

# Christians in Colonial Africa

**Nathan Nunn**<sup>\*‡</sup>

*Harvard University*

December 2009

(Preliminary and Incomplete)

**ABSTRACT:** Using information on the precise locations of Catholic and Protestant mission during Africa's Colonial period, I examine the long-term impact of Protestant and Catholic missionary activity on religious conversion, education, civic participation and attitudes towards democracy. Examining variation across ethnicities and villages within 17 sub-Saharan African countries, I provide evidence that Protestant missions had strong effects on conversion, and increased educational attainment. Catholic missions, on the other hand, appear to have had little effect on conversion, and no effect on education. The results are in line with the arguments of Woodberry and Shah (2004), and confirm the cross-country analysis of Woodberry (2004, 2009). I also find that consistent with the cross-country analysis of Glaeser, Ponzetto, and Shleifer (2007), more educated individuals favor democracy, are more likely to vote, and are less likely to view violence as a justifiable political action. However, less consistent with their arguments, I find that more educated individuals are less likely to believe that voting rights should be extended to all. Although my results suggest that through increased education, Protestant missions increase the prevalence of attitudes favorable towards democracy and civic participation, I find no evidence that missionary activity, either Protestant or Catholic, affects these outcomes through any channels other than education.

**Key words:** Religion; missions; Africa; education; democracy; civic participation.

**JEL classification:** N37, N47, Z12

\*I thank Robert Barro, Oeindrila Dube, Rachel McCleary, and Robert Woodberry for valuable comments, as well as Sayon Deb for excellent research assistance. I also thank seminar participants at Harvard University and ERSA's Conference on Slavery, Colonial History and the New Economic History of Southern Africa.

‡Department of Economics, Harvard University, 1805 Cambridge Street, Cambridge, MA 02138, U.S.A. (e-mail: [nnunn@fas.harvard.edu](mailto:nnunn@fas.harvard.edu); website: <http://www.economics.harvard.edu/faculty/nunn>). Also affiliated with the NBER and BREAD.

## 1. Introduction

Recent studies have hypothesized that the presence of religious missions, particularly Protestant missions, had a long-term positive effect on education, and well-functioning democratic institutions. The most well-developed studies are by Grier (1997), Woodberry (2004), and Woodberry (2009).<sup>1</sup> The studies look across former colonies and examine the relationship between the presence of missionaries historically and either education, democracy, and/or income today. One hypothesis in these studies is that the link between missionary activity and democracy today is through the education, which is needed for a well-functioning democracy. The importance of schooling for democracy has also recently been emphasized by Glaeser *et al.* (2007).<sup>2</sup> The authors develop a theoretical model where schooling socializes individuals, teaching them to interact with one another, and this in turn increases the benefits to voting and civic participation, which supports the existence of democracy.

The hypothesized link between the Protestant religion, education, and economic success has been examined explicitly by Becker and Wöeßmann (2009).<sup>3</sup> Their study finds that the Protestant religion, by increasing human capital, exerted a positive influence on economic growth in 19th century Prussia. In contrast, Cantoni (2009) looks across cities within Germany from 1300 to 1900, and finds no such effects. The difference may arise because Cantoni examines a larger geographic area, and a longer time horizon than Becker and Wöeßmann.

This paper adds to this literature in a variety of ways. First, it tests for many hypothesized relationships at a sub-national level, exploiting within-country, rather than cross-country variation.<sup>4</sup>

Second, my analysis moves beyond using towns, villages, or regions as the unit of observation. Instead it links the historic influence of foreign missionaries on individuals' ancestors and links this to the beliefs and values of the descendants today. This is particularly important, since many of the hypothesized mechanisms and effects (e.g. the Protestant work ethic, or the Protestant belief in the importance of education) work through norms, values or beliefs, which are mobile. Therefore, if there is migration between cities or districts, then the village or district is not longer

---

<sup>1</sup>Also see Barro and McCleary (2003), as well as the review article by McCleary and Barro (2006).

<sup>2</sup>For prior empirical evidence on the positive link between education and democracy across countries see Barro (1999).

<sup>3</sup>Also see the authors' follow-up paper examining the effect of the Protestant religion on the educational gender gap Becker and Wöeßmann (2007), as well as the comment by Schaltegger and Torgler (2009).

<sup>4</sup>The only other study that I am aware of that examines sub-national variation within Africa is Gallego and Woodberry (2009).

the appropriate unit of observation. In other words, it is no longer clear whether we expect to observe a relationship between historic missionary activity in a location and contemporary outcomes in that same location. This study examines whether the descendants of those living in the areas that were historically most exposed to religion and missionary activities are today more educated, more likely to vote, more likely to engage in civic participation, and/or are more likely to view democracy favorably.

Third, the paper extends previous studies, by examining the hypothesized channels underlying the finding of a reduced form relationship between missionary activity and democracy. We find evidence of Protestant missions benefitting democracy, but that the effect only works through increased human capital accumulation.

Fourth, the study examines a number of additional effects of missionary activity that have been hypothesized, but have not yet been carefully examined in the data. For example, Woodberry and Shah (2004) and Woodberry (2009) argue that because Protestant missionary activity was open to educating minorities and women, it had a particularly positive effect for these groups, and a positive effect of societies views towards these groups. The study finds evidence for the first hypothesis, but not the second. Therefore, there is evidence that Protestant missions decreased the educational gap between men and women, but they did not alter attitudes about the role of women relative to men.

The study uses data on the historic location of Protestant and Catholic missions. The data are from a map titled "Ethnographic Survey of Africa: Showing the Tribes and Languages; also the Stations of Missionary Societies" published by William Roome (1924). The map also provides information on the languages that the Bible was translated into at the time and the locations of the tribes speaking these languages. Also provided are the locations of the depots of the British and Foreign Bible Society (BFBS), which is a non-denominational Christian network that translates, publishes and distributes affordable Bibles overseas. This information, combined with information on the historic locations of ethnic groups from Murdock (1959), is used to calculate estimates of how exposed the different African ethnic groups were by missions and the spread of the Bible. I then link this information to 2005 Afrobarometer survey using reported information about the ethnicity of each respondent. This allows me to construct a number of measures of the historic exposure a respondent's ethnic group had to religion in the early 20th century.

Using these linked data sources, I am able to test a number of hypotheses about the relationship

between historic missionary activity, education, and democracy. Specifically, I test whether Afrobarometer survey respondents with ancestors that lived close to the historic locations of missions are today more educated, are more likely to support democracy, and engage in civic participation as the hypotheses of Woodberry (2004) and others would suggest. I also test whether individuals with ancestors that had access to the Bible printed in their indigenous language also exhibit these same characteristics.

## **2. Historical Background and the Determinants of Mission Location**

A number of factors determined the locations chosen for mission stations. The three most important appear to have been access to a clean water supply, a high altitude with as temperate a climate as possible, and the ability to establish an external trade route with Europe to import needed supplies (Johnson, 1967). The reason that each of these factors were important is obvious. Access to water was crucial for the European missionaries, high altitude and temperate climate reduced the likelihood of disease, and access to supplies from Europe were necessary not only for survival, but to build and development the missions.

Other factors like population density also mattered, but the general effect is ambiguous. Some missionaries and societies intentionally built missions in more remote locations, where the word of God otherwise would not reach. Other missionaries recognized the benefits and efficiencies associated with dense populations, and targeted these groups.

Another potential component of the location missionary activity is based on path dependence. The routes taken by the first missionary explorers determined, which areas of Africa became relatively more well-known to Europe, and this may have affected the locations of subsequent missions.

In the analysis, I am careful to control for these potential determinants of the location of colonial missions. If these factors had a direct long-term effect on the outcomes of interest, not properly accounting for this effect will result in biased estimates of the effects of missionary activity.

## **3. Data and their Sources**

The data used in the analysis are built around the most recent round (2005) of the Afrobarometer surveys. These nationally standardized questionnaires measure a host of characteristics among

a random sample of either 1,200 or 2,400 individuals in each country. The questionnaire provides information on each individual's education, occupation, quality of living conditions, civic participation, as well as their views about democracy, political violence, and trust in their local government.

The 2005 Afrobarometer covers the following 17 sub-Saharan African countries: Benin, Botswana, Ghana, Kenya, Lesotho, Madagascar, Malawi, Mali, Mozambique, Namibia, Nigeria, Senegal, South Africa, Tanzania, Uganda, Zambia, and Zimbabwe. It is clear that this is not a random sample. The countries tend to be concentrated in West Africa, Eastern Africa, and Southern Africa. All of West Central Africa is not included, as well as countries inland of the Red Sea. Therefore, it is important to keep in mind that all of the results in the paper apply only to the 17 sub-Saharan African countries included in our sample. The relationships that I identify in the data may be very different within the African countries not included in our sample.

The study by Gallego and Woodberry (2009) also looks within Africa, but examines the long-term effects of competition between Catholic and Protestant missionaries. The study includes the following 17 sub-Saharan African countries: Angola, Benin, Burkina Faso, Burundi, Cameroon, Central African Republic, Cote d'Ivoire, Gambia, Ghana, Guinea, Kenya, Malawi, Nigeria, Rwanda, Tanzania, Togo, and Zambia. Six countries are common to the Afrobarometer sample used here and to Gallego and Woodberry's sample; these are Benin, Ghana, Kenya, Malawi, Nigeria, and Zambia. The information on the historic influence of Christianity within Africa is taken from a map created by Roome (1924). The map provides the exact location of all Protestant and Catholic missions and BFBS Bible depots in Africa in 1924. The map produced by Roome was highly regarded by the experts in the area, who confirm that the locations of the mission stations is very accurate.<sup>5</sup> The only criticisms of the map were some quibbles about the exact spellings of the tribes and of their locations on the maps. For my analysis here, I do not rely on the spellings or locations of ethnic groups from Roome's map.

I combine the data on the historic location of Catholic and Protestant missions with information from Murdock (1959) on the historic location of ethnic groups during the 19th century to construct measures of how exposed ethnic groups were to missionary activity and to the spread of the Bible. The historic information is linked to the individual level data in the Afrobarometer surveys using the reported ethnicity of each respondent. A similar procedure was followed in Nunn and

---

<sup>5</sup>See for example, E.W.S. (1925).

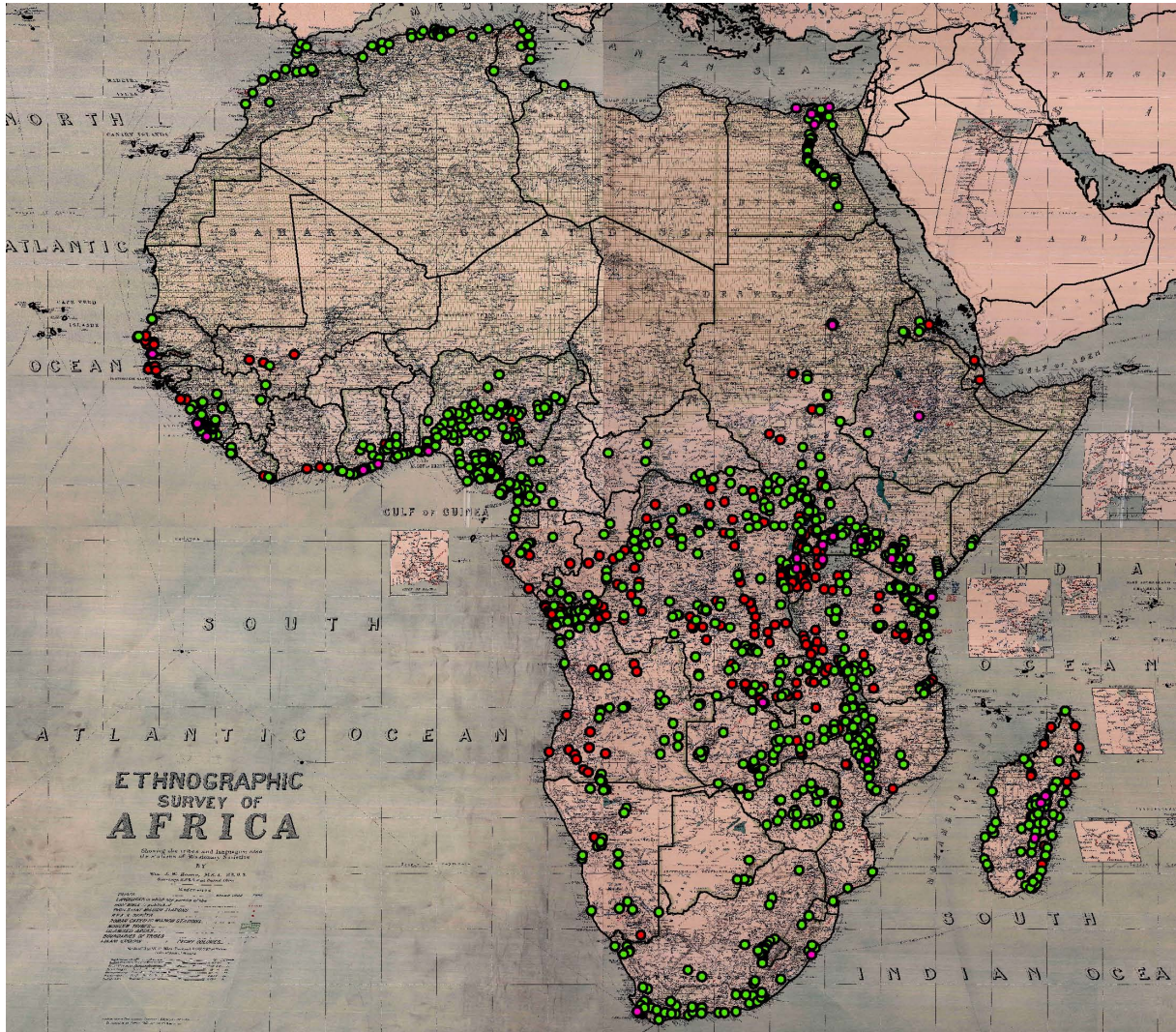


Figure 1: Map displaying the location of Catholic missions (red), Protestant missions (green), and BFBS depots (purple) in Africa in 1924.

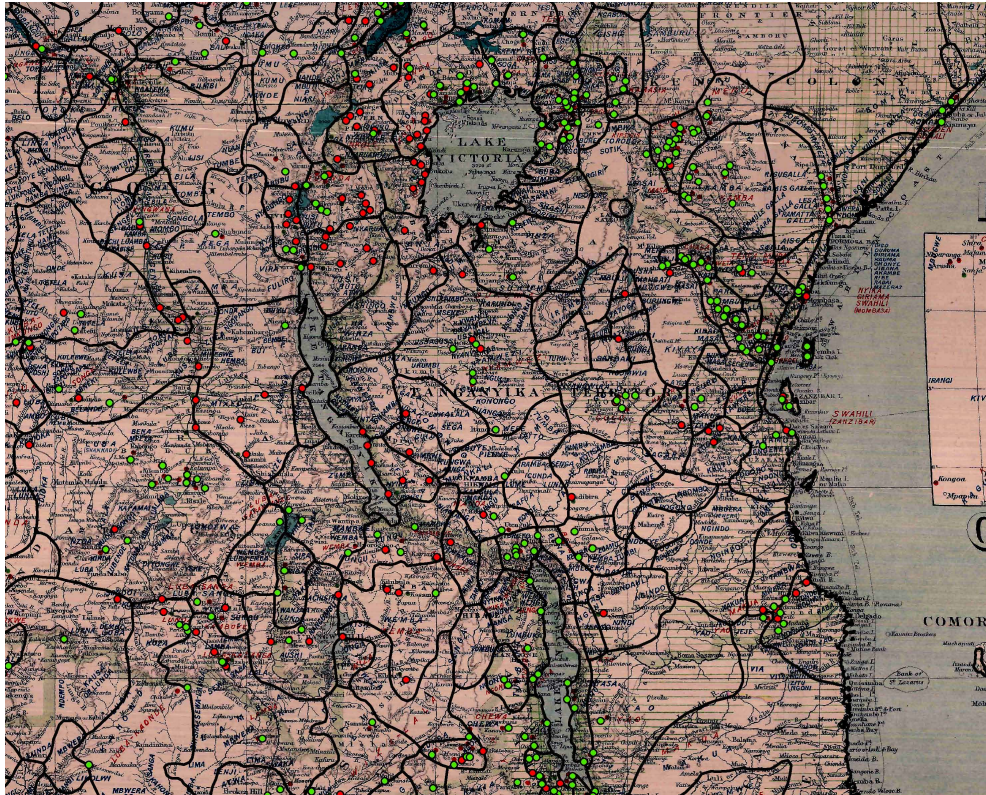


Figure 2: Constructing ethnicity level missions measures.

Wantchekon (2009).

The procedure is illustrated by figure 2. The figure shows the locations of Catholic and Protestant mission stations in Eastern Africa. It also shows, as black polygons, the historic boundaries of ethnic groups (in the 19th century) as mapped by Murdock (1959). For each ethnic group I calculate the number of missions (either total, Protestant, or Catholic) per 1,000 km of land area. Because the measure is left skewed I take use the natural log. This variable is my measures of the historic exposure a respondent's ethnic group had to religion in the early 20th century.

My use of the number of mission stations as a measure of missionary activity is slightly different from measures that has been used previously in the literature. For example, Woodberry (2004) and Gallego and Woodberry (2009) use an estimate measure of the number of foreign Protestant missionaries per capita in the early 1900s, and of the number of Catholic priests per capita during the same time period.

I also construct a second measure of the historic intensity of mission station that varies across villages, rather than ethnic groups. The construction of this variable is reported in figure 3. The figure shows both the historic location of Catholic and Protestant mission stations. It also shows

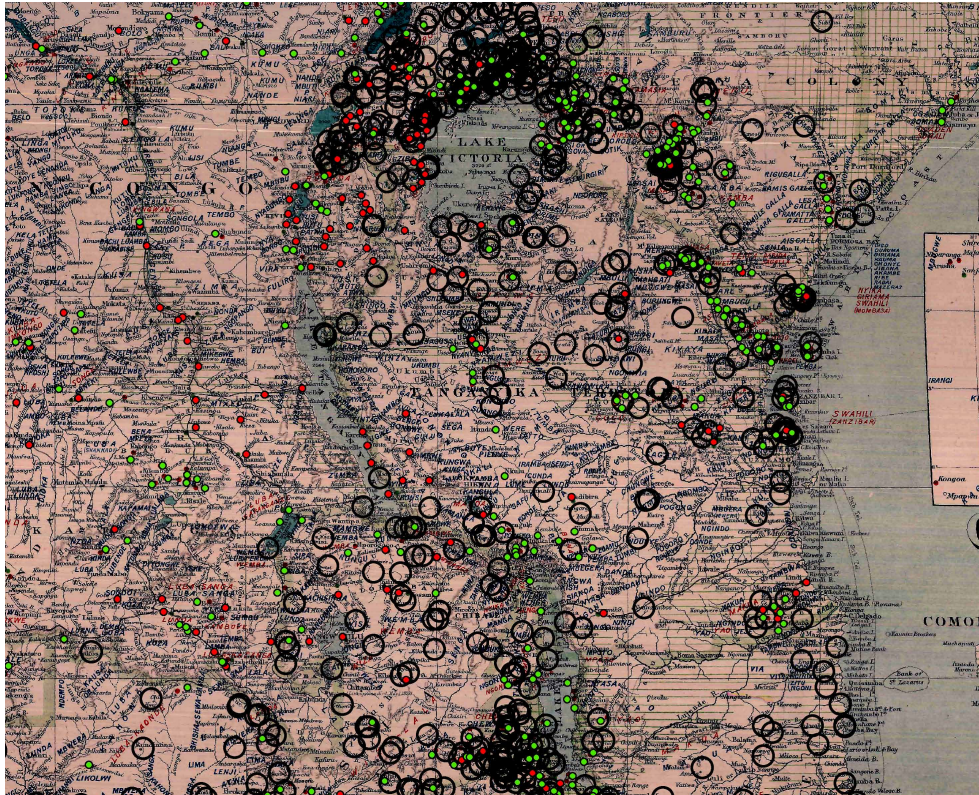


Figure 3: Constructing village level missions measures.

a number of circles. These are circles with a 25km radius drawn around the locations today of individuals in the Afrobarometer surveys. The second measure calculates the number of missions (total, Catholic and Protestant) within each circle. Therefore, this measures the number of missions that the village where the individual is currently living was exposed to in 1924.

In the analysis I construct a number of control variables. These include measures of the historic prevalence of a train networks, and of early explorer contact, measured at the ethnicity and village levels. Data on the location of rail lines as of 1897, and of explorer routes are from a map created by The Century Company (1897). The map shows the expedition routes for the routes of expeditions occurring prior to 1895.

The procedure used to construct ethnicity level measures of contact with early explorers or railway lines is shown in figure 4. The figure shows early expedition routes in green and early railways in purple. For each ethnicity, I construct an indicator variable that equals one if the railway line cuts or touches the ethnicity, and is zero otherwise. I do the same for early explorer routes.

The same procedure is also used to construct the analogous controls at the village level. For



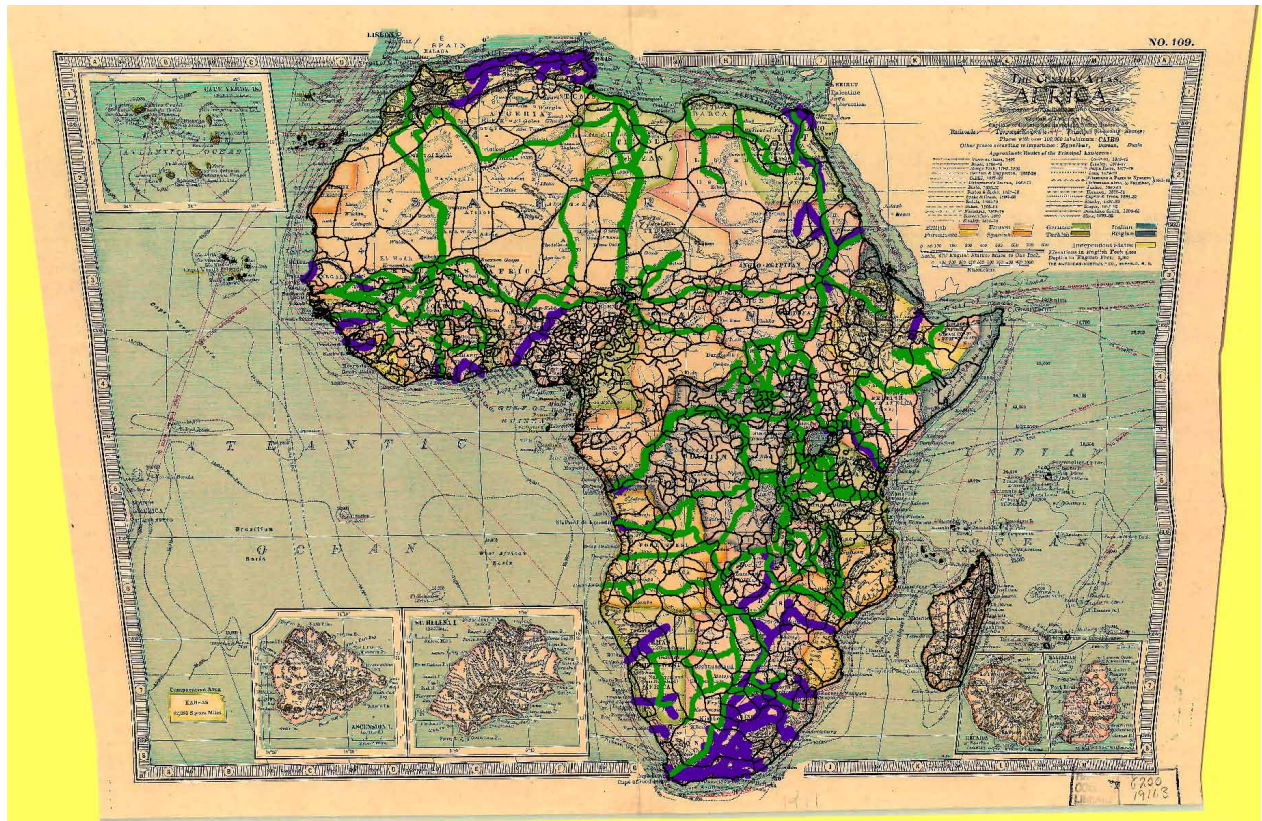


Figure 4: Constructing ethnicity level measures of historic exposure of ethnic groups to explorers and railways.

each village, I construct two indicator variables, each equalling one if a railway, or explorer route (respectively) contacted the town historically, and zero otherwise.

The railway variable is meant to capture ease of access of different villages or ethnic groups to supplies from Europe, which was a factor affecting the locations of missions. The explorer variable captures the proximity of villages and ethnic groups to the routes of early missionary (and other) explorers. This may have affected European knowledge about an area, which may have affected the likelihood of missions being developed there.

I also include two geography measures in the set of control variables. These are the average elevation and the fraction of land classified as tropical, both measured at the ethnicity and village levels. The sources of these data are described in the data appendix. As discussed, these were two factors that also affected the location of missions.

The final control variable that is included is a measure of the intensity of the slave trade among an ethnic group. Because the goal of many missionaries, particularly Protestant missionaries, was to end slavery, missions may have been intentionally located in areas with a history of slavery. We therefore control for this potential determinant of location. The variable is from Nunn and Wantchekon (2009)

## 4. Empirical Results: Conversion

### A. *Missionary Activity and Religious Conversion*

I begin by asking the most natural question about missionary activity. Was it effective? That is, how successful were missions at converting indigenous Africans and their ancestors? Surprisingly, this question has not been addressed by the empirical studies examining the long-term impacts of missionary activity. The religions reported in the Afrobarometer surveys are reported in table 1.

I first examine the average effect of all Christian mission (Protestant and Catholic) on conversion to Christianity. My estimating equation is:

$$I_{i,e,v,c}^r = \alpha_c + \beta M_e + \gamma M_v + \mathbf{X}_i \Gamma + \mathbf{X}_e \Lambda + \mathbf{X}_v \Phi + \varepsilon_{i,e,v,c} \quad (1)$$

where  $r$  is a religion, here either Christian or Protestant or Catholic;  $i$  indexes individuals,  $e$  ethnic groups,  $v$  villages, and  $c$  countries. The dependent variable  $I_{i,e,v,c}^r$  is an indicator variable that equals one if individual  $i$  reports belonging to religion  $r$ .  $\alpha_c$  denote country fixed effects. The

Table 1: The religious categories identified in the Afrobarometer surveys.

	Number	Percent
Catholic	5,415	26.43%
Protestant (mainstream)	3,281	16.02%
Protestant (Evangelical/Pentecostal)	2,732	13.34%
Christian (general/other)	2,346	11.45%
Jehova's Witness	198	0.97%
Seventh Day Adventist	547	2.67%
African independent church (AIC)	702	3.43%
Traditional religion	546	2.67%
Hindu	10	0.05%
Muslim, Sunni	2,561	12.50%
Muslim, Shiite	307	1.50%
Muslim (general/other)	602	2.94%
Muslim , Tijane	583	2.85%
Muslim, Mouride	406	1.98%
Muslim, Layene	6	0.03%
Muslim, Khadre	66	0.32%
Agnostic	16	0.08%
Atheist	37	0.18%
Other	125	0.61%
<b>Total</b>	<b>20,486</b>	<b>100.00%</b>

*Notes* : The table reports the categories of religions reported in the Afrobarometer 2005 survey, and the number of respondents for each category.

variable  $M_e$  measures of the historic intensity of exposure of ethnic group  $e$  to Protestant and Catholic missions in 1924. It is measured as the log number of missions per 1,000 kilometers of land area historically inhabited by the ethnic group. I take the natural log to remove the skew that exists in the distribution otherwise.  $M_v$  is the analogous measure of missionary activity at the village level. It is measured by the number of missions (Catholic and Protestant) in the village of the respondent. In practice, the measure is calculated by identifying the number of missions within a 25 kilometer radius of the geographic location of the respondent.

Equation (1) also includes a host of control variables that vary at both the individual level and the ethnicity level.  $X_i$  denotes a vector of individual level control variables, which includes a gender indicator variable, age and age squared, occupation fixed effects, quality of living condition fixed effects, and an indicator variable that equals one if he or she is living in an urban location.  $X_e$  denotes a vector of ethnicity level control variables, including an indicator that equals one if the ethnic group was contact by early European explorers, an indicator that equals one if a railway was build connecting the land inhabited by the ethnic group, and the measure of historic exposure of the ethnic group to the slave trade, which is taken from Nunn and Wantchekon (2009).  $X_v$  include the village level indicator variables that capture the historic exposure of the village to railway lines and early European explorers.

Estimates of (1) are reported in table 2. The table reports estimates from a linear probability model (LPM). Estimates using a logit or probit model are qualitatively similar. The first three columns report estimates where the dependent variable is an indicator that equals one if the respondent reports being any Christian religion. Column (1) reports estimates with the ethnicity level mission variable included only. Column (2) includes the town level mission variable only, while column (3) both variables. The estimates show a positive effect of missionary activity, measured either at the ethnicity or village level, on long-term conversion to Christianity. All coefficients are positive and statistically significant. Columns (4) to (6) report the same estimates, but with the dependent variable being an indicator for the respondent being either catholic or Protestant. The results are also similar.

All specifications that are reported throughout the paper control for country fixed effects, and therefore are identified from within-country variation only. Omitting the country fixed effects produces estimates that are qualitatively identical to the estimates with country fixed effects, except the estimated magnitudes are typically twice as large as those reported here. There are

Table 2: The relationship between the exposure of an individual's ancestors to missions, the number of missions that were in the individual's town, and the individual's religion today.

	Indicator variable for the religion of respondent					
	Christian			Protestant or Catholic		
	(1)	(2)	(3)	(4)	(5)	(6)
<b>Mission stations among ethnic group</b>	<b>0.0241**</b>		<b>0.0174**</b>	<b>0.0265***</b>		<b>0.0214***</b>
	<b>(0.0093)</b>		<b>(0.0081)</b>	<b>(0.00785)</b>		<b>(0.0071)</b>
<b>Mission stations in town</b>		<b>0.0179***</b>	<b>0.0117**</b>		<b>0.0134***</b>	<b>0.0060</b>
		<b>(0.0033)</b>	<b>(0.0048)</b>		<b>(0.0036)</b>	<b>(0.0052)</b>
Individual-level controls	Yes	Yes	Yes	Yes	Yes	Yes
Historic ethnicity-level controls	Yes	No	Yes	Yes	No	Yes
Historic village-level controls	No	Yes	Yes	No	Yes	Yes
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	21,201	20,755	20,755	21,201	20,755	20,755
Number of clusters	186	2,711	186 / 2,711	186	2,711	186 / 2,711
R-squared	0.39	0.36	0.39	0.34	0.32	0.34

*Notes*: The table reports OLS estimates. The unit of observation is an individual. Coefficients are reported, with clustered standard errors in brackets. The individual controls are for age, age squared, a gender indicator variable, 5 living conditions fixed effects, 25 occupation fixed effects, and an indicator for whether the respondent lives in an urban location. The historic ethnicity controls include the log number of slaves exported per land area during the Atlantic and Indian Ocean slave trades, an indicator variable if the ethnicity was contacted by a European explorer prior to colonial rule (1885), and an indicator variable equal to one if a railway line dissected the region the ethnicity was living during colonial rule. \*\*\*, \*\* and \* indicates significance at the 1, 5 and 10% level.

number of potential explanations for this fact. First, it may be that much of the long-term effect of missionary activity during the colonial period operates at the national level, with religion being institutionalized, and many cases, with a state religion being adopted (Barro and McCleary, 2005, see e.g.,). Once one controls for country fixed effects, the effect of historic missionary activity at the national level is purged from the estimates reducing the coefficients. Second, there may be a host of country-level characteristics, including historic colonial policies, that may be biasing upwards the estimated effect of Protestant missionary activity, and once country fixed effects are controlled for, the bias is reduced and the estimated coefficients decrease. Finally, measurement error may be great at the sub-national level, resulting in a greater downward bias for the within estimates.

The decline in the magnitude of the coefficients when country fixed effects are included is consistent with the finding in Gallego and Woodberry (2009) that all of their estimates become statistically insignificant once country fixed effects are controlled for. A potential reason why I am still able to obtain significant estimates in my analysis may be because the underlying analysis is at a slightly finer level than the sub-national analysis in Gallego and Woodberry (2009). Their study examines variation across 180 African regions, while my analysis exploits variation across 186 ethnicities and across approximately 2,700 villages.

## **B. The Bible and Religious Conversion**

We examine potential impacts of the translation and distribution of the Bible on religious conversion. We estimate the following equation.

$$I'_{i,e,v,c} = \alpha_c + \delta M_e^{BFBS} + \eta M_v^{BFBS} + \lambda I_e^{Bible} + \kappa I_e^{NoBible} + \mathbf{X}_i \Gamma + \mathbf{X}_e \Lambda + \mathbf{X}_v \Phi + \varepsilon_{i,e,v,c} \quad (2)$$

All variables are as defined for equation (1), except now the vectors of ethnicity and village-level control variables,  $\mathbf{X}_e$  and  $\mathbf{X}_v$  also include the number of mission, measured at the ethnicity and village levels,  $\beta M_e$  and  $\gamma M_v$ .

$I_e^{Bible}$  and  $I_e^{NoBible}$  are indicator variables that equal one if the Bible was translated (and not translated, respectively) into the language of ethnic group  $e$  by 1924. The omitted category is for ethnic groups for which we do not have evidence of either translation or not translation. The coefficients  $\lambda$  and  $\kappa$  provide an estimate of the impact of the translation of the Bible on conversion.

The variables  $M_e^{BFBS}$  and  $M_v^{BFBS}$  measure the number of British Foreign Bible Society Bible depots among ethnic group  $e$  and in village  $v$ . The coefficients  $\delta$  and  $\eta$  provide estimates of the

Table 3: The relationship between the exposure of an individual’s ancestors to the Bible, the number of Bible depots that were in the individual’s town, and the individual’s religion today.

	Indicator variable for the religion of respondent							
	Christian				Protestant or Catholic			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<b>Bible translated</b>	<b>-0.0988**</b>			<b>-0.0872**</b>	<b>-0.0748*</b>			<b>-0.0657*</b>
	<b>(0.0424)</b>			<b>(0.0420)</b>	<b>(0.0389)</b>			<b>(0.0383)</b>
<b>Bible not translated</b>	<b>-0.0316</b>			<b>-0.0282</b>	<b>-0.0003</b>			<b>0.0008</b>
	<b>(0.0311)</b>			<b>(0.0281)</b>	<b>(0.0302)</b>			<b>(0.0271)</b>
<b>Bible depot among ethnic group</b>		<b>0.0183*</b>		<b>0.0171*</b>		<b>0.0200**</b>		<b>0.0193*</b>
		<b>(0.0095)</b>		<b>(0.0092)</b>		<b>(0.0101)</b>		<b>(0.00995)</b>
<b>Bible depot in town</b>			<b>-0.0350*</b>	<b>-0.0490*</b>			<b>-0.0000</b>	<b>-0.0142</b>
			<b>(0.0196)</b>	<b>(0.0256)</b>			<b>(0.0222)</b>	<b>(0.0269)</b>
Individual level controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ethnicity level controls	Yes	Yes	No	Yes	Yes	Yes	No	Yes
Village level controls	No	No	Yes	Yes	No	No	Yes	Yes
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	21,201	21,201	20,755	20,755	21,201	21,201	20,755	20,755
Number of clusters	186	186	2,711	186 / 2,711	186	186	2,711	186 / 2,711
R-squared	0.39	0.38	0.38	0.40	0.34	0.34	0.33	0.35

*Notes:* The table reports OLS estimates. The unit of observation is an individual. Coefficients are reported, with clustered standard errors in brackets. The individual controls are for age, age squared, a gender indicator variable, 5 living conditions fixed effects, 25 occupation fixed effects, and an indicator for whether the respondent lives in an urban location. The historic ethnicity controls include the log number of slaves exported per land area during the Atlantic and Indian Ocean slave trades, an indicator variable if the ethnicity was contacted by a European explorer prior to colonial rule (1885), and an indicator variable equal to one if a railway line dissected the region the ethnicity was living during colonial rule. \*\*\*, \*\* and \* indicates significance at the 1, 5 and 10% level.

impact of historic proximity to Bible depots that distributed Bibles free of charge or at very low prices.

Estimates are reported in table 3. The estimates do not provide strong evidence that increased exposure to the Bible resulted in more conversion. The translation of the Bible into the language of an ethnic group is actually negatively correlated with conversion to Christianity. More Bible depots in a town is negatively correlated with conversion, although two of the four coefficients are not significant. The only evidence of a positive conversion effect from exposure to the Bible comes from the variable  $M_e^{BFBS}$ . The positive coefficients suggest that belonging to an ethnic group that was historically close to a Bible depot increases the likelihood of the individual being Christian today. However, the coefficients, although consistently positive are only marginally significant.

The lack of robust evidence for exposure to the Bible having a large effect on conversion is consistent with the qualitative history of missionary activity in Africa. Missionaries realized early

that Africans were most successfully converted when along with conversion came benefits, such as education and training or access to health care. The benefits, rather than the word of god, were the most effective means of conversion historically.

### C. Protestants, Catholics, and Religious Conversion

Much of the pre-existing qualitative and quantitative literature distinguishes between the impact of Protestant and Catholic missions (Woodberry, 2004, Woodberry and Shah, 2004, Gallego and Woodberry, 2009). I next examine whether there is evidence of differential impacts of Protestant and Catholic missions on religious conversion. I construct separate measures for Catholic and Protestant missions at both the ethnicity and the village levels, and include them in the estimating equation.

The relationship between missionary activity and religion is examined using the ethnicity level measures of missionary activity, but distinguishing between Catholic and Protestant missions:

$$I_{i,e,v,c}^r = \alpha_c + \beta_p M_e^{Prot} + \gamma_p M_v^{Prot} + \beta_c M_e^{Cath} + \gamma_c M_v^{Cath} + \mathbf{X}_i \Gamma + \mathbf{X}_e \Lambda + \mathbf{X}_v \Phi + \varepsilon_{i,e,v,c} \quad (3)$$

where, as before,  $r$  is a religion, and the dependent variable  $I_{i,e,v,c}^r$  is an indicator variable that equals one if individual  $i$  reports being religion  $r$ . I now examine the following religious categories: (i) Protestant or Catholic, (ii) Protestant, and (iii) Catholic.  $i$  continues to index individuals,  $e$  ethnic groups,  $v$  villages, and  $c$  countries. The variables  $M_e^{Prot}$  and  $M_e^{Cath}$  are measures of the intensity of exposure of ethnic group  $e$  to Protestant and Catholic missions in 1924. They are measured in the same units as  $M_e$  above.  $\mathbf{X}_i$  denotes the same vector of individual level control variables as in equation (1): a gender indicator variable, age and age squared, occupation fixed effects, quality of living condition fixed effects, and an indicator variable that equals one if he or she is living in an urban location.  $\mathbf{X}_e$  denotes the same vector of ethnicity level control variables: an indicator variable that equals one if the Bible was translated into the language of the ethnic group, an indicator that equals one if the ethnic group was contact by early European explorers, an indicator that equals one if a railway was build connecting the land inhabited by the ethnic group, and the natural log of the normalized number of slave exported during the Indian Ocean and trans-Atlantic slave trades.

Estimates of (3) are reported in the odd numbered columns of table 4. The table reports 3 pairs of columns. In the first two columns, the dependent variable is an indicator variable that



equals one if the respondent is either Catholic or Protestant. In columns (3) and (4), and (5) and (6), the dependent variable equals one if the respondent is Protestant, and if the respondent is Catholic, respectively. The estimates indicate that while Protestant missions had a positive effect on conversion to Protestantism, Catholic missions appear to have had no effect at all on conversions (at least in the long-run).

The even numbered columns of table 4 also control for the village level covariates, including the village level measures of missionary activity. The results confirm the findings without these controls included. Protestant missions continue to have the same robust and statistically significant effects on conversion, while Catholic missions have no effect.

The finding of no effect of Catholic mission on long-run conversion, even long-run conversion to Catholicism is puzzling and potentially troubling. It may reflect the fact that Catholic missionaries and their methods simply were not effective in conversion. But it may also reflect poorer quality data on the location of Catholic missions. This is particularly a concern since the data were constructed by Roome (1924), who himself was a Protestant missionary. Therefore, less care may have been taken when mapping the Catholic missions, since it may have been less important for the author to understand the locations of Catholic missions. Alternatively, the precise location and even existence of all Catholic missions may have been unknown to him. This would have introduced measurement error, which if classical would bias the coefficients of the Catholic mission variables downwards.

In an attempt to distinguish between these two explanations for the estimated zero coefficients for Catholic missions – ineffectiveness of missionary (at least in the long-run) vs. measurement error – we construct a second measure of the location of Catholic mission. The data, which are from a slightly earlier time period, 1889, were taken from a French map constructed by Léon Bethune with the help of the Société Saint Augustin. The map shows Catholic mission located in Africa at that time.

Using the alternative measure of the presence of Catholic missions in Colonial Africa, we undertake two strategies. One is to use this rather than our baseline source to construct our measure of Catholic missions at both the village and ethnicity levels. Doing this poses a slightly problem because our Protestant mission variables are then from a different time period. To try and alleviate this we collect measures of the location of Protestant missions in 1899, a period that is much closer to 1889 than the baseline measure which is from 1924. The data are from Dennis (1902). The second

Table 4: The relationship between the exposure of an individual's ancestors to missions, the number of missions that were in the individual's town, and the individual's religion today.

	Dependent variable: Indicator variable for the self-reported religion of the respondent					
	Protestant or Catholic		Protestant		Catholic	
	(1)	(2)	(3)	(4)	(5)	(6)
<b><u>Number among ethnic group:</u></b>						
Catholic missions	.002 (.007)	.002 (.007)	.002 (.006)	.004 (.006)	-.0002 (.006)	-.001 (.006)
<b>Protestant missions</b>	<b>.022***</b> <b>(.008)</b>	<b>.019**</b> <b>(.008)</b>	<b>.015**</b> <b>(.007)</b>	<b>.013**</b> <b>(.006)</b>	<b>.007</b> <b>(.006)</b>	<b>.006</b> <b>(.006)</b>
<b><u>Number in town:</u></b>						
Catholic missions		.002 (.011)		-.005 (.011)		.007 (.011)
Protestant missions		.010 (.008)		-.004 (.012)		.015 (.010)
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Individual controls	Yes	Yes	Yes	Yes	Yes	Yes
Ethnicity level controls	Yes	Yes	Yes	Yes	Yes	Yes
Village level controls	No	Yes	No	Yes	No	Yes
Number of observations	21,201	20,755	21,201	20,755	21,201	20,755
Number of clusters	186	185 / 2,693	186	185 / 2,693	186	185 / 2,693
R-squared	0.39	0.18	0.35	0.16	0.16	0.17

*Notes:* The table reports estimates from a linear probability model. The unit of observation is an individual. Coefficients are reported, with clustered standard errors in brackets. The individual controls are for age, age squared, a gender indicator variable, 5 living conditions fixed effects, 25 occupation fixed effects, and an indicator for whether the respondent lives in an urban location. The ethnicity level controls include the log number of slaves exported per land area during the Atlantic and Indian Ocean slave trades, an indicator variable if the ethnicity was contacted by a European explorer prior to colonial rule (1885), an indicator variable equal to one if a railway line dissected the region the ethnicity was living during colonial rule, the measure of prevalence of BFBS Bible depots, and indicator variables for whether the bible was translated into the ethnic groups language by 1924. The village level controls include an indicator variable if a town was contacted by a European explorer prior to colonial rule (1885), an indicator variable equal to one if a railway line dissected the village, and the village-level measure of prevalence of BFBS Bible depots. \*\*\*, \*\* and \* indicates significance at the 1, 5 and 10% level.

strategy is to use the 1889 Catholic missions variables as an instrument for the 1924 variables. If the 1889 data are measured more precisely, also subject to random measurement error, then the IV regressions will produce estimates that suffer less from attenuation bias.

The results are reported in table 5. Columns (1) and (4) replace the 1924 Catholic mission variables with the same variables constructed using the 1889 data. Column (1) reports estimates with the ethnicity-level variables and column (4) reports estimates also controlling for the village level measures. As shown, the results of a zero effect of Catholic missions on long-term conversion to Catholicism remains robust. Columns (2) and (5) report the same estimates, but also use the earlier Protestant data. The results are similar. Columns (3) and (6) report the IV estimates. These produce the same results. Catholic missions continue to have no effect on conversion. These results provide evidence against the measurement error explanation for the results of table 4. The results using an alternative data source also suggest that Catholic missionary activity has not been effective at maintaining conversions in the long-run.

## **5. Empirical Results: Education, Gender, and Democracy**

### ***A. Education***

I next examine the relationship between historic missionary activity and educational attainment. I re-estimate equation (3), with the respondent's educational attainment (measured in years) as the dependent variable. The estimates are reported in table 6.

The results show that the historic prevalence of Protestant missions, particularly when measured at the ethnicity level, have a strong robust positive relationship with educational attainment today. This remains true even when I control for the education of the respondent today, suggesting that the education effect is working through a channel other than the current religion of the individual.

The most explanation, which consistent with the arguments and cross-country evidence of Woodberry (2004), is that historic Protestant missionary activity had long-term impacts on the level of education. These effects could occur through a variety of channels. First, Protestant missionaries, by preaching the importance of education may have altered people's views about the importance of education. If these individuals transmitted these attitudes and beliefs to their children, then the descendants of those in contact with Protestant missions, would also value

Table 5: The relationship between the exposure of an individual's ancestors to missions, the number of missions that were in the individual's town, and whether the individual is Catholic today.

	Indicator variable for the self-reported religion of the respondent being Catholic					
	OLS	OLS	IV	OLS	OLS	IV
	(1)	(2)	(3)	(4)	(5)	(6)
<b>Number among ethnic group:</b>						
<b>Catholic missions (in 1889)</b>	<b>.005</b>	<b>.007</b>		<b>.005</b>	<b>.007</b>	
	<b>(.013)</b>	<b>(.013)</b>		<b>(.013)</b>	<b>(.014)</b>	
Protestant missions (in 1899)		-.002			-.001	
		(.005)			(.001)	
<b>Catholic missions (in 1924)</b>			<b>.045</b>			<b>-.146</b>
			<b>(.151)</b>			<b>(.155)</b>
Protestant missions (in 1924)	.007		-.007	.005		.049
	(.005)		(.044)	(.005)		(.048)
<b>Number in town:</b>						
<b>Catholic missions (in 1889)</b>				<b>.005</b>	<b>-.038</b>	
				<b>(.013)</b>	<b>(.025)</b>	
Protestant missions ( in 1899)					.002	
					(.004)	
<b>Catholic missions (in 1924)</b>						<b>.229</b>
						<b>(.370)</b>
Protestant missions ( in 1924)				.015		-.003
				(.009)		(.053)
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Individual controls	Yes	Yes	Yes	Yes	Yes	Yes
Ethnicity level controls	Yes	Yes	Yes	Yes	Yes	Yes
Village level controls	No	No	No	Yes	Yes	Yes
Number of observations	21,201	21,201	21,201	20,755	20,755	20,755
Number of clusters	186	186	186	185 / 2,693	185 / 2,693	185 / 2,693
R-squared	0.11	0.11	0.09	0.11	0.11	0.11

Notes : The table reports estimates from a linear probability model. The unit of observation is an individual. Coefficients are reported, with clustered standard errors in brackets. Control variables are as described in table 3. In column 3, the log number of catholic missions among an ethnic group in 1889 is used as an instrument for the log number of catholic missions among an ethnic group in 1924. In column 6, in addition the number of catholic missions in a town in 1889 is used as an instrument for the log number of catholic missions in a town in 1924. \*\*\*, \*\* and \* indicates significance at the 1, 5 and 10% level.

Table 6: The relationship between the exposure of an individual's ancestors to missions, the number of missions that were in the individual's town, and the respondent's education today.

	Dependent variable: Years of education of the respondent					
	(1)	(2)	(3)	(4)	(5)	(6)
<b><u>Catholic missions:</u></b>						
Number among ethnic group	.011 (.029)		-.005 (.030)	.010 (.024)		-.006 (.026)
Number in town		.116 (.071)	.129 (.086)		.110 (.069)	.122 (.084)
<b><u>Protestant missions:</u></b>						
Number among ethnic group	<b>.105**</b> (.047)		<b>.100**</b> (.044)	<b>.077**</b> (.037)		<b>.077**</b> (.035)
Number in town		<b>.147***</b> (.045)	<b>.094**</b> (.047)		<b>.098**</b> (.042)	<b>.066</b> (.043)
<b><u>Current religion:</u></b>						
Catholic				1.41*** (.136)	1.52*** (.089)	1.37*** (.131)
Protestant				1.48*** (.138)	1.61*** (.090)	1.45*** (.130)
Other Christian				1.32*** (.137)	1.41*** (.091)	1.29*** (.128)
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Ethnicity level controls	Yes	No	Yes	Yes	No	Yes
Village level controls	No	Yes	Yes	No	Yes	Yes
Number of observations	21,218	20,874	20,766	21,136	20,798	20,690
Number of clusters	186	2,710	185/2,692	186	2,710	185/2,692
R-squared	0.47	0.47	0.47	0.48	0.48	0.48

*Notes:* The table reports OLS estimates. The unit of observation is an individual. Coefficients are reported, with clustered standard errors in brackets. The individual controls are for age, age squared, a gender indicator variable, 5 living conditions fixed effects, 25 occupation fixed effects, and an indicator for whether the respondent lives in an urban location. The ethnicity level controls include the log number of slaves exported per land area during the Atlantic and Indian Ocean slave trades, an indicator variable if the ethnicity was contacted by a European explorer prior to colonial rule (1885), an indicator variable equal to one if a railway line dissected the region the ethnicity was living during colonial rule, the measure of prevalence of BFBS Bible depots, and indicator variables for whether the bible was translated into the ethnic groups language by 1924. The village level controls include an indicator variable if a town was contacted by a European explorer prior to colonial rule (1885), an indicator variable equal to one if a railway line dissected the village, and the village-level measure of prevalence of BFBS Bible depots. \*\*\*, \*\* and \* indicates significance at the 1, 5 and 10% level.

education more, and therefore have more education today. This explanation is most consistent with the estimates for the ethnicity based variables. The positive and significant coefficients show that the descendants of those in greater contact with Protestant missions today are more educated.

An alternative mechanism is that Protestant missionaries, because they valued education, immediately established schools and universities. In fact, in British colonies most of the schools in the colonies were established by missionaries rather than by the colonial administration. Because these investments in educational infrastructure tend to persist over time, and even until today (see e.g., Huillery, 2008), towns and villages that historically had more missionary activity may today have more schools and therefore the equilibrium level of education is higher. This channel is captured by the historic mission variables measured at the village level. The variable enters with a positive coefficient, which is generally significant. This suggests that villages that had more Protestant missions in the past have more educated inhabitants today.

Given that the two Protestant mission variables, measured at the village and ethnicity levels, capture two different transmission mechanisms, a natural question is which is more important. Because the two variables are measured in different units, a direct comparison of their coefficients is uninformative. Instead, I compare standardized beta coefficients, which are unit-less coefficients that report the number of standard deviation increases in the dependent variable per one unit increase in the independent variable. This comparison suggests that the effect of the ethnicity-level measure is approximately three times the magnitude of the effect of the village-level measure. According to the estimates of column 3, the beta coefficient for the ethnicity-based measure is .032 and for the village-level measure is .005. For the estimates from column (6), the figures are .034 and .010, respectively. Therefore, the evidence suggests an important role of missions was to alter individual's values, attitude and beliefs about the importance as education, as well as establishing institutions of mass education, which have tended to persist over time.

The lack of a robust relationship between Catholic missionary activity and education is consistent with the historical fact that Protestant missionaries were much more active in providing schooling than Catholic missionaries (Woodberry, 2004).

## ***B. Educational Gender Gap and Attitudes Towards Females***

A number of studies have emphasized how the Protestant religion may be responsible for reducing the educational gender gap, by emphasizing the importance of educating women. In Europe,

Martin Luther urged the education of women so that they too would be able read the Bible. (Becker and Wöeßmann, 2007) empirically test for this effect of the Protestant religion by looking at village level data from the Prussian Census of 1816. They find that a negative relationship between the prevalence of the Protestant religion and the Education gender gap (male minus female).

Using our data we examine whether the long-term effects of Protestant missions on education differ for males and females. We estimate the same regression equations as in table 6, but allow the effect of missions on current education to differ depending on the gender of the respondent. We do this by interacting our baseline mission variables with an indicator variable that equals one if the respondent is female. If, for example, the Protestant religion had no differential impact on males and females, then we expect this additional interaction term to enter with a coefficient close to zero. If the Protestant religion had a particular emphasis on educating girls (even more so than boys), then we expect the interaction to be positive.

Estimation results are reported in table 7. Consider first the Protestant mission variables. The interaction between the missions measure and the female indicator variable is positive in all specifications. Further, for the ethnicity-based missions variables, it is always statistically significant. These results hold even when controlling for the current religion of the respondent. Therefore, the long-term effect is in addition to mechanisms that work through the current religion of the respondent. For example, historic Protestant missions, may have created a belief of the importance of female education that has been transmitted subsequently.

Next, consider the Catholic mission variables. Recall that we found no effect of Catholic missions on average education. However, once we allow the effects to differ by gender, a pattern begins to emerge. The baseline mission variables now all have positive coefficients, while the mission variables interacted with the female indicator variable enter with negative coefficients. As well, the sum of the two coefficients, which gives the total effect for females is generally close to zero. Although the robustness of this finding is unclear, with many of the coefficients being insignificant or marginally significant, this is consistent with education having a small positive impact on male education, but no impact on female education.

The findings of table 7 raise an interesting possibility. It may be that historic Protestant influence altered not only individual's beliefs about the importance of female education, but also of the role of women in society more generally. That is, the Protestant religion may have resulted in a belief about the equality of men and women. To explore this possibility we consider two questions

Table 7: The relationship between the exposure of an individual's ancestors to missions, the number of missions that were in the individual's town, and the respondent's education today, allowing for differential effects by gender.

	Dependent variable: Years of education of the respondent					
	(1)	(2)	(3)	(4)	(5)	(6)
<u>Catholic missions:</u>						
Number among ethnic group	.056 (.041)		.036 (.042)	.054 (.037)		.033 (.039)
Number among ethnic group × Female	-.094* (.052)		-.087* (.052)	-.089* (.051)		-.082 (.051)
Number in town		.205** (.083)	.171 (.114)		.197** (.083)	.165 (.112)
Number in town × Female		-.174** (.074)	-.078 (.097)		-.167** (.074)	-.077 (.099)
<u>Protestant missions:</u>						
Number among ethnic group	.049 (.055)		.053 (.052)	.025 (.046)		.035 (.045)
<b>Number among ethnic group × Female</b>	<b>.116** (.052)</b>		<b>.106** (.053)</b>	<b>.107** (.050)</b>		<b>.095** (.050)</b>
Number in town		.057 (.051)	.037 (.048)		.005 (.049)	.002 (.044)
<b>Number in town × Female</b>		<b>.137*** (.046)</b>	<b>.067 (.065)</b>		<b>.148*** (.046)</b>	<b>.084 (.062)</b>
Religion Controls	No	No	No	Yes	Yes	Yes
Individual controls	Yes	Yes	Yes	Yes	Yes	Yes
Ethnicity controls	Yes	No	Yes	Yes	No	Yes
Village controls	No	Yes	Yes	No	Yes	Yes
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	21,218	20,874	20,766	21,136	20,798	20,690
Number of clusters	186	2,710	185 / 2,692	186	2,710	185 / 2,692
R-squared	0.47	0.47	0.47	0.48	0.48	0.48

*Notes:* The table reports OLS estimates. The unit of observation is an individual. Coefficients are reported, with clustered standard errors in brackets. The individual controls are for age, age squared, a gender indicator variable, 5 living conditions fixed effects, 25 occupation fixed effects, and an indicator for whether the respondent lives in an urban location. The historic ethnicity controls include the log number of slaves exported per land area during the Atlantic and Indian Ocean slave trades, an indicator variable if the ethnicity was contacted by a European explorer prior to colonial rule (1885), an indicator variable equal to one if a railway line dissected the region the ethnicity was living during colonial rule, and indicator variables for whether the bible was translated into the ethnic groups language by 1924. \*\*\*, \*\* and \* indicates significance at the 1, 5 and 10% level.



Table 8: The relationship between the exposure of an individual’s ancestors to missions, the number of missions that were in the individual’s town, and the respondent’s views about gender differences.

	Women should have equal rights and treatment				Women should have same chance of being elected as men			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<u>Catholic missions:</u>								
Number among ethnic group	-.012 (.010)		-.011 (.009)	-.012 (.013)	.010 (.007)		.013** (.007)	.008 (.008)
Number in town		-.031* (.016)	-.028 (.015)	-.044 (.020)		-.028* (.015)	-.033** (.017)	-.052** (.022)
<u>Protestant missions:</u>								
Number among ethnic group	.005 (.011)		.002 (.011)	.003 (.014)	-.002 (.009)		-.005 (.009)	-.005 (.009)
Number in town		.014 (.011)	.009 (.011)	.004 (.015)		.015 (.010)	-.008 (.012)	.014 (.015)
Men only	No	No	No	Yes	No	No	No	Yes
Individual controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ethnicity level controls	Yes	No	Yes	Yes	Yes	No	Yes	Yes
Village level controls	No	Yes	Yes	Yes	No	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	19,762	19,428	19,320	9,697	20,833	20,500	20,757	10,241
Number of clusters	185	2,575	184 / 2,557	177 / 2,483	186	2,705	185 / 2,692	178 / 2,611
R-squared	0.13	0.12	0.13	0.13	0.12	0.11	0.20	0.20

*Notes* : The table reports OLS estimates. The unit of observation is an individual. Coefficients are reported, with clustered standard errors in brackets. The individual controls are for age, age squared, a gender indicator variable, 5 living conditions fixed effects, 25 occupation fixed effects, and an indicator for whether the respondent lives in an urban location. The historic ethnicity controls include the log number of slaves exported per land area during the Atlantic and Indian Ocean slave trades, an indicator variable if the ethnicity was contacted by a European explorer prior to colonial rule (1885), an indicator variable equal to one if a railway line dissected the region the ethnicity was living during colonial rule, and indicator variables for whether the bible was translated into the ethnic groups language by 1924. \*\*\*, \*\* and \* indicates significance at the 1, 5 and 10% level.

about the role of women relative to men from the Afrobarometer survey. The first question asks the respondent whether or not they agree with the following two statements: (A) In our country, women should have equal rights and receive the same treatment as men, (B) Women have always been subject to traditional laws and customs and should remain so. The respondent can choose to “agree strongly” with either (A) or (B) or to “agree very strongly” with (A) or (B). The second question asks the respondent their view on the following two statements: (A) Women should have the same chance of being elected to political office as men, (B) Men make better political leaders than men, and should be elected rather than women. Using the responses we code the respondents’ answers to two variables that takes on the value 1, 2, 3, or 4, and is increasing in their agreement with statement (A) over statement (B). Therefore, the variable is increasing in the respondent’s belief that women and men should have equal rights.

Estimates are reported in table 8. Columns (1)–(3) and (5)–(7) report estimates of equation (3), but with the two gender equality variables as the outcomes of interest. We fail to find any evidence of a positive effect of Protestant missionary activity on these more general attitudes about the equality of men and women. (The same is also true for Catholic missions.) It is possible that only the attitudes of males were affected by missionary activity, and this is the reason for the weak results, which includes both males and females in the sample. We check for this in columns (4) and (8), which report estimates from the column (3) and (7) specifications, but with only males included in the sample. The findings are similar when we restrict the sample to males only.

Although we find evidence consistent with Protestant missionary activity altering beliefs about the importance of education for females, as measured by female educational outcomes, we do not find evidence of an effect on attitudes about gender more generally.

### C. *Education and Democracy*

Woodberry (2004) hypothesizes that a history of Protestant missionary activity supported the evolution of stable well-functioning democracies. He cites one of the reasons being the fact that the Protestant religion promotes education, combined with the potential beneficial effects of education on democracy.

A number of studies have documented a cross-country relationship between education and democracy. For example, Glaeser *et al.* (2007) provide cross-country evidence suggesting that education increases the benefits to civic engagement, and therefore promotes democracy. Here, I test the hypotheses using the Afrobarometer data. I consider the following estimating equation:

$$Y_{i,d,c} = \alpha_d + \lambda E_i + \mathbf{X}_i \Gamma + \varepsilon_{i,d,c} \quad (4)$$

where  $d$  indexes districts, and as before  $i$  indexes individuals, and  $c$  countries.  $Y_{i,d,c}$  denotes our outcomes of interest which vary at the individual level. We consider five different outcomes: (i) A measure of the individuals support for democracy, (ii) an indicator that equals one if he or she voted in the last national election, (iii) a measure that is increasing in the respondent's support of the view that it is important to question the actions of leaders, (iv) an index that is increasing in their support for the view that violence is never a justified action in politics, and (v) an index that is increasing in their support of the view that everyone should be allowed to vote.

Table 9: The relationship between education and democracy across individuals.

	Support democracy		Voted in the last national election		It is important to question the actions of leaders		Use of violence never justified in politics		All people should be allowed to vote	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Years of education	.010*** (.001)	.010*** (.001)	.015*** (.002)	.016*** (.002)	.019*** (.002)	.018*** (.002)	.004** (.002)	.004** (.002)	-.008*** (.002)	-.007*** (.002)
Individual controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country fixed effects	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
District fixed effects	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Number of observations	18,254	18,254	21,320	21,320	19,710	19,710	20,292	20,292	19,829	19,829
R-squared	0.08	0.19	0.19	0.25	0.05	0.17	0.06	0.17	0.06	0.17

*Notes:* The table reports OLS estimates. The unit of observation is an individual. Coefficients are reported, with robust standard errors in brackets. The individual controls are for age, age squared, a gender indicator variable, 5 living conditions fixed effects, 25 occupation fixed effects, and an indicator for whether the respondent lives in an urban location. \*\*\*, \*\* and \* indicates significance at the 1, 5 and 10% level.

The results are reported in table 9. Five pairs of columns report sets of regression for each of our five outcome variables. The first column of each pair (i.e., the odd numbered column) reports estimates with country fixed effects, while the second (even numbered) column reported estimates with district fixed effects. The results provide strong evidence that more educated individuals are also more likely to support democracy as a form of governance, they are more likely to vote, they are more likely to question the actions of their leaders, and they are more likely to believe that violence should never be used in politics. These relationships provide strong support for Glaeser *et al.*'s (2007) argument that democracy needs education. However, the results from columns (9) and (10) provide an important caveat to their argument. Although it is true that more education individuals are more likely to support democracy, they appear to support a limited form of democracy that aligns with their self-interest. The estimates from columns (9) and (10) show clearly that more educated individuals are more likely to believe that voting rights should be limited, and should not be extended to all citizens.

#### ***D. Democratic Participation and Attitudes about Democracy***

To this point I have documented evidence that Protestant missionary activity during the colonial period had a long-term impact on conversion and education. Education in turn, is strongly correlated with an individuals attitude towards democracy and forms of civic participation. Therefore, consistent with the arguments and cross-country evidence of Woodberry (2004), the analysis here

provides evidence that a history of Protestant missionary activity may have promoted democracy through increased education.

I now examine whether there is evidence that missionary activity has any additional effects on democracy, once the education channel is taken into account. I examine this by estimating the following equation:

$$Y_{i,e,v,c}^j = \alpha_c + \beta_p M_e^{Prot} + \gamma_p M_v^{Prot} + \beta_c M_e^{Cath} + \gamma_c M_v^{Cath} + \mathbf{X}_i \Gamma + \mathbf{X}_e \Lambda + \mathbf{X}_v \Phi + \varepsilon_{i,e,v,c} \quad (5)$$

where as before  $Y_{i,d,c}^j$  denotes our five measures (indexed by  $j$ ) of individuals' attitude towards democracy and their civic engagement that were examined in table 9. The vector of individual control variables includes 20 education fixed effects. By controlling explicitly for each individual's educational attainment, our estimated missionary activity coefficients –  $\beta_p$ ,  $\beta_c$ ,  $\gamma_p$ , and  $\gamma_c$  – capture any effects of colonial missionary activity on the dependent variable that does not work through the increased accumulation of human capital.

Estimates of equation (5) are reported in table 10. As shown, there is little evidence that the missionary variables are robustly correlated with any of outcome variables of interest. For Protestant missions, the only coefficients that are significant indicate that Protestant missions are actually negatively correlated with the whether individuals vote. For Catholic missions, the only significant coefficients show a negative relationship between Catholic missions and agreement with the view that voting rights should be extended to all.

## 6. Conclusions

Combining historic information on the locations of Catholic and Protestant mission in colonial Africa, I have examined the long-term impact of Protestant and Catholic missionary activity during the colonial period on religious conversion, education, civic participation and attitudes towards democracy today. Using variation across villages and ethnicities within 17 sub-Saharan African countries, I have provided evidence consistent with Protestant missions having a strong effects on conversion, and on increased educational attainment. I also found that Catholic missions had no effect on conversion, and no effect on education. The results are in line with the arguments of Woodberry and Shah (2004), and confirm the cross-country analysis of Woodberry (2004, 2009).

Linking education to democracy, I found that, consistent with the cross-country analysis of Glaeser *et al.* (2007), more educated individuals favor democracy, are more likely to vote, and are

Table 10: The relationship between the exposure of an individual’s ancestors to missions, the number of missions that were in the individual’s town, and the respondent’s attitudes towards democracy and civic participation today.

	Support democracy			Voted in the last national election			It is important to question the actions of leaders			Use of violence never justified in politics			All people should be allowed to vote		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
<u>Catholic missions:</u>															
Number among ethnic group	.003 (.003)		.005* (.003)	.006 (.004)		.007* (.004)	-.001 (.008)		-.004 (.008)	.010* (.006)		.012* (.006)	-.021*** (.009)		-.019*** (.007)
Number in town		.001 (.007)	-.001 (.008)		-.003 (.012)	-.005 (.013)		.004 (.017)	.004 (.021)		-.009 (.014)	-.017 (.017)		-.044*** (.014)	-.034** (.015)
<u>Protestant missions:</u>															
Number among ethnic group	.003 (.003)		.002 (.003)	-.009 (.006)		-.001 (.005)	.008 (.008)		.010 (.008)	-.004 (.005)		-.004 (.005)	.004 (.006)		.005 (.006)
Number in town		-.005 (.005)	-.007 (.005)		-.027*** (.007)	-.025*** (.010)		.017 (.011)	.013 (.012)		-.005 (.009)	-.007 (.012)		.001 (.009)	.001 (.010)
Individual controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ethnicity level controls	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes
Village level controls	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Country fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	18,153	17,831	17,733	21,209	20,865	20,757	19,602	19,267	19,162	20,186	19,857	19,754	19,719	19,387	19,280
Number of clusters	185	2,677	184/2,657	186	2,710	185/2,692	183	2,577	182/2,560	185	2,698	184/2,681	185	2,571	184/2,553
R-squared	0.08	0.08	0.08	0.20	0.20	0.20	0.05	0.05	0.05	0.06	0.06	0.06	0.07	0.06	0.07

Notes: The table reports OLS estimates. The unit of observation is an individual. Coefficients are reported, with clustered standard errors in brackets. The individual controls are for age, age squared, a gender indicator variable, 5 living conditions fixed effects, 20 education fixed effects, 25 occupation fixed effects, and an indicator for whether the respondent lives in an urban location. The ethnicity level controls include the log number of slaves exported per land area during the Atlantic and Indian Ocean slave trades, an indicator variable if the ethnicity was contacted by a European explorer prior to colonial rule (1885), an indicator variable equal to one if a railway line dissected the region the ethnicity was living during colonial rule, the measure of prevalence of BFBS Bible depots, and indicator variables for whether the bible was translated into the ethnic groups language by 1924. The village level controls include an indicator variable if a town was contacted by a European explorer prior to colonial rule (1885), an indicator variable equal to one if a railway line dissected the village, and the village-level measure of prevalence of BFBS Bible depots. \*\*\*, \*\* and \* indicates significance at the 1, 5 and 10% level.

less likely to view violence as a justifiable political action. However, I also find that more educated individuals are less likely to believe that voting rights should be extended to all. Overall, although my results suggest that through increased education Protestant missions increase the prevalence of attitudes that are favorable towards democracy and civic participation, I did not find evidence that historic missionary activity (either Protestant or Catholic) affects these outcomes through any channels other than education.

## References

- Barro, Robert J., "The Determinants of Democracy," *Journal of Political Economy*, 107 (1999), S158–S163.
- Barro, Robert J., and Rachel McCleary, "Religion and Economic Growth across Countries," *American Sociological Review*, 68 (2003), 760–781.
- , "Which Countries Have State Religions?" *Quarterly Journal of Economics*, 120 (2005), 1331–1370.
- Becker, Sascha O., and Ludger Wößmann, "Luther and the Girls: Religious Denomination and the Female Education Gap in 19th Century Prussia," (2007), CESIFO Working Paper No. 2414.
- , "Was Weber Wrong? A Human Capital Theory of Protestant Economic History," *Quarterly Journal of Economics*, 124 (2009), 531–596.
- Bethune, Léon, *Les Missions Catholiques d'Afrique en 1889 [map]* (Société St. Augustin, Paris, 1889).
- Cantoni, Davide, "The Economic Effects of the Protestant Reformation: Testing the Weber Hypothesis in the German Lands," (2009), mimeo, Harvard University.
- Dennis, James S., *Centennial Survey of Foreign Missions* (Fleming H. Revell Company, New York, 1902).
- E.W.S., "Review of: An Ethnographic Map of Africa," *Journal of the Royal African Society*, 24 (1925), 263.
- Gallego, Francisco A., and Robert Woodberry, "Christian Missionaries and Education in Former Colonies: How Competition Mattered," (2009), mimeo, University of Texas at Austin.
- Glaeser, Edward L., Giancomo Ponzetto, and Andrei Shleifer, "Why Does Democracy Need Education?" *Journal of Economic Growth*, 12 (2007), 77–99.
- Grier, Robin, "The Effect of Religion on Economic Development: A Cross-National Study of 63 Former Colonies," *Kyklos*, 50 (1997), 47–62.
- Huillery, Elise, "History Matters: The Long-Term Impact of Colonial Public Investments in French West Africa," *American Economic Journal: Applied Economics* (2008), forthcoming.
- Johnson, Hildegard Binder, "The Location of Christian Missions in Africa," *Geographical Review*, 57 (1967), 168–202.
- McCleary, Rachel, and Robert J. Barro, "Religion and Economy," *Journal of Economic Perspectives*, 20 (2006), 49–72.
- Murdock, George Peter, *Africa: Its Peoples and Their Cultural History* (McGraw-Hill Book Company, New York, 1959).
- Nunn, Nathan, "The Long-Term Effects of Africa's Slave Trades," *Quarterly Journal of Economics*, 123 (2008), 139–176.
- Nunn, Nathan, and Diego Puga, "Ruggedness: The Blessing of Bad Geography in Africa," (2007), mimeo.
- Nunn, Nathan, and Leonard Wantchekon, "The Slave Trade and the Origins of Mistrust in Africa," (2009), mimeo, Harvard University.

Roome, William R.M., "Ethnographic Survey of Africa: Showing the Tribes and Languages; Also the Stations of Missionary Societies [map]," (1924), 1:5,977,382.

Schaltegger, Christoph A., and Benno Torgler, "Was Weber Wrong? A Human Capital Theory of Protestant Economic History: A Comment on Becker and Woessmann," (2009), mimeo, Queensland University of Technology.

The Century Company, "The Century Atlas, Africa [map]," (1897).

Woodberry, Robert D., "The Shadow of Empire: Christian Missions, Colonial Policy, and Democracy in PostColonial Societies," Phd dissertation in sociology, University of North Carolina at Chapel Hill (2004).

———, "Dividing Elites: Religious Liberty, Protestant Competition, and Democracy in the Global South," Working Paper 002, Project on Religion and Economic Change (2009).

Woodberry, Robert D., and Timothy S. Shah, "The Pioneering Protestants," *Journal of Democracy*, 15 (2004), 47–61.

## Data appendix

### *Contemporaneous Individual-Level Data*

All information at the individual level, such as age, gender, education, religion, occupation, etc. are from the 3rd round of the Afrobarometer surveys, which were conducted in 2005. The data are publicly available and can be downloaded at: [www.afrobarometer.org](http://www.afrobarometer.org). The Afrobarometer is an independent and non-partisan research project conducted by the Center for Democratic Development (CDD), Institute for Democracy in South Africa (IDASA), and Michigan State University (MSU).

### *Historic Data on Missionary Activity*

The location of foreign Catholic and Protestant missions within Africa are measured in two time periods the 1890s and the 1920s. For the 1890s, data on the location of Protestant missions is from Dennis (1902). Data on the location of Catholic missions is from Bethune (1889).

For the 1920s, data on the historic location of Catholic and Protestant mission stations, as well as the location of BFBS Bible depots are from Roome (1924). The information on the languages that the Bible was and was not translated into by the 1920s is also from Roome (1924).

The mission location data are combined with information about the historic boundaries of Africa's ethnic groups in the late 19th century from Murdock (1959) to calculate the number of Catholic and Protestant mission stations and BFBS Bible depots in the area inhabited by each ethnic group. This information is used to construct the ethnicity-based measure of missionary activity.

The information is also combined with information about the location of each respondent in the Afrobarometer surveys to construct a measure of the number of Catholic and Protestant mission stations and BFBS Bible depots that were within a 25 kilometer radius of the location where the respondent is currently living. This is the village-based measure of missionary activity.

### *Historic Ethnicity-Level Control Variables*

The information of the exploration routes of early European explorers is from The Century Company (1897). The map includes the routes of 27 expeditions occurring before 1895. Information of the location of rail-lines are also from the same map.

The data on elevation and tropical climate are from Nunn and Puga (2007).



The data used to control for the number of slaves taken from each ethnicity during the trans-Atlantic and Indian Ocean slave trade are from Nunn and Wantchekon (2009), and the primary sources are described in Nunn (2008).