Sea Change: The Competing Long-Run Impacts of the Transatlantic Slave Trade and Missionary Activity in Africa

Dozie Okoye and Roland Pongou

Dalhousie University, University of Ottawa

10. August 2015

Sea Change: The Competing Long-Run Impacts of the Transatlantic Slave Trade and Missionary Activity in Africa*

Dozie Okoye
Dalhousie University

Roland Pongou
University of Ottawa

August 17, 2015

Abstract

This paper contributes to the debate on the effect of European contact on African societies by comparing the long-run economic impacts of the transatlantic slave trade and historical missionary activity. Recognizing that early missionary activity in Africa was unintentionally aided by the preceding slave trade, it proposes an analytical framework in which the effect of the slave trade was partially mediated by missions. Using unique data from Nigeria, we analyze the causal effects of these shocks on schooling attainment, and consequent effects on literacy rates and self-employment. We find a *total* negative effect of the transatlantic slave trade on schooling; its negative direct effect outweighs its positive indirect effect through missionary activity. Missionary activity, on the other hand, has a strong positive direct effect which outweighs the total negative effect of the slave trade. Furthermore, individuals whose ancestors were historically exposed to greater missionary activity are more likely to be literate and less likely to be self-employed, consistent with the positive effect of missionary activity on schooling. In contrast, exposure to the slave trade is associated with lower literacy rates and a greater likelihood of being self-employed. Analyzing the mechanisms, we provide evidence suggesting that the persistent effects of these historical shocks are due to intergenerational factors and higher schooling infrastructure in areas that were less exposed to the slave trade or more exposed to missionary activity. Consistent with a simple theory, these persistent effects are larger for women, younger cohorts, rural residents, and migrants. Religion does not appear to be especially important, and the findings rule out an explanation based on simple changes in tastes for schooling.

Keywords: European contact, Africa, Slave Trade, Missions, Development, Education, Nigeria
JEL Classification: I20, N30, N37, N47, O15, Z12.

*We are indebted to Daron Acemoglu for guidance and very constructive discussions during the course of this project. We also wish to thank Kehinde Ajayi, David Autor, Moussa Blimpo, Esther Duflo, James Fenske, Talan Iscan, David S. Jacks, Lars Osberg, Peter Temin, Leonard Wantchekon, and Tite Yokossi for insightful comments and discussions. Our gratitude goes to participants at the 2015 AEA meetings, the 2015 Canadian Network for Economic History conference, and the Dalhousie University Macroeconomic and Development Group for useful comments. Special thanks to Nathan Nunn for making his dataset freely available. This project was completed when Roland Pongou was visiting the MIT Department of Economics; he wishes to thank this institution for its hospitality. We are responsible for all errors. *Address correspondence to: cokoye@dal.ca or roland.pongou@uottawa.ca*

1 Introduction

> Let missionaries and school masters, plough and spade, go together and agriculture will flourish, the avenues to legitimate commerce will be opened, confidence between man and man will be inspired, whilst civilization will advance as the natural effect, and Christianity operate as the proximate cause, of this happy change — *T.F. Buxton in The African Slave Trade, and Its Remedy (1840).*

Questions about the long-run economic impacts of European contact on Africa have occupied social scientists for decades. European contact with African societies, over the past 600 years, is chronologically characterized by three major events: the transatlantic slave trade, Christian missionary activity, and colonization. These historical shocks have potentially had opposing long-run effects on African economic development.[1] For instance, while it is argued that the slave trade has had a negative effect, missions are widely believed to have had a positive effect by introducing education and facilitating technological transfers and cultural diffusion. These conflicting findings lend legitimacy to the debate over whether European contact has helped or hurt African societies.

Our goal in this paper is to contribute to this debate, by comparing the long-run economic impacts of the transatlantic slave trade and historical missionary activity in a framework that controls for the effect of colonial history. There is a growing body of research on the identification of the causal effect of historical shocks in Africa (see the literature review below), but most of this fascinating literature has studied these shocks in isolation, and has ignored the complex relationship between them that might alter conclusions regarding total long-run impacts. A distinctive feature of our analysis is the incorporation of the historically documented, but little known, fact that the slave trade unintentionally aided early missionary activity in Africa, and as a result, the slave trade may have an indirect positive impact on contemporary economic outcomes. We believe our analysis is the first attempt to quantitatively link the transatlantic slave trade to subsequent missionary activity, and uncover quantitatively important positive impacts of the slave trade.

Historical studies show missions were vital to nineteenth century efforts to end the transatlantic slave trade, driven by the firm belief this would be achieved through the introduction of Western education, and Christianity, as a means of advancing civilization (Buxton, 1840). Missionary activity not only owed its motivations to the transatlantic slave trade, but also indirectly some of its early successes. This is for a number of reasons: First, missions arrived in Africa from the Sea, which was the gateway for the transatlantic slave trade. Secondly, as a result of high European death rates, early missionary work was greatly aided by freed slaves resettled in Sierra Leone, Liberia, and the Americas, who often preferred to return to their ethnic homelands. Thirdly,

[1] The importance of this topic cannot be overstated. It dominates five of the eight volumes *General History of Africa*, organized and published by UNESCO (1990). Recent contributions to the literature on the economic history of Africa are too numerous to mention, but Hopkins (2009), Fenske (2010), Nunn (2013) and Spolaore and Wacziarg (2013) provide a survey of the major themes and findings. We briefly discuss the most closely related studies later in this section.

resettled slaves from these ethnic groups also lobbied for missionaries to be sent to their ethnic homelands (Ajayi, 1965; Ayandele, 1966; Maxwell, 2013; Sundkler and Steed, 2000; Tasie, 1978).[2] The above factors created a strong link between the slave trade and the success of missionaries.

Testament to the effectiveness of missionary work is the fact that, as early as 1914, and working from barely a hundred mission stations, missionaries had established over 37,000 primary schools in Southern Nigeria alone (Csapo, 1981). Contemporary evidence also shows these advantages of missionary work have persisted in Africa (Gallego and Woodberry, 2010; Nunn, 2014; Okoye and Pongou, 2014; Wantchekon et al., 2015). Therefore, missions are widely believed to have had a positive effect on Africa. By contrast, Nunn (2008) finds that the slave trade has had a long-run negative effect on African countries. While work on the individual factors driving the result is still in its infancy, studies have found it could be attributed to a decline in trust (Nunn and Wantchekon, 2011) and an increase in conflict following abolition of the trade (Fenske and Kala, 2014). Whatley and Gillezeau (2011) find that the slave trade has contributed to increased ethnic fragmentation, which when combined with the results in Easterly and Levine (1997), provides further evidence on the negative effect of the trade on African economic development. An important unanswered question is whether the slave trade had any positive effects at all on African societies. For example, how much of the positive effects of missionary activity can be attributed to the slave trade, given that freed African slaves aided early missionary activity?

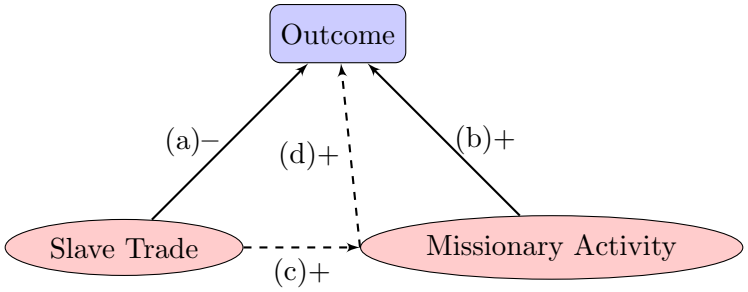
Our paper directly addresses this question, and achieves four goals that have been overlooked in the literature. First, we decompose the long-run impacts of the slave trade on schooling, literacy and self-employment, into its direct effects, and indirect effects through the encouragement of missions. Second, we quantify the direct effects of historical missionary activity. We show this effect is larger than when it is estimated in a framework that does not account for the positive impact that the supply of freed African slaves had on early missionary activity. Third, we establish that the positive effect of missions dominates any negative effects of the slave trade. Lastly, we analyze some of the mechanisms through which these effects have persisted across ethnic groups, within the same country, and distinguish between intergenerational factors and other factors such as variation in the supply of schooling infrastructure. We analyze the differential effects for men versus women, Muslims versus Christians, different levels of education, younger and older cohorts, migrants versus natives, and rural versus urban dwellers. In the analyses, we treat the historical shocks an endogenous and use plausible instruments to generate estimates that correct for potential bias due to endogeneity.

Our analysis is based on data from Nigeria, the most populous country in Africa and a major source of slave exports to the Americas. As in other studies examining the effects of historical shocks on economic development (Huillery, 2009; Acemoglu et al., 2014c; Wantchekon et al., 2015),

[2]For example, some Efiks from modern Nigeria, resettled in Jamaica, were instrumental to the founding of the *United Presbyterian Calabar* in 1846 (Tasie, 1978, p.16). Also, a Kanuri recaptive Wesleyan agent, W. Allakurah Sharpe, had also desperately pleaded with the Wesleyan mission to send missionaries to the Kanuris of Northeastern Nigeria in 1879 (Ayandele, 1966, p.118).

our focus on a single country makes sources of differences in slave exports and missionary activity easier to identify, and immediately accounts for all country and colonial history fixed effects. Nigeria also presents an interesting case study, because of the variation in missionary activity generated by the timing of the British colonial government's policy of indirect rule.[3] We construct a new dataset on the number of primary mission stations per area of each ethnic group's homeland as at 1928, merged with information on transatlantic slave exports from Nunn and Wantchekon (2011), and combine the new data with individual survey data from Nigeria.

We study both shocks in a framework where missionary activity was borne out of and aided by the slave trade. The framework we empirically examine is summarized by the chart below:



For each outcome, we expect the slave trade to have a *direct* detrimental impact, path (a), and missionary activity to have a *direct* positive impact, path (b). One of the novel results in this paper is to show that the slave trade had positive *indirect* effects, by virtue of its positive contribution to increased missionary activity, path (d). We first estimate a model including both shocks, which yields the direct effects (a) and (b).

Then, for each outcome, we follow three approaches to uncover the indirect effect of the slave trade mediated through missionary activity, path (d). For the first approach we exclude missions entirely from the model, and for the second, we use residuals from a regression of missionary activity on slave exports in place of actual missions. Both of these approaches implicitly yield the *total* effect of slave exports (a combination of paths (a) and (d)). The indirect effect, path (d), is obtained by subtracting the direct effect, (a), from the total effect. For the third approach, we directly estimate the elasticity of missionary activity to prior exposure to the slave trade, path (c). The indirect effect of the slave trade is then computed as the product of the elasticity of missions to the slave trade, path (c), and the direct effect of missions on the outcome of interest, path (b).[4]

For all the outcomes we examine, the results show that the slave trade had a direct negative effect, and an indirect positive effect through missionary activity. For example, our ordinary least

[3]In the mid-19th century, the area now known as Nigeria attracted several Protestant and Catholic missionaries whose primary method for proselytizing was the school. The most active missionary societies in Nigeria were Baptists, Irish and French Catholics (Spiritans and the SMA), the Anglican C.M.S., Presbyterians and Wesleyan Methodists. Indirect rule, implemented after the 1900's, limited mission activities as the government sought to govern through traditional rulers whose interests were often at odds with missions.

[4]These approaches are commonly used to study the direct effect of parental attributes on children's incomes, and any indirect effects mediated through the schooling of the parent or child. See Holmlund et al. (2011) for a review of the literature on the effect of parental schooling on the schooling of children.

squares (OLS) estimates show that while a standard deviation increase in the intensity of slave exports, within an individual's ethnic homeland, *directly decreased* school attainment by .6 years, on average, it also *indirectly increased* schooling attainment by .3 years by stimulating missionary activity. By comparison, an equivalent increase in mission stations per area increased schooling by .5 years.

On literacy and ability to get wage jobs, we find that missions had a direct positive effect on literacy rates, contrary to the slave trade which had a negative direct effect. Similarly, missions directly reduced self-employment rates while the slave trade directly increased this outcome.[5] However, unlike the effect of the slave trade on schooling, we find that its indirect positive effects on literacy and self-employment exactly cancel out its direct negative effects. These results on the direct and indirect effects of the slave trade and missionary activity are new, and robust to a host of individual, household, ethnicity, and geographic controls used in the literature. They are also robust to the inclusion of regional fixed effects and fixed effects for whether the individual lives in an oil-producing state.

Nevertheless, there is always a concern about the consistency of OLS estimates associated with endogeneity problems. In our case, even if the distribution of missions were exogenously determined, it is likely that the truncation of our measure of missionary activity at 1928 would measure exposure to missionary activity with error. To address this concern, we use instruments for the slave trade and missionary activity and estimate the model by two-stage least squares (2SLS). We construct three instruments for our two main predictors: an ethnic group's distance to the coast, an ethnic group's distance to a Saharan trading node, and the timing of the British occupation of an ethnic group's homeland. This is similar to the approach adopted by Acemoglu et al. (2014b) in a study of the competing roles of institutions and human capital in economic development.

An ethnic group's distance to the coast is a natural instrument for both the slave trade and missionary activity because ethnic groups closer to the coast were more likely to be exposed to slave raiding and missionary activity. Distance to a Saharan trading node is related to missionary activity because ethnic groups farther away from Saharan trading nodes were less likely to have had Islamic missionaries who were in direct competition with Christian missionaries in many parts of Nigeria (Ajayi, 1965; El-Hareir and Mbaye, 2011). Year of British occupation is a relevant instrument for missionary activity, because ethnic groups occupied in the years before the implementation of indirect rule were exposed to more missionary activity. We obtain the year in which a town within the ethnic homeland was first occupied from historical studies (see Table 18 in appendix), and the distance instruments come from Nunn and Wantchekon (2011).

The 2SLS estimates of the *total* effects of slave exports are very similar to our OLS estimates. But the direct effects of missionary activity and the slave trade, as well as the indirect effects of the

[5]In Nigeria, and much of sub-Saharan Africa, self-employment pays substantially less than wage jobs, and this is only partly explained by the higher schooling attainment of workers in wage jobs. The self-employed are also more likely to work in the informal sector with its lack of security and benefits (Teal, 2014). In this context, self-employment is often viewed as a negative.

slave trade, are significantly larger. Again, looking at schooling, the 2SLS estimates show that a standard deviation increase in the intensity of slave exports, within an individual's ethnic homeland, *directly decreased* school attainment by 1.8 years, on average, but also *indirectly increased* schooling attainment by 1.5 years by stimulating missionary activity. Thus, a standard deviation increase in slave exports per area decreased schooling attainment by a total of .3 years of schooling, in line with OLS estimates. For missionary activity, on the other hand, a one-standard deviation increase in mission stations per area directly increased schooling attainment by 2.5 years, on average. These are substantial effects given average years of schooling of 7 years in our dataset.

We further examine some of the reasons found in the literature regarding why the effect of missions have persisted, and also see if they explain the negative effects of the slave trade. Following the evidence in Wantchekon et al. (2015), we find that intergenerational factors may play a role. For example, when we control for the schooling of the head of household, in a sub-sample that excludes household heads, we find that the estimated positive effect of missionary activity and the negative effect of the slave trade fall by 33%. We also study changes in attitudes towards female education brought about by Protestant missionaries (Nunn, 2014; Becker and Woessmann, 2008).

We find that the effect of missionary activity is substantially larger for females. For example, our estimates imply that, all else the same, females typically have 3.5 years less schooling compared to men. However, a woman from an ethnic group with above average levels of missionary activity only has about 1.4 years less schooling. Thus, the sustained effect of missions on schooling is partly driven by a relatively smaller gender gap in areas with above average levels of missionary activity. Conversely, the effect of the slave trade on schooling does not appear to robustly vary by gender. We also study the role of religion in our findings. 2SLS results show the estimates are robust to controlling for religion, and neither the effect of missions nor the slave trade varies by religion. While Muslims have about 2.8 less years of schooling compared to Christians, we find this is largely driven by fewer mission stations in Muslim areas, and a larger gender gap in Muslim areas. Unlike studies emphasizing Protestant attitudes towards female education, we do not find evidence that the effect of missions is largely different for Catholics and Protestants. This is consistent with the result in Gallego and Woodberry (2010) who find Catholic missions emphasized education when in direct competition with Protestant missions as was the case in Nigeria.

Further examining the role of missions and the slave trade in changing attitudes towards education, we investigate the impact of these historical events at different levels of education. Both the 2SLS and OLS estimates show that both shocks have their strongest impacts on the probabilities of attending primary and secondary education. Conditional on having attended these levels of schooling, there is no effect on university education. Thus, if a change in attitudes towards education is responsible for some of the long-run results we find, these attitudes must have been concentrated on primary and secondary levels of education. This is plausible because missionaries primarily invested in basic education infrastructure, and largely left higher education to the government as they served no further evangelistic purpose (Ayandele, 1966, p. 284–290, 293); (Ajayi et al., 1996).

Consistent with this history, we use the Afrobarometer survey to show that individuals more historically exposed to more missionary activity live in districts with a school, while individuals with a greater exposure to the slave trade are less likely to live in districts with a school. Lower schooling infrastructure with increased exposure to the slave trade is consistent with the effects of increased conflict after the slave trade was abolished in 1807 (Fenske and Kala, 2014), and a decrease in social capital as a result of the slave trade (Nunn and Wantchekon, 2011; Obikili, 2013). Overall, early infrastructural investments appear to play an important role in the sustained effects of the slave trade and missionary activity on the outcomes we examine.

We then present a simple model showing how changes in schooling infrastructure, as a result of the historical shocks, can explain some of the empirical results. A key feature of the model is that missions (the slave trade) increased (decreased) schooling infrastructure that decreased (increased) the marginal cost of schooling. The model predicts that the positive effect of missions will be greater, and the negative effect of the slave trade smaller, among subgroups with lower access to schooling infrastructure. Along with some of our findings for the effect of missions among Muslims, evidence for this prediction of the model is also seen when you look at how the effects differ by migrant and urban status. Assuming higher average schooling costs for women, as a result of gender discrimination, for example, the model also explains the larger effect of missions on women.

Closely Related Literature and Contributions: As already noted, our paper contributes to the growing literature on the long-run effects of historical events on contemporary economic outcomes in Africa. Widely studied events in Africa include the effects of colonization, the transatlantic slave trade, and their interactions with geography.[6] In comparison, the long-term effects of nineteenth century missionaries on economic development remain underexplored. In Africa, the advent of Christian missionaries led to a series of events with persistent effects on African religious and cultural practices (Nunn, 2010; Sundkler and Steed, 2000). To add to this literature, we examine the long-run effects of the slave trade and missions on important outcomes that are relatively understudied in the literature.

Our results are related to studies of the long-run effects of the slave trade. As mentioned earlier, Nunn (2008) finds that the slave trade had a quantifiable long-run negative effect in Africa. However, not much is known regarding why these effects have persisted. Along with a decline in trust (Nunn and Wantchekon, 2011), increased fragmentation (Whatley and Gillezeau, 2011), and increased conflict (Fenske and Kala, 2014), the results in this paper provide evidence that individuals from ethnic groups with greater exposure to the slave trade have significantly less

[6]Contributions to this literature are too numerous to mention, but some important empirical studies on the effects of colonization are Acemoglu et al. (2001), Acemoglu et al. (2002), Michalopoulos and Papaioannou (2013), and Chanda et al. (2014). The effects of the slave trade are documented in Nunn (2008) and Nunn and Wantchekon (2011). Evidence on the importance of geography on African economic development can be found in Nunn and Puga (2012) and Fenske (2013), amongst several other important contributions. Analysis of the persistent effects of colonial investments in French West Africa can be found in Huillery (2009), and Jedwab et al. (2014) provide some evidence from Kenya in East Africa.

schooling, are less literate, and are more likely to be self-employed (less likely to have wage jobs). An additional novelty of our study is the finding that, by indirectly encouraging missionary activity, the slave trade also had a positive effect on schooling, literacy, and self-employment. To the best of our knowledge, these results on the direct and indirect effect of the slave trade on the schooling, literacy, and employment status of individuals are new.

Our findings on the long-run effect of missions on schooling are also related to papers by Gallego and Woodberry (2010), Nunn (2014), Okoye and Pongou (2014), and Wantchekon et al. (2015), but this paper differs from theirs in scope and other important respects. The study by Wantchekon et al. (2015) is concerned with spillover effects of exposure to early missionary activity on future generations and members of the same village. While our results complement theirs, we examine variation at the level of the ethnic group, and this allows us to jointly study the effects of the slave trade with the effect of missions. They are unable to do this as they examine individuals, from otherwise identical villages, who were not directly exposed to the slave trade. Gallego and Woodberry (2010) study the differential effects of Catholic and Protestant missionaries on aggregate regions in Africa. An important difference in our analyses is the focus on individuals. Nunn (2014) examines the effect of missionary, at the level of the ethnic group and at the village level, on individuals and how this impact might vary by gender. Okoye and Pongou (2014) study the long-term impact of missions, and discuss how missionary activity might have contributed to a reversal of fortunes within Nigeria. In comparison, none of these studies examine the effect of missions on self-employment. Most importantly, we are concerned with the direct and indirect effects of the slave trade. Also, we treat the historical events as endogenous and use plausible instruments to generate estimates that correct for potential bias due to endogeneity and find larger effects using instrumental variables.[7]

The study also contributes to the literature on the historical determinants of comparative economic development in Africa. It is related to Michalopoulos and Papaioannou (2014) who find that national institutions are not strongly related to subnational development in Africa. Our findings show that this may be explained by differential exposure to historical shocks across ethnic groups. In this context, ethnic groups exposed to more missionary activity gained an advantage in schooling infrastructure that has been sustained 100 years after Nigeria was amalgamated into one country in 1914. Additionally, the consequences of delayed schooling infrastructure investments as a result of the slave trade, and attendant conflicts, are still being felt. In this light, our results are also related to studies of the persistent effects of colonial investments in Africa (Huillery, 2009; Jedwab et al., 2014). It is important to note that, by design, our paper does not identify any "spillover" effects of missionary activity within an ethnic homeland to closely-situated ethnic groups. Spillover effects of this type could be large, as documented by Acemoglu et al. (2014a) for colonial investments in Latin America.

[7]Our OLS estimates are similar to the estimates in Nunn (2014) when we combine the standardized effect of missions at the level of the ethnic group and at the village level.

The rest of the paper proceeds as follows. In the next section, we present a historical background for missionary activity, and discuss the construction of the dataset in section 3. Section 4 presents the empirical model, estimation strategy, and empirical results on the direct effects of missionary activity, and the direct and indirect effects of the slave trade. Section 5 examines some of the transmission mechanisms and the final section concludes.

2 Historical Background

In this section, we present a brief discussion of the factors behind the distribution of mission stations in Nigeria, and show how the transatlantic slave trade played an important role, especially in the Southern parts of the county. We find that supply-side factors were primarily responsible for the distribution of mission stations between ethnic groups as at 1928. The historical background also provides a motivation for the instruments we use later.

Missionary Activity and the Legacy of Slavery

T.F. Buxton's *The African slave trade and its remedy* published in 1839 and the evangelical revival of John Wesley in Britain are widely regarded as providing the impetus for missionaries eager to reach as many African societies as they could. This grew out of the perceived need to advance civilization, curb the slave trade, and counteract the spread of Islam.

The work of T.F. Buxton was instrumental in convincing the British public to finance the Niger Expedition of 1841, at a cost of about £100,000 (about £280 million in 2010). The expedition failed and of the 145 Europeans on board, 130 contracted malaria fever and 40 had died within a year [(Sundkler and Steed, 2000, p.224) and (Ajayi, 1965, p.7-8)]. This failure did not discourage missionary activity, instead it cemented the need for African missionaries who could survive in the West African environment. The necessity of having African converts who would be able to carry on the missionary work from the coasts to the hinterlands created an important link between education and missionary activity. Thus, mass education was necessary to expand the supply of missionaries in Nigeria, and elsewhere in tropical West Africa (Ajayi, 1965; Tasie, 1978, Chapter 1).[8]

Therefore the missions (Baptists, Catholics, C.M.S., Presbyterians, Wesleyan Methodists) had to look to liberated Africans living in Sierra Leone to carry on the missionary work. The ethnic backgrounds of these Sierra Leonean returnees is one of the driving factors behind the historical variation in missionary activity between ethnic groups close to the coast (see Figure 1).[9] The

[8]Frankema (2012), looking in a time period (20th century), argues the Africanization of various missions across Africa was necessary to meet growing *demand*. In contrast, we are arguing, similar to Acemoglu et al. (2014b) and Nunn (2014), that missionaries were willing to reach every community regardless of demand conditions, but climatic conditions made Africanization necessary in the 19th century.

[9]The demand for schooling, and missionaries, was high among various Southern groups. Some groups were motivated by the protection missionary presence afforded them in times of war (especially in Yorubaland in the Southwest), and others in the Southeast were primarily motivated by the need to have their communities

supply of missions to any ethnic group over this period was limited, and was greatly influenced by the availability of recaptured slaves living in Sierra Leone, who spoke the local language (or a variant). Thus, the larger number of slaves exported from some southern ethnic groups, early in the nineteenth century, meant that they also received a larger supply of missionaries eager to return "home" (Ajayi, 1965, Chapter 2). Recaptured slaves from these ethnic groups also wrote letters to different missions requesting that missionaries be sent to their hometowns (Tasie, 1978, p.14–16).

In summary, ethnic groups that accounted for most of the slaves exports also had a larger supply of missionaries because they were able to attract missionaries who spoke their native languages. This prior exposure to the slave trade is particularly important in explaining the variation in missionary activity between ethnic groups in the south of Nigeria. However, as Figure 1 below shows, the larger variation in missionary activity is between ethnic groups in the southern (close the coast), and northern parts of the country. Next, we turn to a discussion of why distance to the coast mattered for missionary activity well into the twentieth century. As in Larreguy and Marshall (2014), we focus on the restrictions on missionary activity, during the period of indirect rule, which motivates the instruments we use later.

Missionary Activity and the Legacy of Indirect Rule

One reason for the lack of missionary activity in the North is geographic; the South is closer to the Atlantic Coast, so it was easier and less risky for missionaries to set up stations in those areas. However, by 1900, the British colonial administration already had a significant presence in Northern Nigeria and the area was accessible to European traders and missionaries who were eager to work in the region (Ayandele, 1966, p.120–126). By 1911, there was a rail line going from Lagos to Kano in the heart of the North, and by 1926, another line went from Port Harcourt in the Southeast to another major Northern city, Kaduna. Furthermore, Europeans had made contact with the Northern Emirates as early as 1821 (Sundkler and Steed, 2000, p.254), and attempted to establish a mission station in the Illorin Emirate as early as 1855. There were various attempts to establish mission stations in Northern Nigeria between 1855 and 1900, which were met with varying degrees of success (Ajayi, 1965, p.97). Similar to the activities of the Southern ethnic groups, a Kanuri recaptive Wesleyan agent, W. Allakurah Sharpe, had also desperately pleaded with the Wesleyan mission to send missionaries to Kanuris in the Northeast of Nigeria in 1879 (Ayandele, 1966, p.118).

Distance to sea explains why missionaries arrived in Northern Nigeria in great numbers much later in the time period under consideration, but does not explain why they never set up significant numbers of mission stations by 1928.[10] The absence of missionary activity in various places was,

participate in the growing trade in legitimate commodities (Ajayi, 1965, p.134). In the major trading town of Bonny, for example, the Chiefs of Bonny provided about £300 towards the erection of a missionary house in the community (Tasie, 1978, p.30). The King of Calabar also invited missionaries in 1841, hoping they would be of assistance towards his goal of gaining control of a neighbouring town (Berman, 1974).

[10]The mean number of missions per 1000 km^2 is .7 in the South, but only .05 in the North. Take for example, the case of the Igbo ethnic group in Southern Nigeria; missionaries did not penetrate the Igbo

above all, a result of the colonial government's policy of "indirect rule" established around 1900. Indirect rule meant that the protectorate of Northern Nigeria would be administered by Islamic Emirs in various parts of Nigeria. The policy strengthened the opposition of the rulers to Christianity, and the administration opted for government-provided schools in order to preserve the power of these rulers.

Furthermore, missionary activity was significantly restricted by the policy prohibiting missionary activity from most parts of Nigeria under the control of the Emirs [(Ayandele, 1966, Chapter 4), Barnes (1995)].[11] The colonial administration had developed significant antipathy towards African converts to Christianity, and consistently cited the breakdown of law and order among some of the Southern peoples as well as the difficulty of managing "Black White Men," as evidence for the wisdom of indirect rule (Barnes (1995) presents a thorough discussion of the administration's views towards African converts).[12] The government's attitude towards missionary activity is exemplified by the statement below:

> Personally I should like to see the Missions withdraw entirely from the Northern States, for the best missionary for the present will be the high-minded clean living British Resident. — *Sir Percy Girouard, Governor of Northern Nigeria (1907-1909), as quoted in (Ayandele, 1966, p.116).*

The net result of indirect rule was that missions could not rely on the support of British force in the face of opposition as they had enjoyed in Southern Nigeria. Not only did the colonial administration withdraw support for missionary activity in Northern Nigeria, they actively sought to slow down extant missionary activities. There are cases of Northern ethnic groups, such as the Maguzawa (a Hausa subgroup), who had their requests for missionaries turned down on the grounds that it would create disloyalty to the Muslim rulers. Another example could be found in the actions of the Resident, Captain Orr, who desired to move the mission station in Zaria outside of the city, and in Kano where the mission station was actually moved outside the city in order to avoid missionary contact with the native population (see pages 146-152 in Ayandele (1966)). As a result of these and other actions, the administrators in Northern Nigeria were accused of being pro-Islam by the missions (Sundkler and Steed, 2000, p.256).

---

hinterlands until after the Aro Expedition of 1902 (Sundkler and Steed, 2000, p.248-253), but from Figure 1, we see that a significant number of mission stations had been established in Igbo areas by 1928. Thus, timing, or inaccessibility, does not fully explain why missionaries failed to penetrate the Hausa, Fulani, and Kanuri areas of the North which were already under British control by 1903.

[11]This did not entirely eliminate missionary activity from the area, as several pagan ethnic groups in the North, who were not under the direct political control of the Emirates saw significant missionary activity among the Tiv, Igala, and Idoma peoples (Sundkler and Steed, 2000, p. 257–259),(Ayandele, 1966, p.117)]Historical records also indicate the establishment of mission stations in parts of the Emirate at Bida, Kontagora, and Zaria. Led by the evangelist Dr. Walter Miller, several European missionaries also preached in the large cities of the Emirates without the government's approval (Ayandele, 1966, p.133).

[12]Some of the antipathy was of course motivated by the early nationalist sentiments already developing among the educated Southerners, their refusal to submit to forced labour schemes, and other anti-colonial activities (see page 434 in (Barnes, 1995)).

In a bid to satisfy the demand for schooling in the North, the government decided to establish non-missionary schools in the North, and the effort was spearheaded by Sir Hanns Vischer (Sundkler and Steed, 2000, p.256). Nevertheless, the government's effort could not match the more organic community-focused effort of the missionaries. As early as 1914, there were already 37,500 primary schools in the South, but just 1,100 primary schools in the North with an equal population. In a country where 97% of the student population were enrolled in missionary schools by 1942, the negative effects of this infrastructural deficit was already apparent in significantly lower literacy rates (in Roman scripts) among ethnic groups of Northern Nigeria in 1952 (Barnes, 1995; Prothero, 1956).

3 Data

The dataset is built on the male and female individual recode files from the Nigerian 2008 *Demographic and Health Survey* (*DHS*). The *DHS* is a survey implemented in several countries with a focus on obtaining comprehensive information on nationally-representative households, and selected individuals within the household. It provides data on years of schooling, level of education completed, and several demographic variables for individuals and the households in which they live. Along with years of schooling, we also examine the effects of the slave trade and missionary activity on literacy and self-employment status. From the *DHS*, we can obtain information on ethnicity for over 30,000 individuals, between the ages of 15-59, belonging to the 30 major ethnic groups that make up over 90% of the country's population.

Mission Stations and Slave Exports

Data on the location of mission stations in Nigeria are taken from two sources. The first is a map published by Roome (1925) showing the location of *principal* mission stations (Protestant and Catholic) in Africa in 1924. The map, which is highly regarded as accurate, is also used in Nunn (2014) and several other papers.[13] We combine the map from Roome (1925) with another map, from Ayandele (1966), which provides the location of mission stations in Southern and Northern Nigeria as at 1928. Information from both maps were manually cross-checked, and in order to minimize the risk of double-counting, we add a mission station from Ayandele (1966) if it does not belong to the same local government area (a county in the U.S.) as the mission station in Roome (1925). There is significant overlap in both maps, but the map from Ayandele (1966) provides information on 30 additional mission locations (out of 159) in Nigeria.

[13]Some authors make the distinction between Catholic and Protestant missions, but this distinction is not particularly relevant in Nigeria as both mission types actively competed for converts using education as an inducement. In fact, in the Eastern part of Nigeria, enrolment in schools run by Catholic missions outpaced that of Protestant missions (Ayandele, 1966, p.302). Consistent with this history, we also find that the impact of missions does not vary between Catholics and Other Christians.

We combine the map of mission stations with information on the land area historically inhabited by different ethnic groups provided on a map by the anthropologist G.P. Murdock (Murdock, 1959). Using the map by Murdock (1959), we compute the number of mission stations per 1000 km^2 of the individual's ethnic homeland. Information on mission stations per area is then combined with information on the number of slave exports per area taken from (Nunn and Wantchekon, 2011).

Figure 1 shows the location of mission stations within the homelands of the major ethnic groups in our data, and mission stations (in red dots) are superimposed on intensity of the transatlantic slave trade for each ethnic group.[14] The figure illustrates the finding that areas that were exposed to the preceding slave trade also attracted more missionary activity, all else the same. For example, the Ibo and Ibibio ethnic groups, with greater exposure to the slave trade, have greater exposure to missions, compared to the Edo and the Ekoi who live in the same region. The same patterns can also be observed by comparing the Tiv to the Idoma, the Yoruba to the Igbira, or Hausa to Fulani. This pattern is systematic and the correlation between the slave trade and missionary activity is .6, indicating that these events are tightly linked. The link between the slave trade and missionary activity is systematically investigated in section 4.

Individual and Household Variables

The individual level variables we use are age, age-squared, occupation (in 8 groups), sex, type of residence (urban or rural), migrant status, and religion. We include controls for the individual's household which may influence investments in schooling, or correlated with historic missionary activity. These include the age, sex, and years of schooling of the household head. We also include data on the size of the individual's household, and an index of household wealth. All individual and household control variables are taken directly from the DHS, and a summary, by ethnic group, is shown in Table 18.

District Level Variables

We control for geographic and climactic characteristics at the local government area (district) in which the individual resides. These characteristics include the average amount of annual rainfall (in mm), average annual temperature, altitude, and a measure of nutrient availability in the soil. These variables might have influenced schooling outcomes because in areas where farming was viable, parents were less likely to send their children to school, because education often meant leaving farm work (Ayandele, 1966, p.296). Data on nutrient availability is obtained from the

[14]However, given that all individuals within an ethnic group may not have equal access to these mission stations, we also computed the number of mission stations within 25 and 50 kilometre radii of the geometric centre of the individual's homeland. We find the results to be robust to these alternative measures of exposure to missionary activity. The measures of missionary activity are highly correlated, with Spearman rank correlation coefficients above .82 for the centroid-based and area-based measures, and a rank coefficient of .95 for both centroid-based measures. We only report results for the number of mission stations per 1000 km^2 in order to save space.

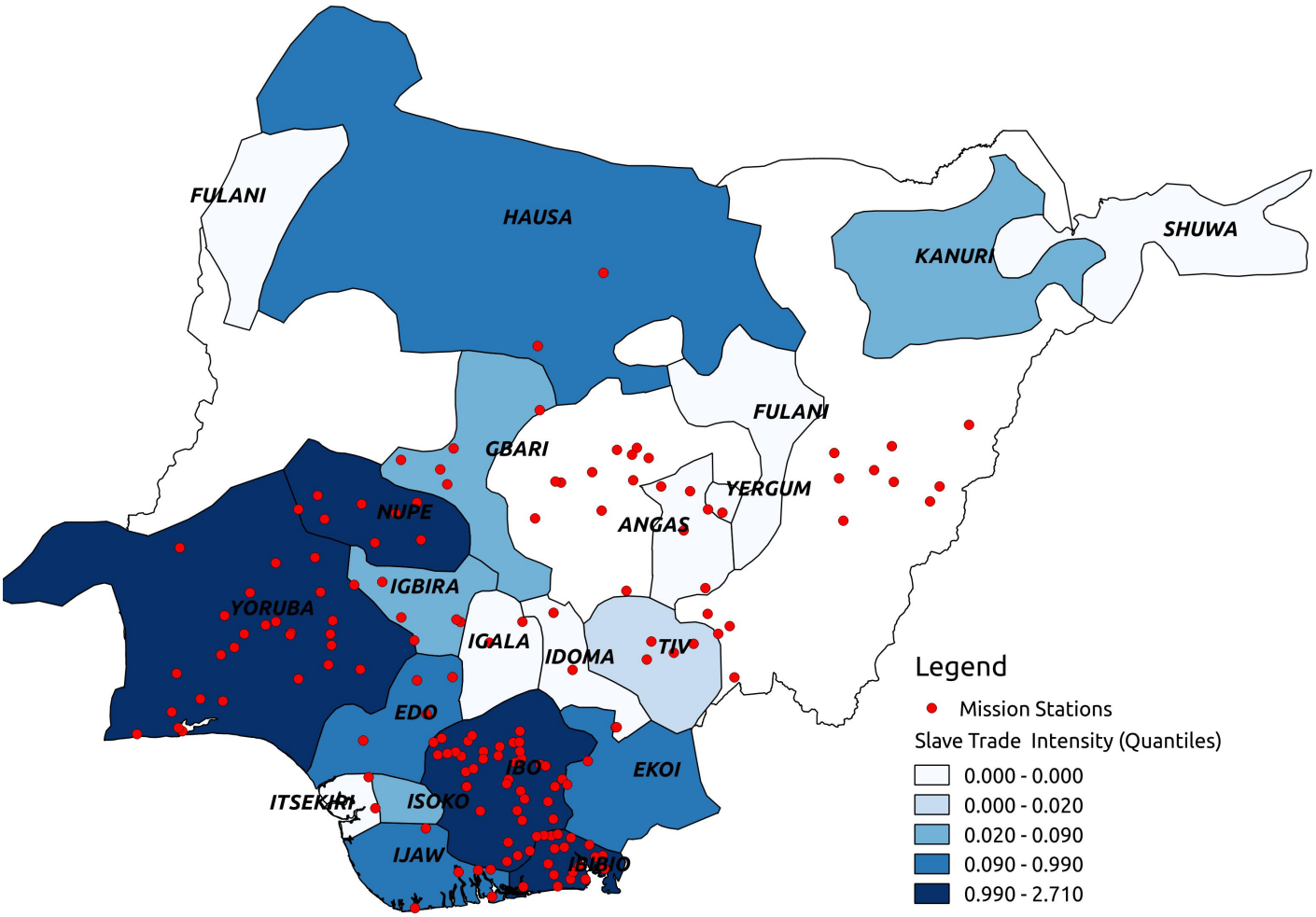


Figure 1: Slave Trade Intensity and Missions within Ethnic Homelands

geographic section of the *2010 General Household Survey* (GHS), published by NBS (2013), and that is based on data from the FAO GAEZ database (Fischer et al., 2008). Data on rainfall, temperature, and altitude are obtained from the WorldClim database (Hijmans et al., 2005). Also, we include an indicator for whether the individual's district is in an oil-producing state. Living in an oil-producing state may be correlated with incomes or conflict, which may influence schooling outcomes (Fenske and Zurimendi, 2015). We also include regional fixed effects to control for the potential influence of the Nigerian civil war on education investments.

Ethnic-Level Variables

We also make use of ethnicity level controls that may be correlated with European contact, and an ethnic group's outlook towards education. We include estimates of the population density of the individual's ethnic homeland during the colonial period, and a measure of malaria vector ecology taken from Nunn and Wantchekon (2011). We also add an indicator for whether the colonial railway crosses the individual's ethnic homeland, as this may have had an important impact on future development (Jedwab et al., 2014). Lastly, we include a measure of the average level of trust at the level of the ethnic group which may be correlated with human capital investments. The average level of trust is computed from the Afrobarometer survey (ICSPR, 2003–2008).[15]

Instruments

We primarily use three instruments: distance to the coast, year of British occupation, and distance to a Saharan trading node. Distance to the coast is a relevant instrument for intensity of the transatlantic slave trade because ethnic groups closer to the coast were more exposed to demand for slaves in Europe and the Americas (Nunn and Wantchekon, 2011). A concern with the instrument would be that groups closer to the coast might have been more prosperous, and are therefore more likely to be educated today. To deal with this concern, as in Nunn and Wantchekon (2011), we control for factors that control for historical prosperity such as colonial-era population density, malaria ecology, trust, and contact with the colonial rail line. Further, while communities on the coast were prosperous as a result of the slave trade and later trade in palm oil, communities farther away from the coast also prospered as a result of their involvement in the trans-Saharan trade. In addition to trade, these ethnic groups were more literate as a result of longer contact with other Islamic civilizations in North and West Africa (El-Hareir and Mbaye, 2011; Lulat, 2005). For the same reasons, we also expect distance to the coast to be correlated with missionary activity.

Year of British occupation is used as an instrument for missionary activity because, as the preceding historical argument suggests, ethnic groups occupied in the years before the implementation of indirect rule were exposed to more missions. Missionary activity in areas occupied after

[15]For each ethnic group, we take the average of responses to the question of "How much do you trust others?" The results are also robust to using the median trust level.

the implementation of indirect rule faced restrictions, and a lack of official military support, that constrained expansions. Specifically, we use the year in which a town within the ethnic homeland was first occupied. Year of first occupation, instead of the year of "final" or "official" occupation, is a relevant instrument because British occupation of a town, within an ethnic homeland, served as a signal to unoccupied towns on the power of British military force. The occupied towns then served as a base for British interference in the affairs of unoccupied towns, often in defense of missions. This aided the growth of missionary activity in many areas, as exemplified in Yorubaland (Lagos), and among the Efiks and Ibibios (Calabar) (Ayandele, 1966, Chapters 1–3). The British became less likely to support missionary activity upon final or formal occupation. The year of first occupation and its sources are shown in Table 18.

On the exogeneity of the instrument, we assume that controlling for distance to the sea, differences in years of occupation generated differences in missionary activity that are independent of future propensity to acquire education.[16] This is plausible for two reasons. First, with the exception of ethnic groups with towns on the open sea susceptible to British gunboats (Yoruba, Ibibio, Efik, Igbo), years of occupation are dated between 1884-1906. This is consistent with the historical accounts of Crowder (1980) and Ikime (1977) who argue that the occupation of Nigeria began in earnest following the Berlin Conference of 1884-1885 and the subsequent "Scramble for Africa." The occupation naturally began from the coast and was guided by idiosyncratic factors, such as resistance to free trade, attack of a trading post, and other signs of insubordination to the British authority (Ikime, 1977).

Secondly, and as already discussed in the historical background, there is little evidence that more "educated" or prosperous ethnic groups were targeted for initial occupation (Nunn, 2014). Schooling, and subsequent prosperity, actually arose out of missionary contact, and missionaries may have sought out the most disadvantaged (Ajayi, 1965; Ayandele, 1966; Acemoglu et al., 2014b; Nunn, 2014). While European traders were present among the coastal ethnic groups, historians note that traders had "remarkably little impact on the societies" (Crowder, 1980, p. 148). Much of the discussion in colonial records emphasized the prosperity of the Northern ethnic groups who were occupied later in the time period.

To test the validity of the instruments, we also use distance to a Saharan trading node, taken from (Nunn and Wantchekon, 2011), as an additional instrument for missionary activity. Distance to a Saharan trading is related to missionary activity because ethnic groups farther away from Saharan trading nodes were less likely to have had Islamic missionaries who were in direct competition with Christian missionaries in many parts of Nigeria. Their absence would have allowed Christian missionaries to gain a significant foothold in these areas.[17]

[16]Future propensity is emphasized because Western education was effectively absent in Nigeria before the arrival of missionaries.

[17]From the preceding discussions, it is clear our instruments are correlated, because occupation began from the coast and areas closer to the coast were also further away from a Saharan trading node. The two-stage least squares (2SLS) estimates take these correlations into account, but we also estimated a system of equations in which missionary activity depends on year of occupation and distance to a Saharan trading

Summary statistics are shown in Table 18, which presents the means of some key variables for all the ethnic groups in our dataset. We see systematic variation in the number of missions per area across various ethnic groups (in log), with the large ethnic groups of Northern Nigeria that were exposed to indirect rule immediately upon British occupation (Hausa, Kanuri, and Fulani) having almost no mission stations. Also, notice the correlation between the number of slaves exported per area of an ethnic group's homeland and the number of missions per 1000 km^2. The correlation coefficient is .6, and this illustrates the importance of studying these historical shocks together. We also briefly examine the relationship between average years of schooling, missionary activity, and slave exports. Again, we find that the larger Northern ethnic groups (Hausa, Fulani, Kanuri), exposed to very little missionary activity, have the lowest average years of schooling. For example, the average years of schooling among the Hausa is 2.78 years, compared to 9.7 years of schooling for the Yorubas who had relatively greater exposure to the slave trade and missionary activities. We also see variations in literacy rates and self-employment status, all of which are related to differences in years of schooling.

Next, we simultaneously assess the effect of an individual's ethnic group's historical exposure to the transatlantic slave trade and missionary activity on schooling, literacy, and self-employment status. We estimate the direct effect of the slave trade and missionary activity, followed by the indirect effect of the slave trade.

4 Empirical Strategy and Results

4.1 Structural Equations

We examine the relationship between exposure to the transatlantic slave trade, mission stations in 1928, and current outcomes of individuals in modern Nigeria. We treat both historical missionary activity and exposure to the slave trade as potentially endogenous, and estimate the system of equations below:

$$Y_{i,h,e,d,r} = \beta M_{i,h,e,d,r} + \gamma T_{i,h,e,d,r} + \mathbf{X_i \Pi} + \mathbf{X_h \Gamma} + \mathbf{X_e \Lambda} + \mathbf{X_d} \upsilon + \rho \mathbb{1}_{\mathbf{d}}^{\mathbf{c}} + \alpha_{\mathbf{r}} + \epsilon_{\mathbf{i,h,e,s,r}}. \quad (1)$$

$$M_{i,h,e,d,r} = \varphi \Omega_e + \phi S_e + \mathbf{X_i \Phi} + \mathbf{X_h \Upsilon} + \mathbf{X_e \Xi} + \mathbf{X_d \Theta} + \lambda \mathbb{1}_{\mathbf{d}}^{\mathbf{c}} + \sigma_{\mathbf{r}} + \zeta_{\mathbf{i,h,e,s,r}}. \quad (2)$$

$$T_{i,h,e,d,r} = \pi \Delta_e + \mathbf{X_i} \nabla + \mathbf{X_h \Psi} + \mathbf{X_e \Sigma} + \mathbf{X_d} \Re + \theta \mathbb{1}_{\mathbf{d}}^{\mathbf{c}} + \tau_{\mathbf{r}} + \xi_{\mathbf{i,h,e,s,r}}. \quad (3)$$

Our parameters of interest, for the direct effects, are in equation (1), which relates the outcome

node only, and intensity of slave exports depends on distance to sea only. As we see below, the estimates are very similar to those obtained from 2SLS.

variable, $Y_{i,h,e,d,r}$ (years of schooling, for example), for individual i, living in household h, who belongs to ethnic group e, and lives in district d in region r, to the intensity of missionary activity M, intensity of the transatlantic slave trade, T, individual characteristics $\mathbf{X_i}$, household characteristics $\mathbf{X_h}$, ethnic-group characteristics $\mathbf{X_e}$, district characteristics $\mathbf{X_d}$, a crude oil-producing fixed effect in the state of residence $\mathbb{1}_d^c$, and a region-specific fixed effect, α_r.[18]

The key variables are M, log of the number of mission stations per 1000 km^2 of the ethnic group's ancestral homeland, and T, log of the number of slave exports per area during the transatlantic slave trade. In equation (2), the number of mission stations per 1000 km^2 of the individual's ethnic homeland is a function of the year of occupation, Ω_e, distance to a Saharan trading node, S_e, and other individual, household, ethnic, district, and regional variables, including exposure to the transatlantic slave trade, T. In computing the indirect effect of the slave trade, we would also be interested in obtaining estimates of the effect of an ethnic group's exposure on subsequent missionary activity. Equation (3) expresses the number of slave exports per area during the transatlantic slave trade as a function of distance to coast, Δ_e, and other individual, household, ethnic, district, and regional characteristics.

Individual level controls contained in $\mathbf{X_i}$ are age, age-squared, occupation (in 8 groups), sex, and type of residence (urban or rural). It is not clear that occupation should be included as a control variable, because missions could influence schooling and subsequent choice of occupation. On the other hand, it could be that missionary activities increased the demand for education by introducing occupations requiring more schooling. We control for occupation in order to focus on the impact of missionary activity through increases in the supply of education.[19] Thus, our estimates may be interpreted as the effect of missionary activity on schooling, controlling for the effect of missionary activity on schooling through choices of occupation.

We include household controls, $\mathbf{X_h}$, and these are the size of the household, age and sex of the household head, and household wealth. We control for household wealth in order to account for intergenerational factors that may influence schooling and are possibly correlated with missionary activity. It is also possible that missions increased wealth and subsequently led to changes in schooling (Ajayi, 1965; Ayandele, 1966; Johnson, 1967). These are factors we would want to control for in estimating the direct effects of both historical shocks. Additionally, as our focus is on increases in the supply of schooling brought about by missionary activity, we control for any intergenerational wealth effects on the demand for schooling, which might have been brought about by early exposure to missionary schools.

The system also includes ethnicity controls that may be correlated with missionary activity in $\mathbf{X_e}$. These are population density in the colonial era, the presence of the colonial rail line, a measure of malaria ecology, and average trust levels (Johnson, 1967; Frankema, 2012). The district level

[18] All equations are also estimated with an individual specific constant term, but this is suppressed for clarity in equations (1), (2), and (3).

[19] On this note, we find that not controlling for occupation (especially professionals), increases the point estimate of the impact of missionaries on schooling by about .1 years.

variables, $\mathbf{X_d}$, are measures of annual rainfall, annual temperature, the availability of nutrients in soil, and altitude of the district. Lastly, we include indicators for whether the individual lives in an oil-producing state, and indicators for the region in which the individual lives (6 regions in total).

4.2 Direct Effects of The Slave Trade and Missions on Schooling

We begin with estimates of the direct effects of the slave trade and missionary activity on schooling. This involves estimating the parameters of equation (1). We first estimate the model by OLS, but recognize this is unlikely to yield consistent estimates because missions and the slave trade might be endogenous. Relatedly, given that the measure of missionary activity stops in 1928, there might be measurement error in our measure of exposure to missions. The measurement error in missionary activities, combined with missions being correlated with slave exports, implies the OLS estimate may be downward biased (see Acemoglu et al. (2014b) for an example of this problem in the context of institutions and human capital). Thus, we also estimate the model by 2SLS, using year of occupation, distance to coast, and distance to a Saharan trading node as excluded instruments for slave exports and missionary activity simultaneously.[20]

Table 1 shows estimates of the direct effects of the transatlantic slave trade and missionary activity (both in logs) on schooling. In column 1, we present OLS estimates of the direct effects. The estimates imply that a one hundred percent increase in missions per area leads to a direct increase of 2.98 years of schooling, and a one hundred percent increase in slave exports per area leads to a decrease of .55 years of schooling. Further, we see that the point estimates for some of the control variables are in line with economic theory and previous findings. Household wealth is an important determinant of schooling attainment, and so is the presence of living in a female-headed household. Living in a larger household is associated with lower individual schooling. Looking at the ethnicity controls, we find that population density in colonial times is negatively associated with schooling attainment and the presence of the colonial rail line within the ethnic homeland increases schooling attainment. The negative effect of initial population density on schooling attainment is consistent with the reversal of fortunes, in which ethnic groups that were more prosperous in pre-colonial times are relatively poorer today as a result of weaker institutions (Acemoglu et al., 2002). The positive effect of the colonial rail line on schooling attainment reinforces the results in Jedwab et al. (2014), who find that colonial rail line has had a persistent positive effect on economic outcomes. Also, living in an oil-producing state increases schooling attainment by .3 years, all else the same, and this is consistent with the results in Fenske and Zurimendi (2015).

We control for fixed regional characteristics in column 2, which reduces the point estimate of the positive effect of missionary activity and slightly increases the (absolute) magnitude of the negative effect of the slave trade. The estimates imply that a one hundred percent increase in missions per

[20]The system was also estimated using limited information maximum likelihood (LIML), and two-stage GMM. Given the large sample size, over 30,000 individuals, the estimates we obtain for equation (1) are unsurprisingly robust to these alternative estimating techniques.

Table 1: Direct Effects of The Slave Trade and Missions on Schooling

	Dependent Variable is Years of Schooling				
	1	**2**	**3**	**4**	**5**
	OLS		**IV**		**IV: Restricted Sample**
Missions per area	2.984***	1.626***	7.989***	7.731***	6.848***
	[10.93]	[5.32]	[8.69]	[9.08]	[8.76]
Slave Exports	-0.549***	-0.591***	-1.729***	-1.682***	-1.850***
	[-5.11]	[-4.94]	[-8.17]	[-7.95]	[-7.90]
Individual Controls	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
	Household Controls				
Wealth	1.424***	1.341***	1.343***	1.343***	1.358***
	[29.96]	[27.05]	[25.77]	[25.89]	[25.83]
Female Head	0.790***	0.677***	0.660***	0.661***	0.630***
	[11.13]	[10.05]	[9.26]	[9.34]	[8.93]
Age of Head	0.0211***	0.0187***	0.0215***	0.0214***	0.0212***
	[9.60]	[8.63]	[9.36]	[9.28]	[9.14]
Household Size	-0.0628***	-0.0466***	-0.0543***	-0.0540***	-0.0580***
	[-6.18]	[-4.12]	[-4.73]	[-4.72]	[-5.80]
	Ethnicity Controls				
Colonial Pop. Density	-1.186***	-0.621***	-1.929***	-1.876***	-1.825***
	[-9.90]	[-4.97]	[-8.20]	[-9.68]	[-9.17]
Colonial Rail	1.005***	1.335***	2.819***	2.757***	2.698***
	[5.32]	[7.26]	[9.44]	[9.58]	[8.45]
Malaria Ecology	0.282***	0.236***	0.191***	0.193***	0.226***
	[8.78]	[6.93]	[4.56]	[4.54]	[4.55]
Mean Trust Level	-2.641***	-1.532***	-4.061***	-3.956***	-4.947***
	[-6.52]	[-4.47]	[-7.80]	[-7.04]	[-6.11]
	Location Controls				
Rainfall	0.00176**	0.00143+	0.001	0.0011	0.00166*
	[3.06]	[1.96]	[1.44]	[1.48]	[2.30]
Temperature	-0.0485***	-0.0503***	-0.0495***	-0.0495***	-0.0519***
	[-6.19]	[-6.61]	[-6.12]	[-6.16]	[-6.47]
Nutrient in Soil	-0.0364	-0.0626	-0.204*	-0.198*	-0.165*
	[-0.49]	[-0.88]	[-2.56]	[-2.48]	[-2.07]
Altitude	-0.000837*	-0.0003	-0.0002	-0.0002	-0.0001
	[-1.97]	[-0.78]	[-0.48]	[-0.50]	[-0.21]
Oil Producing		0.302*	0.284+	0.285+	0.228
		[2.25]	[1.78]	[1.81]	[1.52]
Region-Fixed Effects	**No**	**Yes**	**Yes**	**Yes**	**Yes**
Adjusted R^2	0.56	0.569	0.542	0.544	0.564
Observations	35464	35464	35464	35464	33592
Overid Test (P)				0.65	0.91
KP UnderId Test			75.77	101.2	97.88
KP rk Wald F			47.69	73.05	68.61
AR Wald F			56.47	49.43	43.31
SW LM S			90.89	101	93.69

Notes: IV estimates are 2SLS estimates, and "Restricted Sample" restricts the sample to ethnic groups with strictly positive exposure to the slave trade. T-statistics for standard errors clustered at the district level in brackets. $^{+}p < .1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Regressions include individual, household, ethnicity, location, state, and region controls. **Individual** controls are age, age-squared, urban/rural residence, sex, and 8 occupation dummies. **Household** controls are wealth, sex of the household head, size of the household, and age of the household head. **Ethnicity** controls are colonial-era population density (trade), an indicator for whether the railway crosses the individual's ethnic homeland, malaria ecology, and mean level of trust. **Location** controls are climatic and geographic controls from Fischer et al. (2008) and Hijmans et al. (2005) at the local government area level (county). We also include indicators for the region in which the individual lives (6), and an indicator for whether the individual lives in an oil-producing state. We use year of occupation, distance to coast, and distance to a Saharan trading node as instruments for missionary activity and transatlantic slave exports, as described in the text.

area leads to a direct increase of 1.63 years of schooling, and a one hundred percent increase in slave exports per area leads to a decrease of .6 years of schooling. The patterns in column 2 might be taken to imply that the effects of historical exposure missionary activity is smaller for ethnic groups within a given region. We use this more conservative estimate of the effect of missions by controlling for region-fixed effects in all other regressions (unless otherwise stated).

In columns 3–5, we present instrumental variable (IV) estimates where the number of mission stations and slave exports per area are simultaneously treated as endogenous. To reiterate, even if missionary activity and slave exports were randomly assigned, the high level of correlation between them, and some of the ethnicity-level variables (population density, malaria ecology, trust levels) may lead to a downward estimate in the parameters if measurement errors differ across variables.[21] Column 3 of Table 1 contains 2SLS estimates where we use year of occupation and distance to sea as instruments for missionary activity and slave exports. Overall, we find that the estimated effect of missionary activity and slave exports are substantially larger than the OLS estimates. A one hundred percent increase in the number of mission stations per $1000km^2$ is associated with a 7.9 years increase in schooling attainment, while a proportional increase in slave exports per area decreases schooling attainment by 1.73 years. In column 4, we include distance to a Saharan trading node as an additional instrument, and this enables us to test the validity of our exclusion restrictions (exogeneity of our instruments). Most of the parameter estimates are robust to the additional instrument, and reassuringly, we cannot reject the null hypothesis that the instruments are valid (given that at least two of the instruments are valid). The p-value of the Hansen overidentification test (Overid Test (P)) equals .65. Along with the preceding historical discussion, the statistical test gives us greater confidence in the validity of our instruments.

In order to compare the size of the estimated effects of missionary activity and slave exports on schooling, Table 2 shows the standardized estimated effects of the variables of interest, and include the estimated effect of the colonial rail line for comparison. The OLS estimates in column 1 imply that a standard deviation increase in (log) missions per area is associated with an increase of about .18 standard deviations in schooling attainment. Given a standard deviation of 5.4 years of schooling in our dataset, the estimates imply a standard deviation increase in missions per area increases schooling attainment by .97 years of schooling (.18 * 5.4). Similarly, a standard deviation increase in slave exports per area is associated with a direct decrease of .11 standard deviations in years of schooling, and is roughly equal to a decrease of .55 years of schooling.[22] When we control for fixed region characteristics in column 2, we continue to find similar standardized effects of the slave trade, but the standardized effect of missionary activity is now smaller. The estimates imply

[21] This is very similar to the argument in Acemoglu et al. (2014b), who find that because of the differential measurement errors between measures of human capital and institutions, the coefficient on institutions might be biased downwards in OLS estimates that include both variables.

[22] Note that the effect of a standard deviation increase in (log) slave exports per area is roughly equal to the effect of a one hundred percent increase in slave exports per area. This is because the standard deviation of (log) of slave exports per area is roughly equal to 1 in the Nigerian data, and a similar pattern is found for Africa (Nunn and Wantchekon, 2011).

Table 2: Standardized Direct Effects of The Slave Trade and Missions on Schooling

	Dependent Variable is Years of Schooling				
	1	**2**	**3**	**4**	**5**
	OLS		**IV**		**IV: Restricted Sample**
Missions per area	0.182***	0.099***	0.488***	0.472***	0.426***
	[28.58]	[12.12]	[22.32]	[25.52]	[23.69]
Slave Exports	-0.107***	-0.115***	-0.337***	-0.328***	-0.349***
	[-13.26]	[-12.32]	[-21.51]	[-23.28]	[-22.48]
Colonial Rail	0.070***	0.094***	0.198***	0.193***	0.178***
	[12.68]	[15.00]	[22.92]	[24.18]	[21.39]
All Controls	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
Region-Fixed Effects	**No**	**Yes**	**Yes**	**Yes**	**Yes**
Observations	35464	35464	35464	35464	33592
Adjusted R^2	0.56	0.569	0.542	0.544	0.564

Notes: Table reports standardized (beta) coefficients. IV estimates are 2SLS estimates, and "Restricted Sample" restricts the sample to ethnic groups with strictly positive exposure to the slave trade. T-statistics for standard errors clustered at the district level in brackets. $^{+}p < .1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Regressions include individual, household, ethnicity, location, state, and region controls. **Individual** controls are age, age-squared, urban/rural residence, sex, and 8 occupation dummies. **Household** controls are wealth, sex of the household head, size of the household, and age of the household head. **Ethnicity** controls are colonial-era population density (trade), an indicator for whether the railway crosses the individual's ethnic homeland, malaria ecology, and mean level of trust. **Location** controls are climatic and geographic controls from Fischer et al. (2008) and Hijmans et al. (2005) at the local government area level (county). We also include indicators for the region in which the individual lives (6), and an indicator for whether the individual lives in an oil-producing state. We use year of occupation, distance to coast, and distance to a Saharan trading node as instruments for missionary activity and transatlantic slave exports, as described in the text.

that a standard deviation increase in missionary activity is associated with an increase of about .54 years of schooling (.1 * 5.4).

The standardized estimate of the effect of missionary activity on schooling, in column 2, is very similar to the estimated effect of missions found by Nunn (2014) looking at sub-Saharan Africa as a whole. He finds a standardized effect of missionary activity of .047 standard deviations, at the ethnic group level, and an effect of .036 standard deviations, at the village level, for a combined effect of .083 standard deviations compared to the .1 standard effect we find here. We view it as a positive sign that different datasets, for different groups of countries, yield similar estimates of the effect of missionary activity on schooling attainment. In sum, the OLS estimates imply that missionary activity compensated for the direct negative effect of the slave trade.

However, it is not clear that OLS consistently estimates the direct effects of the slave trade, and missionary activity, on schooling. The IV estimates in column 2–5 suggest that the OLS estimates may be downward biased. The standardized IV estimates in column 3 and 4, of Table 6, implies that a one-standard deviation increase in slave exports directly reduces schooling attainment by .33 standard deviations (1.7 years). A similar increase in the number of missions per area increases schooling attainment by .47 standard deviations (2.54 years), and the direct positive effect of missions is .14 standard deviations larger than the positive effect of the slave trade (about .76 years). This pattern is robust to the set of instruments (column 4), and the sample (column 5). Once again, we find missions have compensated for the negative effect of the slave trade. However, compared to the OLS estimates, we find the standardized positive effect of missionary activity is greater than the negative effect of the slave trade, and also larger than the positive effect of the colonial railway which has been credited with having a substantial impact on the development of African economies (Jedwab et al., 2014).

One objection to the estimates in Table 1 is that wealth should not be a control variable. It could be argued that missions have increased schooling through raising wealth, and controlling for wealth would underestimate the effect of missionary activity. In Table 17, of the appendix, we show that the estimated effects of missionary activity and the slave trade are not sensitive to the exclusion of the control for household wealth. The point estimates we obtain without controlling for household wealth are slightly larger across the board, but of the same magnitude as the estimates in Table 1. We present the more conservative estimates controlling for household wealth in order to be consistent with other studies, such as Nunn and Wantchekon (2011) and Nunn (2014), who control for living conditions and other characteristics acting as proxies for wealth and income.

First-Stage Regressions and Sensitivity of IV Estimates

One might wonder whether the larger IV estimates are not a result of weak instruments? The reported first-stage test statistics in Table indicate the larger estimated effects are unlikely to be as a result of weak instruments. Looking at column 3, of Table 1, we find, from the Kleibergen and Paap (2006) test of underidentification (KP UnderId test), that we can firmly reject the system is

underidentified (test statistic is $\chi^2_{(1)} = 75.77$). Second, the Kleibergen and Paap (2006) test of weak identification (KP rk Wald F = 47.69) also rejects that the system is weakly identified. Lastly, the Anderson and Rubin (1949) (AR Wald F), and Stock and Wright (2000) (SW LM S), weak-instrument robust test statistics indicate the endogenous variables (missions and slave exports) are significant in the system. Similar results in columns 4 and 5 show our first-stage equations are identified by the instruments.

Further, Table 3 shows the first-stage estimates for missionary activity and slave exports. Results from the Angrist and Pischke (2009) F-test of excluded instruments (AP F-stat) show neither of the endogenous regressors is weakly identified. The estimates in column 1 of Table 3 show, consistent with the historical discussions, that ethnic groups occupied later, and groups further from the coast, have less missions. In column 2 of Table 3, with the inclusion of distance to a Saharan trading node as an instrument, we continue to find that ethnic groups occupied later have less missions, and ethnic groups further from a Saharan trading node have more missions. These are all consistent with our priors from the historical discussion. However, the point estimate for distance to coast is now insignificant (and of a different sign), even though all parameters for our instruments remain jointly significant as the AP F-stat indicates.

The change in the sign of parameters is especially worse in the first-stage results for slave exports per area in the bottom panel of Table 3. We find that while ethnic groups occupied later were less exposed to the slave trade (as expected), distance to coast is positively correlated with the slave trade. This positive relationship is inconsistent with the historical evidence and estimates from Nunn and Wantchekon (2011). This is partly due to multicollinearity as year of occupation is partly correlated with distance to sea.

However, we find the larger problem appears to be a collection of small ethnic groups farther away from sea, in the northern part of Nigeria, that were occupied between 1902 and 1903 for whom the data show no exposure to the slave trade (8 in all). This generates a very high correlation between year of occupation and the slave trade in the data. It is potentially problematic if our results are being driven by year of occupation instrument driving the first-stage estimates for slave exports as it does not belong in the structural equation.[23] Therefore, we investigate the sensitivity of our results to this issue by restricting the sample, and then restricting the set of instruments in each first-stage equation.

First, we re-estimate the model without ethnic groups with zero slave exports. We lose 8 ethnic groups making up about 4.5% of the total Nigerian population and 5% of our sample. The first-stage results are shown in column 3 of Table 3. Looking at the first-stage estimates for slave exports, we now see that ethnic groups farther away from the coast were less exposed to the slave trade, as predicted, and ethnic groups farther away from the sea also have less missions. The second stage results in column 5 of Table 1 also reveal that our point estimates are robust to this sample

[23]Year of occupation could not have caused an increase in transatlantic slave exports, because occupation occurred decades after the slave trade was abolished.

Table 3: Select First-Stage 2SLS Results

	Dependent Variable is Missions per area		
	1	**2**	**3**
			Restricted Sample
Year of Occupation	-0.00745***	-0.00706***	-0.00687***
	[-9.94]	[-10.14]	[-8.60]
Distance to Coast	-0.000563***	0.0001	-0.000634*
	[-7.71]	[1.09]	[-2.35]
Distance to Saharan Node		0.000808***	0.0002
		[6.76]	[0.83]
Observations	35464	35464	33592
Adjusted R^2	0.84	0.85	0.869
AP F-stat	88.04	116.8	118.7
All Controls	**Yes**	**Yes**	**Yes**
Region-Fixed Effects	**Yes**	**Yes**	**Yes**
	Dependent Variable is Slave Exports		
	1	**2**	**3**
			Restricted Sample
Year of Occupation	-0.0429***	-0.0430***	-0.0376***
	[-35.44]	[-35.56]	[-37.71]
Distance to Coast	0.000571***	0.0004	-0.00142***
	[4.99]	[0.90]	[-12.01]
Distance to Saharan Node		-0.0003	-0.00171***
		[-0.73]	[-13.19]
Observations	35464	35464	33592
Adjusted R^2	0.964	0.964	0.982
AP F-stat	648.3	580.1	844.1
All Controls	**Yes**	**Yes**	**Yes**
Region-Fixed Effects	**Yes**	**Yes**	**Yes**

Notes: Restricted Sample restricts the sample to ethnic groups with strictly positive positive exposure to the slave trade. T-statistics for standard errors clustered at the district level in brackets. $^{+}p < .1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Regressions include individual, household, ethnicity, and location, state and region controls at the first state. **Individual** controls are age, age-squared, urban/rural residence, sex, and 8 occupation dummies. **Household** controls are wealth, sex of the household head, size of the household, and age of the household head. **Ethnicity** controls are colonial-era population density (trade), an indicator for whether the railway crosses the individual's ethnic homeland, malaria ecology, and mean level of trust. **Location** controls are climatic and geographic controls from Fischer et al. (2008) and Hijmans et al. (2005) at the local government area level (county). We also include indicators for the region in which the individual lives (6), and an indicator for whether the individual lives in an oil-producing state.

restriction, although the point estimate for the effect of missionary activity is slightly smaller, and more precise. The results show that a one hundred percent increase in the number of mission stations per 1000 km^2 directly increases schooling by an average of 6.85 years, and a one hundred percent increase in slave exports per area directly decreases schooling attainment by 1.85 years.

The slight decrease in the point estimate for the effect of missionary activity, and increase in point estimate for the effect of the slave trade when the sample is restricted to individuals who were historically more exposed to the trade, is consistent with our framework where missionary activity alleviated some of the damage inflicted by the slave trade. In this case, the damage of the slave trade is worse, on average, and the estimated effect of missionary activity is smaller as a result.

While the first approach helps alleviate some concerns about the role of distance to coast in the first-stage equations, there may still be concerns about year of occupation driving the first-stage estimates for slave exports. To address this concern, we estimate the system of equations represented by equations (1), (2), and (3) by 3SLS. Specifically, we only use distance to coast as the instrument for slave exports per area, and then year of occupation and distance to a Saharan trading node as the instrument for missionary activity. We continue to restrict the sample to ethnic groups with strictly positive exposure to the slave trade. The results are presented in Table 4.[24]

Results show that estimating the system of equations using the alternate set of instruments above are very similar to the full 2SLS estimates in Table 5. In the first-stage results of column 1, we continue to find that year of occupation is negatively related to missionary activity, and distance to a Saharan trading node is positively related to missionary activity, as expected. Also, for slave exports, we find that ethnic groups farther away from the coast are significantly less exposed to the slave trade. In column 2, we allow missionary activity to depend on the slave trade (while still treating the slave trade as endogenous). In the first-stage results, we find that areas exposed to the slave trade have more missionary activity, and so do areas further from a Saharan trading node. However, year of occupation is now positively associated with missionary activity, which potentially reflects the multicollinearity between slave exports and the instruments. In the top panel, we continue to find that this strategy yields estimates of the direct effects of missionary activity and the slave trade that a similar to those from estimating the model by 2SLS. In summary, we conclude that our estimates of the direct effects of the slave trade and missionary activity are not particularly sensitive to the set of instruments we use in the first stage.

In conclusion, we have found that simultaneously treating both missionary activity and the slave trade as endogenous leads to larger estimates of the directs impacts of both historical shocks. These estimated effects are larger than those found in the previous literature. Next, we address the question of whether the slave trade had *positive indirect* effects, by encouraging missionary activity. First, we present our strategy for uncovering this indirect effect.

[24]Note that the use of all instruments and exogenous variables in the first-stage is actually best practice (Angrist and Pischke, 2009), and the 3SLS exercise is primarily intended for illustrative purposes.

Table 4: Slave Trade, Missions, and Schooling: Estimates From Restricting Instruments

Second Stage: Dependent Variable is Years of Schooling		
	1	**2**
Missions per area	7.003***	6.721***
	[9.68]	[10.52]
Slave Exports	-1.656***	-1.645***
	[-7.41]	[-6.54]
All Controls	**Yes**	**Yes**
Region-Fixed Effects	**Yes**	**Yes**
Observations	33592	33592
Adjusted R^2	0.562	0.564

First Stages		
Dependent Variable is Missions per area		
	1	**2**
Year of Occupation	-0.00502***	0.0096
	[-4.79]	[1.33]
Distance to Saharan Node	0.000784***	0.000953***
	[13.09]	[9.23]
Slave Exports		0.452*
		[2.03]
Observations	33592	33592
Adjusted R^2	0.863	0.889
Dependent Variable is Slave Exports		
	1	**2**
Distance to Coast	-0.000609**	-0.000658**
	[-2.85]	[-3.06]
Observations	33592	33592
Adjusted R^2	0.877	0.877

Notes: System is estimated by 3SLS and T-statistics in brackets come from bootstrapped standard errors clustered at the district level. $^{+}p < .1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. In contrast to the 2SLS estimates in Table 5, we use year of occupation and distance to Saharan node as instruments for missionary activity, and distance to coast as the instrument for the slave trade. Also, sample is restricted to ethnic groups with strictly positive exposure to the slave trade. All Regressions include individual, household, ethnicity, and location, state and region controls at the first state. **Individual** controls are age, age-squared, urban/rural residence, sex, and 8 occupation dummies. **Household** controls are wealth, sex of the household head, size of the household, and age of the household head. **Ethnicity** controls are colonial-era population density (trade), an indicator for whether the railway crosses the individual's ethnic homeland, malaria ecology, and mean level of trust. **Location** controls are climatic and geographic controls from Fischer et al. (2008) and Hijmans et al. (2005) at the local government area level (county). We also include indicators for the region in which the individual lives (6), and an indicator for whether the individual lives in an oil-producing state.

4.3 Estimation Strategy for Indirect Effect of Slave Trade

In the system of equations described by equations (1)–(3), the coefficient on (log) missionary activity, β is the effect of missionary activity on the outcome of interest, controlling for any effects arising out of its correlation with the transatlantic slave trade. Similarly, the coefficient on (log) transatlantic slave exports per area, γ, is the effect of the slave trade on the outcome of interest controlling for any indirect effects coming from the fact that the slave trade might have induced more missionary activity. Thus, γ is the direct effect of the slave trade.

To obtain an estimate of the indirect effect of the slave trade, we adopt three related strategies. Our first strategy is to estimate equation (1) excluding missionary activity, and for the second, we include only the measure of missionary activity orthogonal to the slave trade. For the third, we estimate the effect of the slave trade on subsequent missionary activity, and combine this with the direct effect of missionary activity on schooling to obtain any indirect effects of the slave trade through missions.

To *illustrate* these strategies, consider a simplified form of equations (1) and (2) for every ethnic group, with all other subscripts removed for clarity:

$$Y_e = \alpha_r + \beta M_e + \gamma T_e + \epsilon_e \tag{4}$$

$$M_e = \sigma_r + \hat{\theta} T_e + \zeta_e. \tag{5}$$

The coefficient on slave exports, T_e, in equation (4) when the measure of missionary activity is excluded is $\beta\hat{\theta} + \gamma$, the *total* effect of the slave trade. The total effect consists of the direct effect of slave exports, γ, plus any indirect effects through missionary activity $\beta\hat{\theta}$.[25] The first strategy is to estimate equation (1) without missionary activity, which would yield the *total* effect of the slave trade, assuming the slave trade is uncorrelated with the error terms in equations (4) and (5) (exogenous conditional on the control variables). To obtain the indirect effect, we then subtract the direct effect, in Table 1, from the total effect estimated using the procedure described here.

The second strategy involves estimating equation (5), and obtaining an estimate of the error term, $\hat{\zeta_e}$, which is the portion of missionary activity uncorrelated with the slave trade. We then estimate (4) using $\hat{\zeta_e}$ in place of missionary activity. Once again, the coefficient on $\hat{\zeta_e}$ equals β, the direct effect of missionary activity. The coefficient on slave exports, T_e, in equation (4), using a measure of missionary activity orthogonal to the slave trade is $\beta\hat{\theta} + \gamma$, which is the total effect. In doing this, we treat the error term, $\hat{\zeta_e}$, and the slave trade, as endogenous as a result of measurement errors or other omitted variables. We use the same instruments used in estimating the direct effects in section 4.2. As before, the indirect effect is obtained by subtracting the coefficient on slave exports, when equation (1) is estimated using $\hat{\zeta_e}$, from the coefficient on slave exports when equation (1) is estimated using the actual missionary activity, M_e, as in Table 1.

[25] This can be obtained by substituting (5) into (4), and collecting terms associated with T_e.

Our third strategy allows us to explore a range of estimates for the indirect effects of the slave trade. We explicity estimate $\hat{\theta}$ in equation (5), which is achieved by estimating the full equation for missionary activity in equation (2). The indirect effect of the slave trade is then the product of $\hat{\theta}$, with β estimated in Table 1.

A common shortcoming with the first and third strategies is that we do not have an instrument for the slave trade that is conditionally independent of missionary activity (all our instruments are correlated with both shocks). If we had such an instrument, we would be more confident we were consistently estimating $\hat{\theta}$ in (5) or (2), for the third strategy, and γ in (4) or (1), for the first strategy where missionary activity is excluded. However. the second strategy does not face the same drawbacks as it estimates the *total* effect of the slave trade treating both the slave trade, and the residual from a regression of missions on the slave trade as endogenous. As mentioned earlier, we use the same set of instruments that we employed earlier (year of occupation, distance to sea, and distance to a Saharan trading node) when implementing the second strategy. Comparing the estimates gives us an idea of how serious any endogeneity concerns from the first and third strategies might be. Next, we present estimates of the indirect positive effects of the slave trade obtained from the three strategies.

4.4 Indirect Positive Effects of the Slave Trade

Strategy I and II: Estimates of the Total and Indirect Positive Effect

We begin with estimates of the indirect effect of the slave trade, estimated using our first two strategies: omitting missionary activity from the regressions, and including a measure of missionary activity orthogonal to the slave trade. The estimates are shown in Table 5, and recall the coefficient on the slave trade is the total effect, $\beta\hat{\theta} + \gamma$, and the indirect effect is obtained by subtracting the direct effect, γ, in Table 1, from the total effect in Table 3.

In the first column, we have OLS estimates of the total effect of the slave trade using our first strategy. It shows that a one hundred percent increase in slave exports per area, *decreases* schooling by a total of .32 years. Comparing the coefficients on slave exports in column 2 of Tables 1 and 5, OLS estimates using our first strategy implies that the indirect effect of the slave trade is an *increase* of .28 years of schooling (-.32 + .6). That is, a one hundred percent increase in slave exports per area, increases missions per area, and this leads to a .28 years increase in schooling attainment.

Column 2 contains IV estimates using the first strategy, once again, the result shows the total effect of a one hundred percent increase in slave exports per area is a decrease schooling attainment by .32 years. The IV estimate of the total effect is identical to the OLS estimate, but the estimated indirect effect is now larger. Subtracting column 4 of Table 1 from the total effect estimated here, we find that a one hundred percent increase in slave exports per area increases schooling attainment by about 1.36 years (-.32 + 1.68). This is because of the larger IV estimates of the direct effects

of the slave trade (and missionary activity). Thus, while a one hundred percent increase in slave exports decreased schooling attainment by 1.68 years, it indirectly increased schooling attainment by 1.36 years through its effect on missionary activity.[26]

However, note that in column 2, when missionary activity is omitted from the model, the validity of our exclusion restrictions are rejected (Overid Test (P) = 0). This implies that our instruments do not influence schooling through the slave trade alone. So, in the last two columns, we use the residual from a regression of missionary activity on slave exports as the measure of missionary activity, and as explained in section 4.3, this yields the direct effect of missionary activity and the total effect of slave exports. Using this strategy, we continue to find the same value for the direct effect of missionary activity, both OLS and IV, as in Table 1. The OLS estimates imply a one hundred percent increase in the number of missions stations per $1000km^2$ is to increase schooling attainment by 1.63 years, while the IV estimates imply a larger increase of 7.73 years.

For the total effect of the slave trade, OLS estimates, using the error term from a regression of missions on the slave trade, imply that a one hundred percent increase in slave exports per area decreases schooling attainment by .29 years of schooling. However, in column 2 of Table 1, we find that slave exports directly decreased schooling attainment by .6 years of schooling. Thus the indirect effect of the slave trade is an increase of about .3 years of schooling (-.295 + .591). These estimates are very similar to the OLS estimates using the first strategy. Looking at the 2SLS estimates, in column 4, we find the total effect of a one hundred percent increase in slave exports is now slightly smaller and imprecise at -.27 years. Again, subtracting the coefficient on slave exports in column 4 of Table 1 from the estimate of the total effect in column 4, we find that the indirect effect of a one hundred percent increase in slave exports is to increase schooling attainment by 1.4 years on average.

In Table 6, we show standardized estimates of the total and indirect effects of the slave trade on schooling. For both estimation strategies, and for OLS and IV, we see that the estimated total effects of the slave trade are very similar. A standard deviation increase in slave exports per area is associated with a total decrease of about .06 standard deviations in schooling attainment. For comparison, this decrease is similar to the positive standardized estimate of the total effect of the colonial rail line, an important colonial-era economic infrastructure, in columns 1 and 2.[27] The estimates imply that a standard deviation increase in slave exports leads to a total decrease of about .32 years of schooling (.05 * 5.4).

Moving to the indirect effects, the OLS estimates in columns 1 and 3 reveal that a standard

[26] As in section 4.2, relevant tests of the 2SLS model indicate the first-stages are not weakly identified and the instruments are not weak. This could be seen from the Kleibergen and Paap (2006) test of under-identification (KP UnderId test), Kleibergen and Paap (2006) test of weak identification (KP rk Wald F), the Anderson and Rubin (1949) (AR Wald F), and Stock and Wright (2000) (SW LM S). Therefore, the higher estimates are not a result of weak instruments but probably reflects a correction of the fact missionary activity is measured with error.

[27] The effect of the colonial rail line is larger once we control for missionary activity, in columns 3 and 4, because the rail line is negatively related with missions as we show in Table 7.

Table 5: Indirect Effect of the Slave Trade on Years of Schooling: I and II

Dependent Variable is Years of Schooling				
	1	**2**	**3**	**4**
	Missions Omitted		**Missions Orthogonal**	
	OLS	**IV**	**OLS**	**IV**
Missions per area			1.626***	7.731***
			[5.32]	[9.08]
Slave Exports	-0.317**	-0.319**	-0.295**	-0.272+
	[-2.92]	[-2.87]	[-2.86]	[-1.94]
Individual Controls	**Yes**	**Yes**	**Yes**	**Yes**
	Implied Indirect Effect of Slave Trade on Schooling			
	0.274	1.363	0.296	1.41
	Household Controls			
Wealth	1.341***	1.341***	1.341***	1.343***
	[26.76]	[26.74]	[27.05]	[25.89]
Female Head	0.680***	0.680***	0.677***	0.661***
	[9.99]	[9.95]	[10.05]	[9.34]
Age of Head	0.0179***	0.0179***	0.0187***	0.0214***
	[8.25]	[8.29]	[8.63]	[9.28]
Household Size	-0.0447***	-0.0447***	-0.0466***	-0.0540***
	[-3.89]	[-3.90]	[-4.12]	[-4.72]
	Ethnicity Controls			
Colonial Pop. Density	-0.282**	-0.281**	-0.621***	-1.876***
	[-2.85]	[-2.91]	[-4.97]	[-9.68]
Colonial Rail	0.975***	0.978***	1.335***	2.757***
	[5.88]	[5.33]	[7.26]	[9.58]
Malaria Ecology	0.249***	0.249***	0.236***	0.193***
	[6.73]	[6.56]	[6.93]	[4.54]
Mean Trust Level	-0.907*	-0.910**	-1.532***	-3.956***
	[-2.44]	[-2.60]	[-4.47]	[-7.04]
	Location Controls			
Rainfall	0.00154*	0.00154*	0.00143+	0.0011
	[2.04]	[2.05]	[1.96]	[1.48]
Temperature	-0.0504***	-0.0504***	-0.0503***	-0.0495***
	[-6.58]	[-6.52]	[-6.61]	[-6.16]
Nutrient in Soil	-0.0255	-0.0254	-0.0626	-0.198*
	[-0.35]	[-0.35]	[-0.88]	[-2.48]
Altitude	-0.0003	-0.0003	-0.0003	-0.0002
	[-0.79]	[-0.79]	[-0.78]	[-0.50]
Oil Producing	0.307*	0.307*	0.302*	0.285+
	[2.27]	[2.27]	[2.25]	[1.81]
Region-Fixed Effects	**Yes**	**Yes**	**Yes**	**Yes**
Observations	35464	35464	35464	35464
Adjusted R^2	0.567	0.565	0.569	0.544
Overid Test (P)		0		0.65
KP UnderId Test		229.1		101.2
KP rk Wald F		452.2		73.05
AR Wald F		49.43		49.43
SW LM S		101		101

Notes: IV estimates are 2SLS estimates, and "Missions Orthogonal" means we use the residual from a regression of missionary activity on slave exports as the independent variable. T-statistics for standard errors clustered at the district level in brackets. $^{+}p < .1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. **Indirect effects** are computed by subtracting the direct effect of the slave trade, in columns 2 and 4 Table 1, from the total effect estimated above in Table 5. Regressions include individual, household, ethnicity, location, state, and region controls. **Individual** controls are age, age-squared, urban/rural residence, sex, and 8 occupation dummies. **Household** controls are wealth, sex of the household head, size of the household, and age of the household head. **Ethnicity** controls are colonial-era population density (trade), an indicator for whether the railway crosses the individual's ethnic homeland, malaria ecology, and mean level of trust. **Location** controls are climatic and geographic controls from Fischer et al. (2008) and Hijmans et al. (2005) at the local government area level (county). We also include indicators for the region in which the individual lives (6), and an indicator for whether the individual lives in an oil-producing state. We use year of occupation, distance to coast, and distance to a Saharan trading node as instruments.

Table 6: Standardized Indirect Effect of Slave Trade on Schooling

Dependent Variable is Years of Schooling				
	1	**2**	**3**	**4**
	Missions Omitted		**Missions Orthogonal**	
	OLS	**IV**	**OLS**	**IV**
Missions per area			0.082***	0.388***
			[12.12]	[9.08]
Slave Exports	-0.062***	-0.062**	-0.057***	-0.053+
	[-7.47]	[-2.87]	[-6.96]	[-1.94]
	Implied Indirect Effect of Slave Trade			
	0.053	0.266	0.058	0.275
Colonial Rail	0.068***	0.069***	0.094***	0.193***
	[11.60]	[5.33]	[15.00]	[9.58]
All Controls	**Yes**	**Yes**	**Yes**	**Yes**
Region-Fixed Effects	**Yes**	**Yes**	**Yes**	**Yes**
Observations	35464	35464	35464	35464
Adjusted R^2	0.567	0.565	0.569	0.544

Notes: Table reports standardized (beta) coefficients. "Missions Orthogonal to Slave Trade" means we use the residual from a regression of missionary activity on slave exports as the independent variable. T-statistics in brackets. $^{+}p < .1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Regressions include individual, household, ethnicity, location, state, and region controls. **Individual** controls are age, age-squared, urban/rural residence, sex, and 8 occupation dummies. **Household** controls are wealth, sex of the household head, size of the household, and age of the household head. **Ethnicity** controls are colonial-era population density (trade), an indicator for whether the railway crosses the individual's ethnic homeland, malaria ecology, and mean level of trust. **Location** controls are climatic and geographic controls from Fischer et al. (2008) and Hijmans et al. (2005) at the local government area level (county). We also include indicators for the region in which the individual lives (6), and an indicator for whether the individual lives in an oil-producing state. We use year of occupation, distance to coast, and distance to a Saharan trading node as instruments for missionary activity and transatlantic slave exports, as described in the text.

deviation increase in slave exports per area has directly increased schooling attainment by .053 standard deviations, by virtue of its positive contribution with missionary activity. This is about 46% of the estimated direct negative impact (.12). The IV estimates show an even larger standardized positive indirect effect. A standard deviation increase in slave exports has increased schooling attainment by .27 standard deviations, and this positive effect is about 82% of the estimated direct negative effect (.32). Overall, the estimates from our first two strategies show the transatlantic slave trade has a positive indirect effect on schooling attainment. Nonetheless, we continue to find prior exposure to the slave trade has a total negative effect of the slave trade on schooling.

Strategy III: Exploring a Range of Possible Indirect Effects

Estimates of the indirect effect of the slave trade on schooling using the third strategy are shown in Table 7. Recall that our third strategy is to explicitly obtain an estimate of the elasticity of missionary activity to slave exports, and the indirect effect of the slave trade is then computed as a product of this elasticity and the direct effect of missions. The relationship in Table 7 is the elasticity of missionary activity to slave exports; that is, we estimate the percentage change in missions per $1000km^2$ for a one percentage change in number of slave exports per area. We then multiply this elasticity with the direct effect of missions on schooling in order to obtain the indirect effect of slave exports through missionary activity.

In column 1, we estimate the effect of slave exports on missionary activity with no additional controls. The estimates in column 1 imply that a one hundred percent increase in slave exports per area increases missions per $1000km^2$ by .18%, for an elasticity of .18. Thus, the IV estimates in column 1 imply the indirect effect of a one hundred percent increase in slave exports is to increase schooling attainment by 1.41 years (.18 * 7.73). This is very similar to the IV estimate of the indirect effect in column 4 of Table 5. In column 2, we include all controls (individual, ethnicity, location, and regional fixed effects), and continue to find an elasticity of missionary activity to slave exports of .17, which is very similar to the model with no controls. Once again, the IV estimates imply an positive indirect effect of 1.31 years of schooling for a one hundred percent increase in slave exports. In column 3, we include our instruments for missionary activity, year of occupation and distance to a Saharan trading node, as control variables. We find the elasticity of missions to the slave trade is slightly smaller at .14, but we continue to find a strong positive relationship between slave exports and missionary activity. An elasticity of .14 implies that a one hundred percent increase in slave exports is associated with an indirect increase of 1.1 years of schooling.

Also, examining the reduced-form relationship between the instruments and missionary activity, we find that distance to a Saharan trading node is positively related missionary activity, as predicted by the historical discussion. We also find year of occupation is negatively related to missionary activity, but the effect is insignificant. In column 4, we show that the weak relationship between year of occupation and missionary activity in column 3 is because of the correlation between the instrument and slave exports. Once slave exports is dropped from the model, the estimates clearly

Table 7: Slave Exports and Missions: Indirect Effect of the Slave Trade Schooling: III

Dependent Variable is (Log) Mission Stations per 1000 km^2				
	1	**2**	**3**	**4**
Slave Exports	0.182***	0.169***	0.141**	
	[24.11]	[10.55]	[3.14]	
	Direct Effect of Missions From Table 1			
	OLS		**IV**	
	1.626***		7.731***	
	[5.32]		[9.08]	
	Implied Indirect Effect of Slave Trade			
OLS	0.2959	0.2748	0.2293	
IV	1.407	1.3065	1.0901	
	Instrumental Variable Controls			
Year of Occupation			-0.001	-0.00719***
			[-0.51]	[-8.86]
Distance to Saharan Node			0.000769***	0.000725***
			[12.65]	[12.97]
	Ethnicity Controls			
Colonial Pop. Density		0.208***	0.228***	0.253***
		[15.80]	[17.91]	[17.32]
Colonial Rail		-0.221***	-0.222***	-0.0750***
		[-9.21]	[-5.60]	[-4.17]
Malaria Ecology		0.0076	-0.0100**	-0.0160***
		[1.63]	[-2.79]	[-3.48]
Mean Trust Level		0.384***	0.451***	0.315***
		[9.54]	[8.42]	[5.09]
All Controls	**No**	**Yes**	**Yes**	**Yes**
Region-Fixed Effects	**No**	**Yes**	**Yes**	**Yes**
Observations	39366	35498	35498	33625
Adjusted R^2	0.37	0.819	0.857	0.865

Notes: OLS estimates of the effect of the slave trade on missionary activity. "Restricted Sample" restricts the sample to ethnic groups with strictly positive exposure to the slave trade. T-statistics for standard errors clustered at the district level in brackets. $^{+}p < .1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. **Indirect effects** are computed by multiplying the coefficient on the slave trade by the estimated direct effect of missionary activity in Table 1 for OLS and IV. Regressions include individual, household, ethnicity, location, state, and region controls. **Individual** controls are age, age-squared, urban/rural residence, sex, and 8 occupation dummies. **Household** controls are wealth, sex of the household head, size of the household, and age of the household head. **Ethnicity** controls are colonial-era population density (trade), an indicator for whether the railway crosses the individual's ethnic homeland, malaria ecology, and mean level of trust. **Location** controls are climatic and geographic controls from Fischer et al. (2008) and Hijmans et al. (2005) at the local government area level (county). We also include indicators for the region in which the individual lives (6), and an indicator for whether the individual lives in an oil-producing state.

show ethnic groups occupied later were exposed to less missions, all else the same.

In summary, examining the relationship between missionary activity and the slave trade allows us to explore a range of possibilities for the indirect effect of the slave trade. We find a strong positive indirect effect of the slave trade on schooling across all specifications. Further, the positive effect of the slave trade on subsequent missionary activity is robust to additional controls, and even the inclusion of distance to a Saharan trading node and year of occupation, which are two important determinants of missionary activity. The indirect effect of the slave trade range from an increase of 1.1 to 1.4 years of schooling. Next, we assess the effects of the slave trade and missionary activity on other related outcomes, literacy and self-employment.

4.5 Long-Run Effects on Literacy and Self-Employment

In this section, we explore the effects of missionary activity and the transatlantic slave trade on on literacy and self-employment. These are two important outcomes related to schooling attainment that have been under-explored in the literature.

Literacy

Literacy is important because, while years of schooling might be desirable, cognitive skills obtained from schooling are even more important for economic outcomes (Hanushek and Kimko, 2000; Hanushek and Woessmann, 2008). Further, one might suspect that higher rates of schooling associated with missionary activity might be a result of Nigerian Muslims favouring Islamic education instead of formal Western schooling for basic education (Reichmuth, 1989). The results of Table 8 shows that missionary activity is strongly positively related to literacy, but the total effect of the slave trade is insignificant. Because the literacy variable is coded as a dummy, the IV estimates, in the bottom panel of column 3, imply that a one hundred percent increase in the number of mission stations per 1000 km^2 of an individual's ethnic homeland increases the probability of being literate by 64%. A similar increase in the number of slave exports per area directly lowers literacy by 12%.

As the total effect is approximately zero, in both OLS and 2SLS, this implies that the indirect effect of the slave trade on schooling attainment is roughly equal to its direct effect. By encouraging missionary activity, the slave trade has increased literacy rates by as much as it decreased literacy. In standardized terms, missionary activity has the larger marginal effect on literacy. A standard deviation increase in the number of mission stations per $1000km^2$ of an ethnic group's homeland increases the probability of being literate by .43 standard deviations, while a standard deviation increase in slave exports per area reduces the probability of being literate by .26 standard deviations. Once again the long run positive effects of missionary activities dominate the negative effects of the transatlantic slave trade.

Also, note from column 1 that if we do not control for the slave trade, the estimated effect

Table 8: Effect of The Slave Trade and Missionary Activity on Literacy

	Dependent Variable is an Indicator for Literacy			
	OLS Estimates			
				Missions Orthogonal
	1	**2**	**3**	**4**
Missions per area	0.122***		0.176***	0.176***
	[4.62]		[6.02]	[6.02]
Slave Exports		-0.0117	-0.0414***	-0.0093
		[-1.19]	[-3.91]	[-0.99]
Observations	35138	35138	35138	35138
Adjusted R^2	0.452	0.451	0.453	0.453
	2SLS IV Estimates			
				Missions Orthogonal
	1	**2**	**3**	**4**
Missions per area	0.270***		0.639***	0.639***
	[6.46]		[8.32]	[8.32]
Slave Exports		-0.0067	-0.119***	-0.0027
		[-0.66]	[-6.31]	[-0.23]
All Controls	**Yes**	**Yes**	**Yes**	**Yes**
Region-Fixed Effects	**Yes**	**Yes**	**Yes**	**Yes**
Observations	35138	35138	35138	35138
Overid Test (P)	0	0	0.186	0.186
KP UnderId Test	132.9	228.9	101.6	101.6
KP rk Wald F	104.9	455.5	73.54	73.54
AR Wald F	38.16	38.16	38.16	38.16
SW LM S	81.52	81.52	81.52	81.52

Notes: "Missions Orthogonal to Slave Trade" means we use the residual from a regression of missionary activity on slave exports as the independent variable. T-statistics for standard errors clustered at the district level in brackets. $^{+}p < .1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Regressions include individual, household, ethnicity, location, state, and region controls. **Individual** controls are age, age-squared, urban/rural residence, sex, and 8 occupation dummies. **Household** controls are wealth, sex of the household head, size of the household, and age of the household head. **Ethnicity** controls are colonial-era population density (trade), an indicator for whether the railway crosses the individual's ethnic homeland, malaria ecology, and mean level of trust. **Location** controls are climatic and geographic controls from Fischer et al. (2008) and Hijmans et al. (2005) at the local government area level (county). We also include indicators for the region in which the individual lives (6), and an indicator for whether the individual lives in an oil-producing state. We use year of occupation, distance to coast, and distance to a Saharan trading node as instruments for missionary activity and transatlantic slave exports, as described in the text.

of missionary activity on schooling falls from .64 to .27 in the IV regressions, because of positive correlation with the slave trade which has a negative effect on literacy. We emphasize that while the result in column 2 is the total effect of the slave trade, the result in column 1 reflects an omitted variable bias. This downward bias is also present when the equation is estimated by OLS as can be seen in the top panel. All of these justify the importance of simultaneously studying the effects slave trade and missionary activity.

Self-Employment

Here we look at the effect of missionary activity and the slave trade on rates of self-employment. In Nigeria, and much of Sub-Saharan Africa, self-employment pays substantially less than wage jobs, and this is only partly explained by the higher schooling attainment of workers in wage jobs (Teal, 2014). Our estimates of the effects of missions and the slave trade are in Table 9.

In column 3, the OLS estimates show that greater historical exposure to missionary activity decreases the probability of being self employed, all else equal. On the other hand, greater slave exports increases the probability of being self employed. Our IV estimates do not differ significantly from OLS, although they are slightly less precise. A one hundred percent increase in (log) of missions per 1000 km^2 decreases the probability of self-employment by 16 percentage-points, and a similar increase in slave exports per area increases the probability of being self-employed by 4%. The standardized coefficients imply that a standard deviation increase in mission stations per 1000 km^2 lowers the probability of being self employed by .1 standard deviations. The slave trade increases the probability of being self employed by .08 percentage points. Thus, when it comes to the probability of being self employed, both direct effects are roughly of the same magnitude (but of opposite signs). However, the net effect of the slave trade on self-employment status is insignificant thus the direct effect is cancelled out by the indirect effect through missions.

The positive effect of missions on the probability of having a wage job, and the negative effect of the slave trade on the same outcome is consistent with the trends we have observed so far. We have a historical narrative where the negative effects of the transatlantic slave trade has been partially reversed by the positive effects of the slave trade through the stimulation of missionary activity. This was primarily seen in schooling, and outcomes such as literacy and ability to get a wage job.

Next, we analyze mechanisms through which the effects of missionary activity and the slave trade have persisted to the present day. We focus on schooling as the outcome of interest as we believe it is primarily responsible for the literacy and self-employment outcomes. In turn, we look at the role of the head of household's schooling (Wantchekon et al., 2015), the role of gender norms and general tastes for education (Nunn, 2014; Becker and Woessmann, 2008, 2009), and the persistence of schooling infrastructure introduced by missionaries. The persistent negative effects of the slave trade have been attributed to cultural factors such as trust (Nunn and Wantchekon, 2011), social capital (Obikili, 2013), and increased conflict after the trade was abolished (Fenske and Kala, 2014), which might have made it difficult to establish infrastructure in affected areas.

Table 9: Effect of The Slave Trade and Missionary Activity on Self-Employment

	Dependent Variable is an Indicator for Self-Employment			
	OLS Estimates			
				Missions Orthogonal
Missions per area	-0.0947***		-0.131***	-0.131***
	[-3.45]		[-4.50]	[-4.50]
Slave Exports		0.006	0.0275**	0.0036
		[0.65]	[2.95]	[0.40]
Observations	24645	24645	24645	24645
Adjusted R^2	0.193	0.192	0.193	0.193
	2SLS IV Estimates			
				Missions Orthogonal
	1	**2**	**3**	**4**
Missions per area	-0.0384		-0.158*	-0.158*
	[-0.90]		[-2.30]	[-2.30]
Slave Exports		0.0091	0.0363*	0.0076
		[0.87]	[2.19]	[0.73]
Observations	24645	24645	24645	24645
Overid Test (P)	0.0747	0.0647	0.322	0.322
KP UnderId Test	127.1	221.8	92.7	92.7
KP rk Wald F	93.29	402.9	63.44	63.44
AR Wald F	1.908	1.908	1.908	1.908
SW LM S	5.841	5.841	5.841	5.841
All Controls	**Yes**	**Yes**	**Yes**	**Yes**
Region-Fixed Effects	**Yes**	**Yes**	**Yes**	**Yes**

Notes: "Missions Orthogonal to Slave Trade" means we use the residual from a regression of missionary activity on slave exports as the independent variable. T-statistics for standard errors clustered at the district level in brackets. $^{+}p < .1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Regressions include individual, household, ethnicity, location, state, and region controls. **Individual** controls are age, age-squared, urban/rural residence, sex, and 8 occupation dummies. **Household** controls are wealth, sex of the household head, size of the household, and age of the household head. **Ethnicity** controls are colonial-era population density (trade), an indicator for whether the railway crosses the individual's ethnic homeland, malaria ecology, and mean level of trust. **Location** controls are climatic and geographic controls from Fischer et al. (2008) and Hijmans et al. (2005) at the local government area level (county). We also include indicators for the region in which the individual lives (6), and an indicator for whether the individual lives in an oil-producing state. We use year of occupation, distance to coast, and distance to a Saharan trading node as instruments for missionary activity and transatlantic slave exports, as described in the text.

5 Persistence: Evidence For Different Mechanisms

5.1 Head of Household Schooling

An important transmission mechanism identified in previous literature are intergenerational effects, and other externalities within the extended family and members of the same village (Wantchekon et al., 2015). In our data, we also find that the schooling of the head of the household matters for the educational outcome of all members of the household, all else equal. Table 10 shows estimates of the effects of missions when we restrict the sample to individuals that are neither heads of households, nor their spouses. In the results that follow, we focus on the direct effect of missionary activity and slave exports, as the goal is to understand why the direct effects have persisted.

Table 10: Role of Head's Schooling (IV)

Dependent Variable is Years of Schooling				
	1	**2**	**3**	**4**
			Standardized	**Coefficients**
Missions per area	3.918***	2.580***	0.329***	0.217***
	[5.45]	[4.06]	[8.21]	[5.71]
Slave Exports	-1.060***	-0.742***	-0.282***	-0.197***
	[-6.00]	[-4.94]	[-9.30]	[-6.86]
Wealth	1.109***	0.716***	0.354***	0.229***
	[22.09]	[15.73]	[37.56]	[23.94]
Head's Schooling		0.237***		0.303***
		[22.35]		[35.69]
All Controls	**Yes**	**Yes**	**Yes**	**Yes**
Region-Fixed Effects	**Yes**	**Yes**	**Yes**	**Yes**
Observations	11358	11346		
Overid Test (P)	0.978	0.842		
KP UnderId Test	71.8	71.84		
KP rk Wald F	44.47	44.07		
AR Wald F	16.64	9.98		
SW LM S	42.4	28.25		

Notes: T-statistics for standard errors clustered at the district level in brackets. $^{+}p < .1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Regressions include individual, household, ethnicity, location, state, and region controls. **Individual** controls are age, age-squared, urban/rural residence, sex, and 8 occupation dummies. **Household** controls are wealth, sex of the household head, size of the household, and age of the household head. **Ethnicity** controls are colonial-era population density (trade), an indicator for whether the railway crosses the individual's ethnic homeland, malaria ecology, and mean level of trust. **Location** controls are climatic and geographic controls from Fischer et al. (2008) and Hijmans et al. (2005) at the local government area level (county). We also include indicators for the region in which the individual lives (6), and an indicator for whether the individual lives in an oil-producing state. We use year of occupation, distance to coast, and distance to a Saharan trading node as instruments for missionary activity and transatlantic slave exports, as described in the text.

In column 1, we see that while the effect of missionary activity, and the slave trade, remains strong, the estimated effects are substantially smaller than those in Table 5 estimated on the full sample, but larger than the OLS estimates in Table 1. In column 2, we control for the schooling of the household head, and find that the point estimate on the effect of missionary activity drops.

The size of the drop is best seen from the standardized coefficients, where we find that the standardized effect of missions drops from .33 to .22 standard deviations when we control for head of household schooling. Similarly, the direct effect of a standard deviation increase in slave exports decreases from about -.3 standard deviations to -.2. Nevertheless, these effects remain large, and are roughly equal to the effect of wealth on schooling in this sample (standardized effect of .23). This suggests that some, but not all, of the persistent effects of missionary activity might come through intergenerational transfer of human capital.

5.2 Slave Trade, Missions, and Schooling by Sex

In this section, we analyze how the effect of missionary activity varies by gender by interacting the (log of) mission stations per $1000km^2$ and an indicator for sex of the respondent (1 if male). Table 11 presents OLS and 2SLS estmates. Beginning in the top panel by examining OLS estimates in column 1, we find that the effect of missions is lower for men, but the negative effect of the slave trade is greater for men, all else the same. Similar conclusions are found in the IV estimates, however there is now no differential effect of the slave trade by sex, but the effect of missionary activity continues to be greater for females. Overall, these results support the results in the literature arguing that missions increased schooling attainment by encouraging more female education. While there is some evidence that the slave trade might have impacted males more negatively, this conclusion is not robust to IV estimation.

In column 2, we center the measure of missionary activity on the average number of missions per $1000km^2$ in the data, which allows us to investigate the contribution of missionary activity to alleviating the gender gap. The OLS estimates suggest that when the measure of missionary activity is centered on the average, the gender gap drops a little (from 2.95 to 2.3 years). Thus a man with average historical exposure to missions has 2.3 more years of schooling relative to an otherwise observationally equivalent woman. In the IV estimates, the decrease is more substantial, with the gender gap dropping from 3.5 to 2.3 years at the mean. This is a decrease of 34%, which is consistent with the higher estimated marginal effect of missions on female education. Examining the IV estimates in column 3, we find that, when missionary activity is centered on the average for Christians, the gender education gap decreases by an additional 38% to 1.4 years. Overall, moving from an ethnic group with no missionary activity (Fulani) to one at the Christian mean (Igbo) lowers the gender gap by 60%, from 3.5 years to about 1.5 years, all else the same.[28]

The above discussion shows that an important mechanism through which missions have generated persistent increases in schooling is by increasing female access to education. The effect of missions on the gender education gap is a common finding in the literature (see Becker and Woessmann (2008) and Nunn (2014)), and has led many to conjecture that it may be a result of Protestant attitudes. Next, we show that the role of Protestant attitudes is not straightforward.

[28]The OLS estimates imply a smaller overall drop of 40%, which reflects the smaller marginal effect of missions on females under OLS. Average number of missions per $1000km^2$ is .42, and .72 for Christians.

Table 11: Effects of the Slave Trade and Missions by Sex

Dependent Variable is Years of Schooling			
	1	**2**	**3**
	Missionary Activity is:		
	Uncentered	**Centered on Mean**	**Centered on Christian Mean**
	OLS Estimates		
Missions per area	2.172***	2.172***	2.172***
	[6.90]	[6.90]	[6.90]
Missions*Male	-1.608***	-1.608***	-1.608***
	[-8.28]	[-8.28]	[-8.28]
Slave Exports	-0.440***	-0.440***	-0.440***
	[-3.62]	[-3.62]	[-3.62]
Slave Exports*Male	-0.513***	-0.513***	-0.513***
	[-8.53]	[-8.53]	[-8.53]
Male	3.415***	2.983***	2.677***
	[28.98]	[25.43]	[20.56]
Observations	35464	35464	35464
Adjusted R^2	0.574	0.574	0.574
	IV Estimates		
Missions per area	9.615***	9.615***	9.615***
	[10.68]	[10.68]	[10.68]
Missions*Male	-4.803***	-4.803***	-4.803***
	[-10.34]	[-10.34]	[-10.34]
Slave Exports	-1.777***	-1.777***	-1.777***
	[-7.83]	[-7.83]	[-7.83]
Slave Exports*Male	0.0504	0.0504	0.0504
	[0.44]	[0.44]	[0.44]
Male	3.540***	2.246***	1.335***
	[27.34]	[13.18]	[5.62]
Observations	35464	35464	35464
Overid Test (P)	0.64	0.64	0.64
KP UnderId Test	101.4	101.4	101.4
KP rk Wald F	55.05	55.05	55.05
AR Wald F	102.3	102.3	102.3
SW LM S	250.7	250.7	250.7
All Controls	**Yes**	**Yes**	**Yes**
Region-Fixed Effects	**Yes**	**Yes**	**Yes**
Excluded Group	**Females**	**Females**	**Females**

Notes: T-statistics for standard errors clustered at the district level in brackets. $^{+}p < .1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Regressions include individual, household, ethnicity, location, state, and region controls. **Individual** controls are age, age-squared, urban/rural residence, sex, and 8 occupation dummies. **Household** controls are wealth, sex of the household head, size of the household, and age of the household head. **Ethnicity** controls are colonial-era population density (trade), an indicator for whether the railway crosses the individual's ethnic homeland, malaria ecology, and mean level of trust. **Location** controls are climatic and geographic controls from Fischer et al. (2008) and Hijmans et al. (2005) at the local government area level (county). We also include indicators for the region in which the individual lives (6), and an indicator for whether the individual lives in an oil-producing state. The IV estimates use year of occupation, distance to coast, and distance to a Saharan trading node as instruments for missionary activity and transatlantic slave exports. Interactions of the instrument and observables of interest are used as additional instruments.

5.3 Missionary Activity, Slave Trade, and Schooling by Religion

We begin by interacting the measures of missionary activity and the slave exports by an indicator for whether the individual is Muslim. The results are shown in Table 12. In the top panel, we treat all variables as exogenous, and in the bottom panel we treat them as endogenous (including religion). From the OLS estimates in columns 1 and 2, we find that while the estimated effect of missions is insignificant for non-Muslims (mostly Christians), it is large and significant for Muslims. This suggests that the effect of missions is greater for Muslims, but there is no difference by religion for the effect of slave exports.

For the corresponding IV estimates, however, we interact missionary activity with religion in columns 1 and 2, and in column 3, we interact slave exports with religion. While this is not ideal, the unavailability of instruments means that some of the interaction terms are underidentified if we include all interaction terms at the same time.

From the IV estimates, in columns 1 and 2, we find a strong positive effect of missions on all individuals regardless of religion. The effect of missionary activity is slightly larger, but insignificant, for Muslims. In essence, the IV estimates imply that the effect of missions on schooling does not significantly vary by religion, even though the point estimate is substantial. As far as we are aware, this is a new finding in the literature. In column 3, the IV estimates continue to show that the effect of slave exports does not vary by religion, and the point estimate of the interaction is very similar to the OLS estimates.

Looking at the education gap between Muslims and Christians by comparing columns 1 and 2 of the IV estimates, we find that a Muslim from an ethnic group at the Christian mean of missionary activity has .6 years less schooling, all else the same. This is small, and insignificant, compared to the much larger education gap of 1.5 (IV) and 2.8 (OLS). This means that the Muslim education gap in Nigeria is primarily because Muslims tend to live in areas historically exposed to less missionary activity, and perhaps have less access to the educational infrastructure at the mission stations in those places. A good example may be seen by comparing two of the largest ethnic groups in Nigeria, the Yoruba and the Hausa in Table 13.

From Table 13, we see that the Hausa virtually had no mission stations (actually only 2 in our dataset), however for Hausa Christians, average years of schooling is about 6.15 years compared to 2.72 years for Hausa Muslims. While this might seem to indicate religion is important, we find that among the Yorubas, Christians have an average of 10.46 years of schooling compared to 8.6 years for Muslims. This religion gap in education is smaller in percentage, and in absolute terms, for the Yoruba who were exposed to more missionary activities. This pattern underlies the results in Table 12, where we find a religion gap in schooling that decreases with increased exposure to missionary activity. Put differently, the religion education gap is primarily a result of Muslims in areas with less missionary activity having relatively less schooling, perhaps as a result of inability to access the educational infrastructure provided by missionaries. As noted in the historical background, the Emirs in several Muslim areas often protested against missionary schools and the administration

Table 12: Effect of The Slave Trade and Missions by Religion

	Dependent Variable Years of Schooling					
	1	**2**	**3**	**4**	**5**	**6**
	Missionary Activity Centered at:					
	Uncentered	**Christian Mean**			**Christian Mean**	
	OLS Estimates					
				All	**Male**	**Female**
Missions per area	0.0297	0.0297	**Missions per area**	4.742***	4.748**	4.973***
	[0.10]	[0.10]		[4.29]	[3.28]	[3.97]
Missions*Muslim	3.377**	3.377**	**Catholic**	0.867*	0.374	1.146**
	[2.75]	[2.75]		[2.40]	[0.84]	[2.81]
Slave Exports	-0.210+	-.210+	**Missions*Catholic**	-5.259***	-5.542***	-5.352***
	[-1.94]	[-1.94]		[-4.86]	[-3.59]	[-4.40]
Slave Exports*Muslim	0.208	0.208	**Protestant**	0.581+	0.0934	0.785*
	[1.61]	[1.61]		[1.70]	[0.22]	[2.02]
Muslim	-2.769***	-0.863*	**Mission*Protestant**	-4.580***	-4.547**	-4.729***
	[-9.89]	[-2.21]		[-4.13]	[-2.98]	[-3.80]
Observations	34774	34774	**Observations**	34774	11193	23581
Adjusted R^2	0.58	0.58	**Adjusted R^2**	0.58	0.509	0.62
	IV Estimates					
Missions per area	5.100***	5.100***	4.795***			
	[3.40]	[3.40]	[3.40]			
Slave Exports	-1.124***	-1.124***	-1.130***			
	[-3.40]	[-3.40]	[-4.67]			
Missions*Muslim	1.629	1.629				
	[0.44]	[0.44]				
Slave Exports*Muslim			0.294			
			[0.79]			
Muslim	-1.459+	-0.621	-1.343***			
	[-1.73]	[-0.77]	[-3.55]			
Observations	35316	35316	34774			
Overid Test (P)	0.18	0.18	0.208			
KP UnderId Test	48.15	48.15	47.56			
KP rk Wald F	16.35	16.35	10.28			
AR Wald F	50.52	50.52	53.28			
SW LM S	134.2	134.2	137.3			
All Controls	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
Region-Fixed Effects	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
Excluded Group	**Christians**	**Christians**	**Christians**	**Excluded Group**	**Muslims**	**Muslims**	**Muslims**

Notes: T-statistics for standard errors clustered at the district level in brackets. $^{+}p < .1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Regressions include individual, household, ethnicity, location, state, and region controls. **Individual** controls are age, age-squared, urban/rural residence, sex, and 8 occupation dummies. **Household** controls are wealth, sex of the household head, size of the household, and age of the household head. **Ethnicity** controls are colonial-era population density (trade), an indicator for whether the railway crosses the individual's ethnic homeland, malaria ecology, and mean level of trust. **Location** controls are climatic and geographic controls from Fischer et al. (2008) and Hijmans et al. (2005) at the local government area level (county). We also include indicators for the region in which the individual lives (6), and an indicator for whether the individual lives in an oil-producing state. The IV estimates use year of occupation, distance to coast, and distance to a Saharan trading node as instruments for missionary activity and transatlantic slave exports. Interactions of the instrument and observable of interest are used as additional instruments.

Table 13: Comparing Years of Schooling by Religion and Ethnicity

	Yoruba	**Hausa**
Missions per area	0.234	0.011
Prop. Muslim	50 %	98%
Christian	10.466	6.157
Muslim	8.606	2.727

Notes: Weighted averages computed from the *DHS*. Missions per area calculated as described in the text.

often responded by closing down the schools (Sundkler and Steed, 2000, p.256).

Moving to columns 3, 4, and 5 of Table 12, we interact the effect of missions with an indicator for the individual being Catholic or Protestant, and also break out the effects by gender. Our focus is on the religion fixed effect and interaction terms, and note the measure of missionary activity and slave exports is centered on the Christian mean. In column 3, the estimates imply that the marginal effect of missionary activity is not substantially different between Catholics and Protestants (a difference of about .7). We can also see the education gap between Christians and Muslims is slightly larger for Catholics compared to Protestants at the Christian mean of missionary activity. The more interesting findings come from comparing columns 4 and 5. These estimates imply that, at the Christian mean of missionary activity, there is no difference between a Muslim male, compared to either a Catholic male or a Protestant male. The Muslim education gap, in this case, is driven by differences between female Muslims and female Christians. Thus, all else the same, at the mean number of mission stations, the religion gap reflects a greater gender gap in Muslim areas.

In summary, we have shown that the negative effect of the slave trade does not significantly differ by gender nor religion. However, the effect of missionary activity is, on the margin, stronger for females, but does not significantly vary by religion. Thus, the persistence of the effect of missionary activity is partly due to a smaller gender gap in areas exposed to average missionary activities. Next, we examine the effects of the slave trade and missions on the probability of attending different levels of education.

5.4 Impacts on Level of Education Attended

It is well known that missionaries were primarily interested in "basic education," and also primarily invested in basic education infrastructure. They widely shunned further levels of education as those served no further evangelistic purpose (Ayandele, 1966, p. 284–290, 293). The regular curriculum emphasized the four R's: religion, reading, writing, and arithmetic (Ajayi, 1965, p.139). It was not until much later that missionaries began to invest in secondary schools, but missionaries did not invest in tertiary education which was a government endeavour. We want to see if the effect of

missions have gone beyond the levels of education in which they invested. That is, have missions increased taste for schooling beyond the levels in which they invested?

To do this, we estimate the effect of missions on the probability of completing different levels of education, and the results from OLS and 2SLS are shown in Table 14.[29] Both OLS and 2SLS estimates show that the impact of missionary activity is strongest at the primary level of education. The IV estimates show that a one hundred percent rise in the number of mission stations increases the probability of attending primary education by 76%, and conditional on attending primary school, increases the probability of attending secondary school by 34%. In column 3, we find that conditional on having attending secondary school, missionary activity has no effect on the probability of attending university. In fact, in the OLS regression, it has a small negative impact. This result is also robust across gender and religion. Lastly, note the downward bias in the effect of missions and the slave trade which we have emphasized throughout this paper.

The result in Table 14 is not surprising, because missionaries emphasized basic education and higher levels of education was primarily left for the government. Note that if persistence was driven by a simple change in tastes for schooling, we might expect to see the probability of completing all levels of education increasing with missionary activity, which is not directly borne out by the evidence here. The negative effects of the slave trade on the probability of completing primary and secondary education is perhaps a result of missionaries having a more difficult time setting up mission stations in areas exposed to the slave trade as a result of increased conflict, all else equal. While changes in attitudes towards education might be important, the above results show that they are only important at the level at which missions invested in schooling. Next, we briefly examine the effect of the slave trade and missions on schooling infrastructure.

5.5 Slave Exports, Missions, and Education Infrastructure

The *DHS* data we use does not provide direct information on education infrastructure. Instead, we use data from rounds 3 and 4 of the *Afrobarometer Survey* conducted in Nigeria (ICSPR, 2003–2008) to test for the relationship between historical missionary activity, exposure to the slave trade and current access to education. The *Afrobarometer Survey* records the presence of a school in the individual's district of residence and the individual's ethnicity. Given that most Nigerians tend to live within ethnic homelands (see Oyeniyi (2013)), we estimate the effect of historic missionary activity on the current probability that there is a school within the individual's district. We also include other controls that may determine demand for education in the district such as age, urban/rural residence, sex, occupation, living conditions, and level of education. The results are shown in Table 15 for linear and logistic probability models.

The results show that an additional mission station per 1000 km^2 of an individual's ethnic

[29]For a history of the development of higher education in Africa, see (Ajayi et al., 1996). We also estimated the model as a logit and our conclusions are similar. We report OLS results in order to ease our interpretation of the estimates.

Table 14: Effect of The Slave Trade and Missions on Probability of Attending Levels of Education

	Dependent Variable is Probability of Attending:		
	Primary	**Secondary**	**University**
	1	**2**	**3**
	OLS Estimates		
Missions per area	0.201***	0.0486+	-0.0372*
	[7.07]	[1.95]	[-2.16]
Slave Exports	-0.0725***	-0.0209**	0.0196***
	[-6.11]	[-2.60]	[3.64]
Observations	35498	35498	35498
Adjusted R^2	0.499	0.53	0.322
	IV Estimates		
Missions per area	0.763***	0.335***	0.01
	[9.28]	[5.94]	[0.31]
Slave Exports	-0.160***	-0.0819***	0.0098
	[-7.68]	[-5.66]	[1.12]
Observations	35498	35498	35498
Overid Test (P)	0.123	0.15	0.751
KP UnderId Test	101.2	101	101.2
KP rk Wald F	72.99	72.26	73.35
AR Wald F	55.34	18.58	1.408
SW LM S	99.87	49.11	4.002

Notes: T-statistics for standard errors clustered at the district level in brackets. $^{+}p < .1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Regressions include individual, household, ethnicity, location, state, and region controls. **Individual** controls are age, age-squared, urban/rural residence, sex, and 8 occupation dummies. **Household** controls are wealth, sex of the household head, size of the household, and age of the household head. **Ethnicity** controls are colonial-era population density (trade), an indicator for whether the railway crosses the individual's ethnic homeland, malaria ecology, and mean level of trust. **Location** controls are climatic and geographic controls from Fischer et al. (2008) and Hijmans et al. (2005) at the local government area level (county). We also include indicators for the region in which the individual lives (6), and an indicator for whether the individual lives in an oil-producing state. The IV estimates use year of occupation, distance to coast, and distance to a Saharan trading node as instruments for missionary activity and transatlantic slave exports. In columns 2 and 3, the model includes a dummy for having completed the preceding level of education.

Table 15: Slave Trade, Missions, and Schooling Infrastructure

Dependent Variable is Probability of School in District				
	(1)	(2)	(3)	(4)
	Linear Probability		**Logit**	
Missions per area	0.124***	0.0962***	0.148***	0.118***
	[5.51]	[4.19]	[4.91]	[3.88]
Slave Exports	-0.0145*	-0.0170*	-0.0172*	-0.0195**
	[-2.08]	[-2.44]	[-2.42]	[-2.71]
Education Level Dummies	No	Yes	No	Yes
Observations	4187	4169	4179	4161
Adjusted/Pseudo R^2	0.03	0.038	0.048	0.058

Notes: Logit model reports average marginal effects. T-statistics for robust standard errors are reported in brackets. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. **Individual** controls including age, age-squared, urban/rural residence, sex, and dummies for 5 living conditions and 23 occupation categories. The education dummies indicate 10 different levels of education.

homeland makes it more likely that there is a school in the individual's district of residence. When we do not control for the individual's levels of education, we find that a one hundred percent increase in the number of mission stations per 1000 km^2 of the ethnic homeland is associated with a 12.4 percentage-point increase in the probability of having a school in the district under the linear specification. The average marginal effects from the logit model are slightly higher with an estimated increase of 14.8 percentage points. Controlling for individuals' levels of education reduces the average marginal effects to 9.6 and 11.8 percentage points for the linear and logistic models, respectively. Thus, after controlling for the demand of education (education levels), individuals historically exposed to greater missionary activities are more likely to live in district with schools. Similarly, individuals historically exposed to the slave trade are less likely to live in a district with a school. A one hundred percent increase in the number of slave exports decreases the probability the individual lives in a district with a school by 1.5 percentage points.

Evidence from the colonial era also points to the importance of educational infrastructure provided by missionaries, even in the face of government provision of schooling infrastructure. For example, in the Calabar province, records show that in 1998, the government only had 4 schools, while missions had a total of 14,161 schools (Nwabara, 1978, p.68). The discrepancy between government and missionary provision in schooling infrastructure was not restricted to a single province. As early as 1914, Csapo (1981) reports that there were 37,500 primary schools in the South, but just 1,100 primary schools in the North where the colonial government had taken primary responsibility for schooling. Overall, the estimates provide evidence that the infrastructural gains brought by missionary activity, and any infrastructural deficits as a result of the slave trade, have been sustained into the present time. Next, we look at how the estimated effects of missions and

the slave trade vary across different population categories.

5.6 Effects by Cohort, Migration Status, and Place of Residence

In this section, we provide additional evidence on the mechanisms through which the effects of the slave trade and missionary activity have persisted by analyzing how these effects differ by age cohort, migration status, and urban/rural place of residence. The results are presented in Table 16. In each panel, we present OLS estimates in the first column, OLS estimates with missions and slave trade centered at their means in the second column, and 2SLS estimates in the third column.

In columns 1-3, we examine the differential effects of the slave trade and missionary activity for the older versus the younger cohorts. Theolder cohort is defined as individuals who are at least 40 years old. Our choice of this threshold is justified by the fact that the Nigerian population, like other African countries' populations, is very young. Individuals over the age of 40 make up about 20% of our sample. The OLS and IV estimates show that the positive effect of missionary activity is smaller among the older cohort, indicating that the long-run effect of historical missionary activity on schooling has been increasing over time. This increasing effect of missions might be a result of initial schooling differences being reinforced. As for the slave trade, we find that its direct negative effect is smaller among the older cohort, and once again, this might reflect a reinforcement of an initial negative effect across generations. However, on average, we do not find large differences in schooling attainment across these cohorts.

Secondly, in columns 4-6, we examine how the long-run effects of the two historical shocks being studied vary by migrant status. We define migrants as individuals whose current place of residence differs from their previous place of residence. Therefore, individuals identified by the *DHS* as those who have "always lived in the present location" are taken to be non-migrants. Non-migrants make up about 40% of our sample. We find that migrants have less schooling compared to non-migrants. We also find a stronger positive effect of historical missionary activity on schooling outcomes for individuals who have migrated at some point. From the IV estimates, we find that the negative effect of the slave trade is greater among migrants, although this result is not present in the OLS estimates. These results are consistent with the model we present in the next section, where the marginal effect of schooling infrastructure is larger for individuals who have a limited access to it. Thus, an increase (a decrease) in schooling infrastructure as a long-run consequence of missionary activity (slave exports) would predict a larger effect of missions (slave exports).

Lastly, in columns 7-9, we look at how the effects vary across rural and urban dwellers. About 60% of the individuals in our sample live in rural areas. Interestingly, the estimates show that, all else the same, the slightly negative differences in schooling attainment between rural and urban residents is not statistically significant. The estimates show that the positive effect of missionary activity is slightly larger in rural areas(although this is insignificant). On the other hand, the negative effect of the slave trade is greater for rural dwellers. Again, these results are consistent with a framework where there is less schooling infrastructure in rural areas. Thus, the positive

Table 16: Slave Trade, Missions, and Schooling: Conditional on Individual Characteristics

Dependent Variable is Years of Schooling

	Older Cohort				Migrant Status				Rural Dwelling		
	1	**2**	**3**		**4**	**5**	**6**		**7**	**8**	**9**
		Centered	**IV**			**Centered**	**IV**			**Centered**	**IV**
Missions per area	1.897***	1.897***	8.864***	**Missions per area**	0.889*	0.889*	5.275***	**Missions per area**	1.464***	1.464***	5.599***
	[6.14]	[6.14]	[10.06]		[2.52]	[2.52]	[5.78]		[4.34]	[4.34]	[3.57]
Slave Exports	-0.616***	-0.616***	-4.187***	**Slave Exports**	-0.677***	-0.677***	-1.335***	**Slave Exports**	-0.515***	-0.515***	-1.576***
	[-5.05]	[-5.05]	[-5.43]		[-5.06]	[-5.06]	[-6.41]		[-4.06]	[-4.06]	[-7.09]
Missions*Older	-1.025***	-1.025***	-1.901***	**Missions*Migrant**	0.484***	0.484***	3.471***	**Missions*Rural**	0.253	0.253	1.419
	[-4.72]	[-4.72]	[-8.76]		[4.69]	[4.69]	[7.59]		[0.79]	[0.79]	[1.57]
Slave Exports*Older	0.0889	0.0889	0.804***	**Slave Exports*Migrant**	0.150*	0.150*	-0.506***	**Slave Exports*Rural**	-0.133	-0.133	-0.328+
	[1.27]	[1.27]	[3.94]		[2.01]	[2.01]	[-4.45]		[-1.16]	[-1.16]	[-1.71]
Older Cohort	0.108	-0.186	-0.188+	**Migrant**	-0.677***	-0.440***	-0.412**	**Rural**	-0.286	-0.217	-0.448
	[0.81]	[-1.25]	[-1.70]		[-6.04]	[-3.47]	[-3.23]		[-1.20]	[-0.93]	[-1.52]
Observations	35464	35464	35464	**Observations**	35385	35385	35385	**Observations**	35464	35464	35464
Adjusted R^2	0.57	0.57		**Adjusted R^2**	0.57	0.57		**Adjusted R^2**	0.57	0.57	
				IV Diagnostic Test Results							
Overid Test (P)		0.663		**Overid Test (P)**		0.642		**Overid Test (P)**		0.719	
KP UnderId Test		270.2		**KP UnderId Test**		115.3		**KP UnderId Test**		104.3	
KP rk Wald F		120.2		**KP rk Wald F**		47.42		**KP rk Wald F**		46.77	
AR Wald F		39.09		**AR Wald F**		47.4		**AR Wald F**		29.83	
SW LM S		143.1		**SW LM S**		158.3		**SW LM S**		104	

Notes: T-statistics for standard errors clustered at the district level in brackets. $^{+}p < .1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Regressions include individual, household, ethnicity, location, state, and region controls. **Individual** controls are age, age-squared, urban/rural residence, sex, and 8 occupation dummies. **Household** controls are wealth, sex of the household head, size of the household, and age of the household head. **Ethnicity** controls are colonial-era population density (trade), an indicator for whether the railway crosses the individual's ethnic homeland, malaria ecology, and mean level of trust. **Location** controls are climatic and geographic controls from Fischer et al. (2008) and Hijmans et al. (2005) at the local government area level (county). We also include indicators for the region in which the individual lives (6), and an indicator for whether the individual lives in an oil-producing state. The IV estimates use year of occupation, distance to coast, and distance to a Saharan trading node as instruments for missionary activity and transatlantic slave exports. Interactions of the instrument and observable of interest are used as additional instruments. "Centered" means missionary activity and slave exports are centered at their means.

effect of missions on infrastructure will be greater in those areas, and the negative effect of the slave trade will also be larger in those areas.

To summarize, by examining the long-run effects of the slave trade and historical missionary activity across population subgroups, we find a pattern where these effects are greater for individuals with less schooling. Next, we present a simple model of the relationship between schooling infrastructure and schooling outcomes that is able to rationalize the results in sections 5.2, 5.3, and 5.6. The model shows that schooling infrastructure has a positive effect on schooling, but its marginal effect is decreasing. Drawing on the evidence in section 5.5. on the positive effect of missions and the negative effect of the slave trade on schooling infrastructure, the model therefore implies that the effects of missions and the slave trade would be greater for population subgroups with less schooling, because the positive effects of higher infrastructure will be larger for those subgroups. By the same logic, the effect of lower infrastructure will be smaller for those subgroups. This would help us explain why the estimated effect of missions, for example, is stronger among Muslims as they were exposed to less missionary activity and schooling infrastructure. Combined with labour market discrimination against females, the model also explains why the estimated effect of missionary infrastructure is greater among females, especially females in areas with less average exposure to missionary infrastructure.

6 Explanation: A Model of Schooling Infrastructure

We briefly present a simple model of schooling infrastructure that would be helpful in understanding the positive effect of missionary activity and the negative effect of the slave trade on schooling. Let i be an individual who has to decide on the amount of education he/she would like to acquire. The benefits of education such as higher incomes, better living standards, prestige, and knowledge increase with the level of education. Education is also costly to acquire, and the cost is lower with a higher supply of educational infrastructure. By education infrastructure, we mean physical infrastructure, as well as the availability of teachers and teaching materials used in schools.

Individual i's utility function is:[30]

$$u(e) = \alpha b(e) - \tfrac{c(e)}{I}.$$

Where e is the amount of education, $b(e)$ the benefit of acquiring e units of education, and $c(e)$ the cost of e units of education. The parameter α denotes the degree of gender discrimination in the labour market, and we assume $\alpha = 1$ if i is male, and $0 < \alpha < 1$ if i is female. We include this parameter to recognize substantial labour market discrimination against women in Nigeria, as

[30]Note that an alternative way to model educational choice would be to assume that i derives utility from consumption, but consumption depends on income (first constraint), and income depends on education level (second constraint incorporating a parameter of income discrimination against females). Also, education is costly, but the cost is lower with higher educational infrastructure (budget constraint). Solving this problem will be similar to the one we solve.

documented in Aromolaran (2006). The quantity of available educational infrastructure is denoted by I. For simplicity, e and I are assumed to be positive real numbers. Also, b is assumed to be twice-continuously differentiable, increasing, and strictly concave, and c is assumed to be twice-continuously differentiable, increasing, and strictly convex.

Individual i maximizes his or her utility function by choosing the optimal amount of education e^* given $I > 0$. From the first order condition of the consumer problem, we know that at the optimal level of education, marginal benefits must equal marginal costs:

$$g(e^*, I) = 0, \quad \text{where} \quad g(e, I) = \alpha b'(e) - \frac{c'(e)}{I}. \tag{6}$$

The first implication of the model is given by proposition 1 below:

Proposition 1. *The optimal amount of education, e^*, is increasing in the amount of education infrastructure, I.*

To see why proposition 1 is true, note that the function g is decreasing in education because the marginal benefit, b, is decreasing in education and the marginal cost, c, is increasing. Increasing the quantity of education infrastructure lowers the marginal cost, which means that $g(e, I) > 0$. By the assumptions on $b()$ and $c()$, the intermediate value theorem implies that the quantity of education must increase to equate marginal benefits and costs as in equation (6). Supported by evidence from section 5.5, our primary argument in the rest of this section is that, all else equal, missions increased schooling infrastructure while the slave trade decreased it.

We explore other results which provide guidance towards understanding the empirical results derived in the previous section on the differential impacts of the slave trade and historical missionary activity. The model also implies that in the presence of gender discrimination against females, $0 < \alpha < 1$, the marginal impacts of missionary activity and the slave trade, driven by increases in infrastructure, would be greater for females. This is summarized in proposition 2 below:

Proposition 2. *The marginal effect of increasing education infrastructure on schooling attainment is decreasing in α. Thus, as long as there is some wage discrimination against females compared to males, $0 < \alpha < 1$, the marginal impact of missionary education on schooling would be larger for women.*

To show the proposition above formally, we apply the implicit function theorem to equation (6), and take derivatives to find that:

$$\frac{de^*}{dI} = -\frac{\frac{c'(e^*)}{I^2}}{\alpha b''(e^*) - \frac{c''(e^*)}{I}}. \tag{7}$$

Given that $c' > 0$, $c'' > 0$, $b'' < 0$, equation (7) implies that the impact of increases in infrastructure is higher for females, because the denominator in (7) is smaller when $0 < \alpha < 1$. The intuition for this result is as follows: wage discrimination implies that females have higher

marginal benefits to education because they choose lower levels of schooling in equilibrium. With an increase in infrastructure, the marginal increase in educational attainment would be more responsive for women compared to men who already have higher levels of education and lower marginal benefits. In the extreme case, think of a community where all males must go to school first before females because of infrastructural constraints. The responsiveness of female education to expanded infrastructure would be greater than that of males, because more males are already in school.

Lastly, the model implies that the marginal effect of educational infrastructure on the optimal amount of education decreases with the supply of educational infrastructure. We want to show that $\frac{d^2e^*}{dI^2} < 0$. Differentiating equation (7) yields:

$$\frac{d^2e^*}{dI^2} = -\frac{-\alpha b''(e^*)\frac{2c'(e^*)}{I^3} + \frac{c'(e^*)c''(e^*)}{I^4}}{(\alpha b''(e^*) - \frac{c''(e^*)}{I})^2} \tag{8}$$

Given that $c' > 0$, $c'' > 0$, and $b'' < 0$, equation (8) implies that $\frac{d^2e^*}{dI^2} < 0$. The result implies that the marginal effect of historical missionary activity should be larger for groups that had less exposure to missions. Similarly, the marginal effect of the slave trade should be larger for groups that had more exposure to slave raiding. This is because less exposure to missions and more exposure to the slave trade have a negative effect of schooling infrastructure today (Section 5.5), and the effect of infrastructure on schooling attainment is greater at lower levels of infrastructure. This is an immediate implication of decreasing marginal benefit to education for an individual, so that further reductions in costs would lead to smaller increases in educational attainment. The third result is summarized below:

Proposition 3. *The marginal effect of increasing education infrastructure on schooling attainment is decreasing in the amount of infrastructure, I.*

Evidence for this proposition can seen in the higher estimated marginal effect of missionary activity , all else equal for Muslims, who have generally been less exposed to missionary activity. Evidence is also provided by the estimates of section 5.6, where we find the effect of missions and the slave trade to be greater for groups with less average exposure to schooling infrastructure (migrants and rural dwellers).

The model again explains why the positive effect of missions is greater for women than for men, as there is historical evidence that women were discriminated against in access to schooling infrastructure. A preference for male education in the early missionary period as a result of economic realities is also supported by the historical evidence; for example, the Chiefs of Bonny, in Southern Nigeria, asked in 1877, "what profit is there to us for girls?" They felt that female education was not profitable because "they cannot trade on board ships when they grow up only live in the house" (Tasie, 1978, p. 34). This preference for male education is evident in enrolment statistis. In the 4 provinces of Eastern Nigeria, for example, enrolment data show a disproportionately high enrolment rate of boys relative to girls in both government and missions schools (Nwabara, 1978, p. 69). For

example, in 1929, girls made up 118 students in an enrolment class of 1,767 in government schools, and only 2781 in a class of 11,422 students in mission schools, operating in the Calabar province. Our model also explains why the differential effects of missionary activity, for women versus men, is larger among Muslims where women are still being discriminated against today (Csapo, 1981). Our findings illustrate the contrast between our model and models where missionaries simply increased tastes for education (benefits). In such a model, the impact of missionary activity would be greater in areas with more missionary activity where one would expect the change in tastes to be greater.

7 Conclusion

In this paper, we have studied the long-run effects of the slave trade and Christian missionary activity in a framework, inspired by the historical literature, in which ethnic groups exposed to the slave trade also attracted more missions in the nineteenth and early twentieth centuries. Using data from Nigeria, we find historic exposure to the slave trade had a *direct negative* effect on schooling, literacy, and ability to get wage jobs, but by encouraging missionary activity, the trade also had a substantial *indirect positive* effect. For example, the instrumental variables (IV) estimates show that a standard deviation increase in the number of slave exports, per area of an individual's ethnic homeland, directly led to a decrease of .32 standard deviations in years of schooling (1.73 years), but an indirect increase of .27 standard deviations (1.46 years). Missionary activity also directly increased schooling attainment by .4 standard deviations (2.2 years), which is greater than previous OLS estimates in the literature. Our main contribution in this area is in uncovering direct and indirect effects of the slave trade on new individual-level outcomes, and correcting previous estimates of the effects of missions for measurement error using instruments.

We also examined reasons why the effects of the slave trade, and missions, on schooling have persisted. The results show an important role for the schooling of the household head for the effect of both historical shocks. We find a stronger effect of missions on women, and that the effect of missions have persisted by closing the gender gap in education, in areas with above-average missionary activity. In contrast, we do not find any role for the slave trade in affecting the gender gap. Our estimates show religion per se does not matter, and that most of the schooling gap between Christians and Muslims disappear once we account for below-average missionary activity in Muslim areas. Importantly, we also find that the slave trade and missionary activity also affected missionary activity only influence schooling attainment at basic levels of education, which are the levels of education in which missions invested their resources. Thus, we present empirical and theoretical evidence that the effects have persisted as a result of increases in education infrastructure in areas exposed to missionary activity. Our results differ from the previous literature in this area as we do not find a strong role for religion, and neither do we find a strong role for general changes in schooling tastes.

In sum, the results provide further evidence of a negative effect of the slave trade and a positive

effect of missionary activity. However, by linking these events across time, we also provide evidence that the negative effects of the slave trade have been partially alleviated by subsequent missionary activity. Thus, the sea brought negative changes through the slave trade, but even greater positive effects through missions. Our hope is that, as more data becomes available, we would begin to gain an even better understanding of how contact with Europe has transformed African societies over the past 500 years.

References

Acemoglu, Daron, Camilo Garca-Jimeno, and James A. Robinson, "State Capacity and Economic Development: A Network Approach," NBER Working Papers 19813, National Bureau of Economic Research, Inc Jan 2014.

_ , Francisco A. Gallego, and James A. Robinson, "Institutions, Human Capital, and Development ," *Annual Review of Economics*, 08 2014, *6* (1), 875–912.

_ , Simon Johnson, and James A Robinson, "The Colonial Origins of Comparative Development: An Empirical Investigation," *The American Economic Review*, 2001, *91* (5), 1369–1401.

_ , _ , and James A. Robinson, "Reversal Of Fortune: Geography And Institutions In The Making Of The Modern World Income Distribution," *The Quarterly Journal of Economics*, November 2002, *117* (4), 1231–1294.

_ , Tristan Reed, and James A Robinson, "Chiefs: Economic Development and Elite Control of Civil Society in Sierra Leone," *Journal of Political Economy*, 2014, *122* (2), 319–368.

Ajayi, J.F.A., *Christian Missions in Nigeria, 1841-1891: The Making of a New Élite* Ibadan history series, Longmans, 1965.

_ , L.K.H. Goma, and A.G. Johnson, *The African experience with higher education*, Association of African Universities, 1996.

Anderson, T. W. and Herman Rubin, "Estimation of the Parameters of a Single Equation in a Complete System of Stochastic Equations," *The Annals of Mathematical Statistics*, 03 1949, *20* (1), 46–63.

Angrist, J.D. and J.S. Pischke, *Mostly Harmless Econometrics: An Empiricist's Companion*, Princeton University Press,, 2009.

Aromolaran, Adebayo, "Estimates of Mincerian Returns to Schooling in Nigeria," *Oxford Development Studies*, 2006, *34* (2), 265–292.

Ayandele, E.A., *The Missionary Impact on Modern Nigeria, 1842-1914: A Political and Social Analysis* Ibadan history series, Longmans, 1966.

Barnes, Andrew E., "'Evangelization Where It Is Not Wanted': Colonial Administrators and Missionaries in Northern Nigeria during the First Third of the Twentieth Century," *Journal of Religion in Africa*, 1995, *25* (4), pp. 412–441.

Becker, Sascha O and Ludger Woessmann, "Luther and the Girls: Religious Denomination and the Female Education Gap in Nineteenth-century Prussia," *The Scandinavian Journal of Economics*, 2008, *110* (4), 777–805.

Becker, Sascha O. and Ludger Woessmann, "Was Weber Wrong? A Human Capital Theory of Protestant Economic History," *The Quarterly Journal of Economics*, 2009, *124* (2), 531–596.

Berman, Edward H., "African Responses to Christian Mission Education," *African Studies Review*, 1974, *17* (3), pp. 527–540.

Buxton, T.F., *The African Slave Trade, and Its Remedy*, J. Murray, 1840.

Chanda, Areendam, C. Justin Cook, and Louis Putterman, "Persistence of Fortune: Accounting for Population Movements, There Was No Post-Columbian Reversal," *American Economic Journal: Macroeconomics*, July 2014, *6* (3), 1–28.

Crowder, M., *The Story of Nigeria* Faber paperbacks, Faber & Faber, 1980.

Csapo, Marg, "Religious, Social and Economic Factors Hindering the Education of Girls in Northern Nigeria," *Comparative Education*, 1981, *17* (3), 311–319.

Easterly, William and Ross Levine, "Africa's Growth Tragedy: Policies and Ethnic Divisions," *The Quarterly Journal of Economics*, 1997, *112* (4), 1203–1250.

El-Hareir, Idris and Ravane Mbaye, *The Spread of Islam Throughout the World* Different Aspects of Islamic Culture, UNESCO Publishers, 2011.

Fenske, James, "The Causal History of Africa: A Response to Hopkins," *Economic History of Developing Regions*, 2010, *25* (2), 177–212.

_ , "Does Land Abundance Explain African Institutions?," *The Economic Journal*, 2013, *123* (573), 1363–1390.

_ **and Igor Zurimendi**, "Oil and ethnic inequality in Nigeria," CSAE Working Paper Series 2015-02, Centre for the Study of African Economies, University of Oxford 2015.

_ **and Namrata Kala**, "1807: Economic shocks, conflict and the slave trade," CSAE Working Paper Series 2014-02, Centre for the Study of African Economies, University of Oxford 2014.

Fischer, G., F. Nachtergaele, S. Prieler, H.T. van Velthuizen, L. Verelst, and D. Wiberg, *Global Agro-ecological Zones Assessment for Agriculture (GAEZ 2008)*, IIASA, Laxenburg, Austria and FAO, Rome, Italy, 2008.

Frankema, Ewout H.P., "The origins of formal education in sub-Saharan Africa: was British rule more benign?," *European Review of Economic History*, 2012, *16* (4), 335–355.

Gallego, Francisco A. and Robert Woodberry, "Christian Missionaries and Education in Former African Colonies: How Competition Mattered," *Journal of African Economies*, 2010, *19* (3), 294–329.

Hanushek, Eric A and Dennis D Kimko, "Schooling, labor-force quality, and the growth of nations," *American economic review*, 2000, pp. 1184–1208.

_ **and Ludger Woessmann**, "The role of cognitive skills in economic development," *Journal of economic literature*, 2008, pp. 607–668.

Hijmans, Robert J., Susan E. Cameron, Juan L. Parra, Peter G. Jones, and Andy Jarvis, "Very high resolution interpolated climate surfaces for global land areas," *International Journal of Climatology*, 2005, *25* (15), 1965–1978.

Holmlund, Helena, Mikael Lindahl, and Erik Plug, "The Causal Effect of Parents' Schooling on Children's Schooling: A Comparison of Estimation Methods," *Journal of Economic Literature*, 2011, *49* (3), 615–51.

Hopkins, Anthony G., "The New Economic History of Africa," *The Journal of African History*, 7 2009, *50*, 155–177.

Huillery, Elise, "History matters: The long-term impact of colonial public investments in French West Africa," *American Economic Journal: Applied Economics*, 2009, pp. 176–215.

ICSPR, "Afrobarometer Data," 2003–2008. Available at `http://www.afrobarometer.org/data/data-by-country-n-z/nigeria`.

Ikime, O., *The fall of Nigeria: the British conquest*, Heinemann, 1977.

Jedwab, Remi, Edward Kerby, and Alexander Moradi, "History, Path Dependence and Development: Evidence from Colonial Railroads, Settlers and Cities in Kenya," Technical Report 2014.

Johnson, Hildegard Binder, "The location of Christian missions in Africa," *Geographical Review*, 1967, pp. 168–202.

Kirk-Greene, A.H.M., *Gazetteers of the Northern Provinces of Nigeria* Cass library of African studies: General studies, Cass, 1972.

Kleibergen, Frank and Richard Paap, "Generalized reduced rank tests using the singular value decomposition," *Journal of Econometrics*, July 2006, *133* (1), 97–126.

Larreguy, Horacio A and John Marshall, "The Effect of Education on Political Engagement in Non-Consolidated Democracies: Evidence from Nigeria," *Unpublished Manuscript*, 2014.

Lulat, Y.G.M., *A History of African Higher Education from Antiquity to the Present: A Critical Synthesis* Studies in Higher Education, Praeger Publishers, 2005.

Maxwell, David, "Freed Slaves, Missionaries and Respectability: The Expansion of the Christian Frontier from Angola to Belgian Congo," *The Journal of African History*, 3 2013, *54* (01), 79–102.

Michalopoulos, Stelios and Elias Papaioannou, "The long-run effects of the scramble for Africa," Technical Report 2013.

__ **and** __ , "National Institutions and Subnational Development in Africa," *The Quarterly Journal of Economics*, 2014, *129* (1), 151–213.

Murdock, G.P., *Africa: Its Peoples and Their Cultural History: Maps*, McGraw-Hill, 1959.

NBS, "Nigeria General Household Survey (GHS), Panel 2010," `http://microdata.worldbank.org/index.php/catalog/1002/accesspolicy` 2013.

Nunn, Nathan, "The Long-Term Effects of Africa's Slave Trades," *The Quarterly Journal of Economics*, 02 2008, *123* (1), 139–176.

__ , "Religious Conversion in Colonial Africa," *American Economic Review*, 2010, *100* (2), 147–52.

__ , "Historical Development," in Phillipe Aghion and Steven Durlauf, eds., *Handbook of Economic Growth*, Vol. 2, North-Holland, 2013.

__ , "Gender and Missionary Influence in Colonial Africa," in Emmanuel Akyeampong, Robert H. Bates, Nathan Nunn, and James Robinson, eds., *African Development in Historical Perspective*, Cambridge: Cambridge University Press, May 2014.

__ **and Diego Puga**, "Ruggedness: The blessing of bad geography in Africa," *Review of Economics and Statistics*, 2012, *94* (1), 20–36.

__ **and Leonard Wantchekon**, "The Slave Trade and the Origins of Mistrust in Africa," *American Economic Review*, 2011, *101* (7), 3221–52.

Nwabara, S.N., *Iboland: a century of contact with Britain, 1860-1960*, Humanities Press, 1978.

Obikili, Nonso, "The Impact of the Slave Trade on Literacy in Africa: Evidence from the Colonial Era," Working Papers 378, Economic Research Southern Africa 2013.

Ochonu, M.E., *Colonialism by Proxy: Hausa Imperial Agents and Middle Belt Consciousness in Nigeria*, Indiana University Press, 2014.

Okoye, Dozie and Roland Pongou, "Historical Missionary Activity, Schooling, and the Reversal of Fortunes: Evidence from Nigeria," MPRA Paper 58052, University Library of Munich, Germany Aug 2014.

Okwu, A.S.O., *Igbo Culture and the Christian Missions, 1857-1957: Conversion in Theory and Practice*, University Press of America, 2010.

Oyeniyi, Bukola Adeyemi, "Internal Migration in Nigeria: A Positive Contribution to Human Development," `http://www.acpmigration-obs.org/NigeriaInternal` 2013.

Prothero, R Mansell, "The population census of Northern Nigeria 1952: Problems and results," *Population Studies*, 1956, *10* (2), 166–183.

Reichmuth, Stefan, "New trends in Islamic education in Nigeria: a preliminary account," *Die Welt des Islams*, 1989, pp. 41–60.

Roome, William R.M., *Ethnographic Survey of Africa Showing the Tribes and Languages: Also the Stations of Missionary Societies*, Edward Stanford Ltd, 1925.

Skutsch, C., *Encyclopedia of the World's Minorities* Encyclopedia of the World's Minorities, Taylor & Francis, 2013.

Spolaore, Enrico and Romain Wacziarg, "How Deep Are the Roots of Economic Development?," *Journal of Economic Literature*, 2013, *51* (2), 325–69.

Stock, James H. and Jonathan H. Wright, "GMM with Weak Identification," *Econometrica*, 2000, *68* (5), 1055–1096.

Sundkler, B. and C. Steed, *A History of the Church in Africa*, Vol. 74 of *Studia Missionalia Upsaliensia*, Cambridge University Press, 2000.

Tasie, G.O.M., *Christian Missionary Enterprise In the Niger Delta 1864-1918* Studies on Religion in Africa, Brill, 1978.

Teal, Francis, "Employment Creation, Poverty and the Structure of the Job Market in Nigeria," Working Paper 14, Centre for the Study of African Economies, University of Oxford 2014.

UNESCO, *General History of Africa* number v. I–VIII, UNESCO, Heinemann, University of California Press, 1990.

Wantchekon, Leonard, Marko Klanja, and Natalija Novta, "Education and Human Capital Externalities: Evidence from Colonial Benin," *The Quarterly Journal of Economics*, 2015, *forthcoming.*

Whatley, Warren and Rob Gillezeau, "The Impact of the Transatlantic Slave Trade on Ethnic Stratification in Africa," *American Economic Review*, 2011, *101* (3), 571–76.

Table 17: Direct Effects of The Slave Trade and Missions on Schooling (No Wealth Control)

	Dependent Variable is Years of Schooling				
	1	2	3	4	5
	OLS		IV		IV: Restricted Sample
Missions per area	3.647***	1.627***	8.155***	7.760***	7.014***
	[10.35]	[4.40]	[6.78]	[7.27]	[6.67]
Slave Exports	-0.376**	-0.383*	-1.537***	-1.464***	-1.615***
	[-2.70]	[-2.51]	[-5.90]	[-5.96]	[-5.81]
Individual Controls	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**
	Household Controls				
Female Head	0.667***	0.521***	0.504***	0.505***	0.483***
	[8.11]	[6.72]	[6.21]	[6.29]	[5.95]
Age of Head	0.0140***	0.0112***	0.0141***	0.0139***	0.0138***
	[5.42]	[4.41]	[5.23]	[5.20]	[5.12]
Household Size	-0.0299*	-0.0095	-0.0173	-0.0169	-0.0238
	[-2.09]	[-0.59]	[-1.06]	[-1.04]	[-1.63]
	Ethnicity Controls				
Colonial Pop. Density	-1.510***	-0.704***	-2.050***	-1.969***	-1.951***
	[-10.15]	[-4.78]	[-6.73]	[-7.58]	[-6.99]
Colonial Rail	0.726**	1.191***	2.697***	2.602***	2.496***
	[2.98]	[5.08]	[7.16]	[7.46]	[6.55]
Malaria Ecology	0.353***	0.289***	0.243***	0.245***	0.262***
	[9.96]	[7.39]	[5.05]	[5.10]	[4.65]
Mean Trust Level	-3.467***	-1.827***	-4.403***	-4.243***	-5.303***
	[-6.95]	[-4.52]	[-6.73]	[-6.40]	[-5.57]
	Location Controls				
Rainfall	0.00146*	0.001	0.0006	0.0006	0.0011
	[1.99]	[1.13]	[0.67]	[0.70]	[1.19]
Temperature	-0.0583***	-0.0602***	-0.0594***	-0.0595***	-0.0614***
	[-5.95]	[-6.41]	[-6.09]	[-6.13]	[-6.25]
Nutrient in Soil	0.0377	-0.0105	-0.156	-0.148	-0.135
	[0.39]	[-0.11]	[-1.56]	[-1.47]	[-1.30]
Altitude	-0.0009	-0.0002	-0.0001	-0.0001	0
	[-1.51]	[-0.30]	[-0.15]	[-0.17]	[0.01]
Oil Producing		0.554**	0.536*	0.537*	0.496*
Region-Fixed Effects	**No**	**Yes**	**Yes**	**Yes**	**Yes**
Adjusted R^2	0.493	0.512	0.483	0.486	0.503
Observations	35464	35464	35464	35464	33592
Overid Test (P)				0.559	0.808
KP UnderId Test			75.79	101.2	97.87
KP rk Wald F			47.64	72.98	67.84
AR Wald F			34.73	29.55	25.49
SW LM S			59.59	66.89	63.16

Notes: IV estimates are 2SLS estimates, and "Restricted Sample" restricts the sample to ethnic groups with strictly positive exposure to the slave trade. T-statistics for standard errors clustered at the district level in brackets. $^{+}p < .1$, * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Regressions include individual, household, ethnicity, location, state, and region controls. **Individual** controls are age, age-squared, urban/rural residence, sex, and 8 occupation dummies. **Household** controls are wealth, sex of the household head, size of the household, and age of the household head. **Ethnicity** controls are colonial-era population density (trade), an indicator for whether the railway crosses the individual's ethnic homeland, malaria ecology, and mean level of trust. **Location** controls are climatic and geographic controls from Fischer et al. (2008) and Hijmans et al. (2005) at the local government area level (county). We also include indicators for the region in which the individual lives (6), and an indicator for whether the individual lives in an oil-producing state. We use year of occupation, distance to coast, and distance to a Saharan trading node as instruments for missionary activity and transatlantic slave exports, as described in the text.

Table 18: Summary Statistics

	Outcome Variables					Ethnicity Variables						
ETHNICITY	**Schooling** (In Years)	**Literate** (Proportion)	**Wives**	**Marriage Age**	**Self Employed** (Proportion)	**Missions** (In Log)	**Slave Exports** (In Log)	**Pop. Density** (In Log)	**Malaria Eco.**	**Rail**	**Occupied** (Year)	**Source**
ANANG	8.83	0.80	1.06	22.07	0.43	1.10	1.91	4.77	25.65	0.00	1856	Ikime (1977)
EBIRA	8.32	0.75	1.33	20.92	0.45	0.28	0.09	3.65	26.56	0.00	1903	Kirk-Greene (1972)
EDO	10.40	0.87	1.13	22.15	0.41	0.17	0.62	3.30	26.84	0.00	1897	Ikime (1977)
EFIK	8.81	0.78	1.02	21.04	0.45	1.10	1.91	4.77	25.65	0.00	1856	Ikime (1977)
EKOI	8.87	0.74	1.13	20.79	0.52	0.07	0.20	2.60	23.02	0.00	1902	Ikime (1977)
EKPEYE	9.82	0.94	1.18	19.92	0.28	0.22	0.99	2.38	19.77	0.00	1886	Crowder (1980)
FULANI	1.10	0.14	1.22	16.74	0.43	0.00	0.00	N/A	22.31	1.00	1902	Ikime (1977)
GWARI	4.96	0.49	1.15	19.09	0.45	0.15	0.04	1.77	21.56	1.00	1901	Ikime (1977)
HAUSA	2.78	0.31	1.26	17.26	0.50	0.01	0.68	3.62	17.47	1.00	1902	Ikime (1977)
IBIBIO	9.02	0.83	1.14	21.27	0.44	1.10	1.91	4.77	25.65	0.00	1856	Ikime (1977)
IDOMA	8.34	0.71	1.26	19.98	0.46	0.28	0.00	3.43	26.80	1.00	1899	Ochonu (2014)
IGALA	7.74	0.66	1.54	19.99	0.47	0.13	0.00	3.01	27.13	0.00	1904	Kirk-Greene (1972)
IGBO	9.67	0.87	1.15	23.36	0.41	0.75	2.50	4.71	25.87	1.00	1871	Okwu (2010)
IGEDE	5.44	0.44	1.09	19.68	0.65	0.28	0.00	3.43	26.80	1.00	1899	(Ochonu)
IJAW	9.19	0.81	1.18	21.10	0.47	0.22	0.99	2.38	19.77	1.00	1895	Ikime (1977)
IKWERE	10.08	0.91	1.00	21.51	0.52	0.75	2.50	4.71	25.87	1.00	1886	Ikime (1977)
ISOKO	9.03	0.73	1.17	21.07	0.53	0.00	0.07	4.50	27.06	0.00	1894	Ikime (1977)
ITSEKIRI	8.46	0.76	1.25	19.43	0.47	0.37	0.00	1.99	14.35	0.00	1884	Ikime (1977)
KALABARI	9.73	0.84	N/A	19.84	0.32	0.22	0.99	2.38	19.77	0.00	1886	Crowder (1980)
KANURI	1.77	0.17	1.19	16.98	0.44	0.00	0.04	3.03	19.71	1.00	1904	Ikime (1977)
NUPE	4.16	0.36	1.24	18.22	0.47	0.27	1.19	2.64	27.03	1.00	1897	Ikime (1977)
OGONI	8.23	0.78	1.06	19.33	0.46	1.10	1.91	4.77	25.65	0.00	1901	Skutsch (2013)
OKIRIKA	13.06	1.00	1.00	22.01	0.31	0.22	0.99	2.38	19.77	0.00	1886	Ikime (1977)
SAYAWA	7.44	0.77	1.00	19.92	0.39	0.27	0.00	2.53	22.03	1.00	1903	Ikime (1977)
SHUWA	2.88	0.25	1.14	17.47	0.38	0.00	0.00	1.02	20.64	0.00	1904	Ikime (1977)
TAROH	7.43	0.69	1.31	20.53	0.21	0.43	0.00	2.94	21.26	1.00	1903	Kirk-Greene (1972)
TIV	6.31	0.54	1.50	18.70	0.52	0.16	0.02	3.56	25.35	1.00	1906	Ikime (1977)
UKWANI	9.24	0.82	1.42	20.78	0.47	0.75	2.50	4.71	25.87	1.00	1871	Okwu (2010)
URHOBO	9.53	0.80	1.23	21.24	0.45	0.00	0.07	4.50	27.06	0.00	1894	Ikime (1977)
YORUBA	9.67	0.86	1.25	22.36	0.52	0.21	2.71	3.51	26.64	1.00	1861	Ikime (1977)

Table 18: Summary Statistics (Continued)

	Household Variables						Individual Variables				
ETHNICITY	**Trust**	**Wealth** (Index)	**Size**	**Head's Age**	**Head's Schooling**	**Male** (Proportion)	**Age**	**Rural** (Proportion)	**Migrant** (Proportion)	**Muslim** (Proportion)	**Percent**
ANANG	0.92	3.61	5.62	43.84	8.98	0.33	28.97	0.86	0.66	0.00	1.01
EBIRA	0.63	3.31	6.18	46.67	7.67	0.33	28.72	0.55	0.47	0.73	1.50
EDO	0.84	4.33	5.78	47.57	10.25	0.32	29.71	0.36	0.82	0.12	2.38
EFIK	0.89	4.08	4.89	40.09	9.44	0.40	28.59	0.39	0.86	0.02	0.51
EKOI	1.00	3.10	5.63	43.75	8.53	0.30	29.26	0.74	0.63	0.00	2.20
EKPEYE	0.92	4.35	9.26	54.63	8.93	0.23	25.11	0.53	0.63	0.11	0.10
FULANI	1.60	1.64	6.80	41.23	1.18	0.30	30.04	0.88	0.53	0.99	8.97
GWARI	1.62	3.06	6.57	41.88	4.93	0.36	29.17	0.66	0.38	0.25	1.27
HAUSA	1.35	2.43	7.00	43.00	3.01	0.32	30.00	0.74	0.51	0.98	26.58
IBIBIO	0.86	3.77	5.40	43.46	8.99	0.33	29.24	0.70	0.68	0.00	2.91
IDOMA	0.84	3.23	6.86	45.23	8.37	0.31	28.47	0.82	0.59	0.02	1.09
IGALA	0.69	3.25	6.12	42.39	7.47	0.34	28.50	0.69	0.46	0.47	2.05
IGBO	0.68	3.92	5.16	47.03	9.24	0.30	29.88	0.48	0.60	0.00	17.05
IGEDE	1.88	3.11	5.38	39.90	5.33	0.33	29.97	0.91	0.87	0.00	0.30
IJAW	1.05	3.29	4.80	41.86	9.26	0.37	28.97	0.82	0.51	0.00	4.71
IKWERE	0.53	4.31	5.38	44.00	9.55	0.25	29.34	0.68	0.42	0.00	0.35
ISOKO	0.89	4.08	4.93	43.06	8.80	0.30	29.16	0.66	0.79	0.00	0.51
ITSEKIRI	0.78	3.20	4.77	43.46	8.72	0.36	30.65	0.68	0.66	0.00	0.15
KALABARI	0.62	4.30	3.79	45.97	10.21	0.00	29.49	0.02	0.59	0.00	0.03
KANURI	1.27	1.57	5.91	40.69	2.10	0.31	30.95	0.93	0.50	1.00	0.41
NUPE	1.32	3.32	7.87	42.24	5.34	0.32	29.76	0.78	0.59	0.96	1.00
OGONI	0.33	2.94	4.53	39.05	8.04	0.31	27.67	0.90	0.67	0.00	0.34
OKIRIKA	0.43	4.72	3.73	37.68	14.02	0.27	32.46	0.00	0.73	0.00	0.02
SAYAWA	1.80	1.86	6.93	42.30	6.75	0.32	28.92	0.90	0.30	0.04	0.13
SHUWA	2.00	2.69	12.02	46.49	1.51	0.34	27.75	0.50	0.61	0.99	0.43
TAROH	1.88	2.26	6.26	41.61	7.86	0.35	28.66	0.80	0.31	0.01	0.66
TIV	1.43	2.07	7.03	42.89	6.58	0.32	27.88	0.79	0.68	0.00	3.33
UKWANI	0.45	3.72	5.41	43.78	8.83	0.32	28.72	0.45	0.65	0.00	0.51
URHOBO	0.73	4.03	4.32	40.95	9.46	0.32	28.78	0.45	0.82	0.00	0.98
YORUBA	0.72	4.09	4.96	45.16	9.53	0.33	30.06	0.40	0.69	0.43	18.52