**	**6-9**	**35-39**	**6-9**	**35-39**	**6-9**	**35-39**
Excluded Sample	Student T Residuals Exclude > +2 & -2	Student T Residuals Exclude > +2 & -2	Student T Residuals Exclude > +2.5 & -2.5	Student T Residuals Exclude > +2.5 & -2.5	Student T Residuals Exclude > +3 & -3	Student T Residuals Exclude > +3 & -3	Cook Distance	Cook Distance
State centralization	5.79634[a] (0.6497)	5.3687[a] (0.7162)	5.8174[a] (0.6712)	5.3803[a] (0.7386)	5.7230[a] (0.7045)	5.0642[a] (0.7772)	4.8825[a] (0.6256)	4.1187[a] (0.6754)
Koranic education	-24.8033[a] (3.2364)	-25.3266[a] (3.5652)	-23.4726[a] 3.410075	-24.0345[a] (3.7280)	-23.0212[a] (3.4261)	-23.8135[a] (3.7548)	-28.579[a] (3.1207)	-31.4302[a] (3.2440)
State centralization X Koranic education	-0.0668a (0.0124)	-0.0551a (0.0139)	-0.0668[a] (0.0132)	-0.0552 (0.0146)	-0.0672a (0.0135)	-0.0554a (0.0150)	-0.0548a (0.0119)	-0.0397a (0.0127)
Historical Variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
1975 LGA Population Per Square Km	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
District Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
F-statistics	160.58	123.62	135.70	106.51	126.86	97.97	160.59	146.60
Observations	740	740	757	757	767	767	732	722
R-squared	0.6310	0.5845	0.5899	0.5456	0.5597	0.5159	0.6294	0.6080

Notes: Same as Table 2.0

Table 5: Robustness Checks: Sample Selection and Influential Observations: Scientific Methods

Dependent Variable: Enrolment Rate

Panel A Cohorts	**6-9**	**35-39**	**6-9**	**35-39**	**6-9**	**35-39**	**6-9**	**35-39**
Test	DFIT	DFIT	DFBETA	DFBETA	RREG	RREG	QREG	QREG
State centralization	4.8182[a] (0.6042)	4.2966[a] (0.6439)	4.2840[a] (0.6019)	3.4822[a] (0.5355)	5.8652[a] (0.7536)	5.1154[a] (0.7946)	6.1481[a] (0.8949)	4.5863[a] (1.0405)
Koranic education **Beta Coefficient**	-30.2688[a] (2.9957)	-31.3222[a] (3.1055)	-29.696[a] (3.3234)	-32.9490[a] (2.5552)	-23.6872[a] (3.5272)	-25.365[a] (3.7189)	-23.279[a] (4.1885)	-33.0081[a] (4.8699)
State centralization X Koranic education	-0.0536[a] (0.0113)	-0.0419[a] (0.01193)	-0.0530[a] (0.0122)	-0.0365[a] (0.0100)	1.6196[a] (0.3626)	-0.0520[a] (0.0146)	-0.0734[a] (0.0165)	-0.0338[a] (0.0192)
Historical Variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
1975 LGA Population Per Square Km	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
District Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
F-statistics	180.83	166.42	190.49	214.65	101.32	90.63	----	----
Observations	704	699	595	595	771	771	771	771
R-squared /Pseudo R2	0.6540	0.6384	0.6955	0.7277	----	----	0.3811	0.3588

Notes: Same as Table 2

Table 6: OLS Regression: More Controls

Panel A 6-9 Cohorts	All	All	All	All	All	All	All	**All**	**All**
State Centralization	4.5290[a] (0.7240)	4.5304[a] (0.7237)	4.5426[a] (0.7251)	4.4139[a] (0.7188)	4.4313[a] (0.7191)	4.3067[a] (0.7135)	4.3360[a] (0.7114)	4.3491[a] (0.7168)	4.3490[a] (0.7158)
Koranic education	-22.7786[a] (3.4223)	-22.7004[a] (3.4514)	-22.3931[a] (3.4706)	-22.2873[a] (3.4627)	-22.3718[a] (3.4689)	-21.6620[a] (3.4714)	-21.933[a] (3.4687)	-22.2057[a] (3.4576)	-22.1423[a] (3.4588)
State centralization X Koranic education	-0.0613[a] (0.0131)	-0.0610[a] (0.01317)	-0.0611[a] (0.0132)	-0.0598[a] (0.0131)	-0.0603[a] (0.0132)	-0.0593[a] (0.0132)	-0.0593[a] (0.0131)	-0.0595[a] (0.0132)	-0.0595[a] (0.0132)
Historical Variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
1975 District Popn. Per Square Km	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
District Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Added Variable	Rail Dummy	European Explorer	Catholic/ Protestant	No. of Mission Schools Est. Between 1843-1920	Conflict Presence	No of Conflicts / Km	No of Conflicts / Per Capita	Conflicts Per Capita 1990	Conflicts Per Capita 2000
F-statistics	123.82	111.50	93.50	86.58	80.03	81.33	80.76	80.77	80.80
Observations	771	771	770	770	770	769	767	767	767
R-squared	0.5387	0.5388	0.5405	0.5447	0.5453	0.5470	0.5487	0.5467	0.5470
Panel B: 35-39 Cohorts									
State centralization	3.9019[a] (0.8021)	3.9052[a] (0.7999)	3.9443[a] (0.8017)	3.8199[a] (0.7964)	3.833[a] (0.7978)	3.6670[a] (0.7855)	3.7586[a] (0.7888)	3.7718[a] (0.7964)	3.7727[a] (0.7951)

Koranic education	-25.6405[a] (3.7269)	-25.4522[a] (3.7608)	-25.0088[a] (3.7889)	-24.9066[a] (3.7835)	-24.9709[a] (3.7906)	-23.9601[a] (3.8181)	-24.304[a] (3.8036)	-24.6685[a] (3.7915)	-24.5853[a] (3.7935)
State centralization X Koranic education	-0.0455[a] (0.0148)	-0.0447[a] (0.0148)	-0.0451[a] (0.0148)	-0.0439[a] (0.0148)	-0.0442[a] (0.0148)	-0.0431[a] (0.0148)	-0.0437[a] (0.0148)	-0.0438[a] (0.0148)	-0.0439[a] (0.0148)
Historical Variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
1975 LGA Population Per Square Km	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
District Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
F-statistics	96.19	86.58	72.44	67.11	62.08	62.71	62.08	62.03	62.02
Observations	771	771	770	770	770	769	767	767	767
R-squared	0.4933	0.4939	0.4953	0.4990	0.4994	0.5046	0.5036	0.5005	0.5009

OLS method is used in the regressions reported here. Standard errors indicated in parenthesis are clustered at the district level. District (or LGA) is the unit of observation. CS is the enrolment rate for children whose in 2006 were in the 6-9 age category. Historical variables include complexity settlement patterns, use of animal plough, intensity of agriculture and degree of dependence on hunting. [a]Significant at 1 % level [b] Significant at 1 % level, [c] Significant at 1 % level

Table 7: OLS Regression: More Controls and Sample Selection (Continued)

Panel A 6-9 Cohorts	Overall Enrollment						Male Enrolment	Female Enrolment	10-14 Cohorts
State centralization	4.1558[a] (0.7256)	4.2150[a] (0.7235)	4.5843[a] (0.6999)	4.5908[a] (0.7003)	4.5801[a] (0.6066)	3.6823[a] (0.6630)	3.5635[a] (0.6480)	3.5500[a] (0.6757)	3.1936a (0.9558)
Koranic education	-22.6165[a] (3.4636)	-23.0835[a] (3.4160)	-17.8222[a] (3.3245)	-17.8432[a] (3.3323)	-16.4533[a] (3.0449)	-19.1327[a] (3.5042)	-19.585[a] (3.2954)	-21.0865[a] (3.4509)	-24.4009a (3.9810)
State centralization X Koranic education	-0.0525[a] (0.0132)	-0.0525[a] (0.0132)	-0.0546[a] (0.0127)	-0.0545[a] (0.0128)	-0.0597[a] (0.0117)	-0.0517[a] (0.0133)	-0.0494[a] (0.0128)	-0.0462[a] (0.0133)	-0.0415a (0.0147)
Historical Variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
1975 District Popn. Per Square Km	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
District Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Added Variable	13 Mean Temperature Variables (1993-2005)	5 Rainfall Variables (1993-2005)	Indicator Variables for Petroleum, gold and gemstone in each District	Chinese District Foreign Investment	Access to City	Tsetse and Malaria Prevalence			
F-statistics	45.10	31.64	34.69	33.87	46.67	39.76	38.45	41.30	34.66
Observations	769	769	769	769	769	681	767	767	767
R-squared	0.5576	0.5667	0.6001	0.6002	0.6706	0.6856	0.6798	0.6717	0.6029
Panel B 35-39 Cohorts									

State centralization	3.708[a] (0.7813)	3.6321[a] (0.7833)	4.1578[a] (0.7564)	4.1662[a] (0.7562)	4.2526[a] (0.6634)	3.4078[a] (0.7070)	2.3796[a] (0.6530)	4.1771[a] (0.8223)	
Koranic education	-24.5506[a] (3.8053)	-24.5169[a] (3.8324)	-17.5703[a] (3.6995)	-17.649[a] (3.7113)	-16.148[a] (3.3747)	-17.5296[a] (3.9145)	-17.784[a] (3.6909)	-18.2060[a] 4.312994	
State centralization X Koranic education	-0.0389[a] (0.0148)	-0.0381[a] (0.0149)	-0.0410[a] (0.01426)	-0.0406[a] (0.0143)	-0.0473[a] (0.0129)	-0.0387[a] (0.0149)	-0.0189 (0.0141)	-0.0554[a] (0.0174)	
Added Variable	5 Climate Variables (1970-1975)	5 Rainfall Variables (1970-1975)	Indicator Variables for Petroleum, gold and gemstone in each District	Chinese District Foreign Investment	Access to City				
Historical Variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
1975 District Popn. Per Square Km	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
District Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
F-statistics	46.99	36.19	49.01	47.29	66.37	54.22	43.60	62.51	
Observations	769	769	769	769	769	769	769	769	769
R-squared	0.5138	0.5155	0.5714	0.5723	0.6447	0.6687	0.6343	0.5468	

OLS method is used in the regressions reported here. Standard errors indicated in parenthesis are clustered at the district level. District (or LGA) is the unit of observation. CS is the enrolment rate for children whose in 2006 were in the 6-9 age category. Historical variables include complexity settlement patterns, use of animal plough, intensity of agriculture and degree of dependence on hunting. [a] Significant at 1 % level [b] Significant at 1 % level, [c] Significant at 1 % level

Notes

1 We sticked to the first approach, another study is being proposed to explore the second possibility.

2 NPEC (2011) and FME (2008) reports are cited in Aghedo and Eke (2013).

3 The data distinguish between the mere presence of Gold and the presence of Gold that can looted.

4 The data from obtained from Nunn and Wantchekon (2011).

5 These distance variables are measured in metres. These are all from GeoAid.

6 Both are measures of determining the influence of outlying observations by measuring the difference in the estimated coefficients of key variables when the observations are added and when they are omitted from the regression sample.

7 RREG and QREG are robust and quantile regressions respectively, they produce regression estimates robust to the presence of influential observations in the regression sample.

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