Legacy of Colonial Education: Unveiling Persistence Mechanisms in the D.R.Congo

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Abstract

Regional inequalities in education are a persistent and worrying phenomenon in Africa, with roots dating back to the colonial period. However, the mechanisms that explain this persistent inequality remain poorly understood. This paper addresses this gap by examining the case of colonial Congo and the Democratic Republic of Congo. Using contemporary and historical surveys, archives, and administrative data on contemporary schools, we offer new insights into the persistence of regional educational inequalities since the colonial period. We highlight a factor neglected in the existing literature: the spatial clustering of post-independence schools around historical missions, driven by competition between religious schools of different denominations. Since distance to school has a stronger effect on girls' than boys' enrollment, our results help explain the stronger long-term impact of colonial schools on women than on men. Regarding other mechanisms, we isolate the role of parents' education on children's educational outcomes and examine whether missions were the locus of structural change. The quantitative importance of these channels seems limited in this context.

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1 Introduction

Regional inequalities in education and educational mobility are a persistent and worrying phenomenon observed in many countries. These disparities not only reflect stark inequalities of opportunity, but also threaten social cohesion by perpetuating cycles of disadvantage (Collier, 2024). Across Africa, such inequalities are particularly pronounced (Alesina et al., 2021), with a wealth of literature linking them to patterns of colonial investment in education. In particular, regions that received greater colonial investment –whether through public or missionary schools– tend to have higher levels of human capital today, especially for women (Huillery, 2009; Nunn, 2014; Montgomery, 2017). However, the mechanisms that explain this persistent inequality are complex and often difficult to identify due to limited data availability (Cagé and Rueda, 2016; Calvi et al., 2022; Okoye, 2022). Understanding these mechanisms is crucial for designing effective policy interventions to correct these inequalities and their reproduction. For example, if parental demand is the primary driver of these inequalities, conditional cash transfers could incentivize school enrollment. Conversely, if the unequal distribution of schools is the main problem, expanding school infrastructure may be a more appropriate response.

In this paper, we offer new insights into the persistence of regional educational inequalities since colonial times by highlighting a factor neglected in the existing literature: the spatial clustering of new schools today, driven by competition among religious schools of different denominations. We focus on the Democratic Republic of Congo (DRC) and proceed in two steps. First, we examine regional inequalities in education today and then trace their roots back to the colonial period using unexplored individual-level data from a sample of about 250,000 individuals born during the colonial period or immediately after independence. Specifically, we assemble a comprehensive dataset of missionary posts and, using the state-of-the-art set of controls and robustness checks (Jedwab et al., 2022), we show a strong correlation between missionary presence in 1948 and educational attainment today, especially for women. To determine whether this correlation reflects a persistence of educational inequalities, we use difference-in-difference analysis to compare educational outcomes *during* the colonial period before and after the establishment of new mission posts between 1930 and 1948. Our results show that the opening of these missions significantly raised local educational levels during the colonial period (for both men and women).

The main contribution of our study lies in the second part of the analysis, where we explore the mechanisms of path dependency that have sustained these educational inequalities over time. First, we use administrative data on contemporary schools in the DRC and show that the current distribution of schools exhibits pronounced clustering around historical missions. Specifically, dividing the country into small 20km x 20km grid cells, we find that an additional historical Catholic (Protestant) mission in the grid cell is associated with a 109% (50%) increase in the average number of primary schools per 1000 inhabitants today, or with a 126% (62%) increase in the average number

of contemporary secondary schools.[1] Second, we find evidence that the establishment of a school affiliated with a particular denomination leads to the opening of a school of a competing denomination in the same area (holding time-invariant characteristics constant at the grid-cell level), suggesting that religious competition through schools is a driver of these clustering dynamics. These results are consistent with historical accounts of religious competition through (missionary) schools (Gallego and Woodberry, 2010) and with recent policy reports arguing that religious organizations open schools to attract new adherents (and possibly money), especially where other organizations are already active. Yet, to the best of our knowledge, the impact of (religious) school competition on the geographic location of new schools today has not been formally demonstrated. Importantly, the clustering of schools driven by competitive forces is likely to operate in many contexts where the private education sector is important and largely unregulated, so that private (religious) actors, competing with each other, choose where to open schools. We show that the resulting clustering has a greater impact on women's education than on men's: distance to schools is greater the further away from historic missions, which depresses girls' school attendance more than boys'.

We also examine other potential channels of persistence, such as the intergenerational transmission of educational demand and early structural change near mission sites. We rely on a representative sample of urban migrants educated during the colonial era in order to isolate a "pure demand channel" in the education transmission. Using a difference-in-differences specification, we examine how parental education (and exposure to colonial schools) influence children's educational outcomes. We find that - in an urban context of high educational mobility due to the expansion of the education system - parental education (and exposure to specific missionary schools) has a modest impact on children's education and thus on long-term educational inequality. Similarly, we do not find strong evidence of structural change in the vicinity of missions (using indicators such as night-lighting or labor market structure). In short, our results suggest that these factors are less influential than the dynamics of school clustering, which appears to be a key driver of the persistent educational inequalities observed today.

We contribute to several strands of literature. First, we contribute to a growing literature on the long-term effects of colonial investments, especially those related to Christian missions and human capital (see, for example, Cagé and Rueda 2016, 2020; Valencia Caicedo 2019b; Calvi et al. 2022; Nunn 2014; Montgomery 2017 and the extensive reviews by Becker 2022 and Okoye 2022). Several authors have noted a strong impact of Protestant missions, especially on women's education, in Prussia (Becker and Woessmann, 2008), India (Calvi et al., 2022), and Africa (Nunn, 2014). In the specific context of the DRC, Bergeron (2020) examines the influence of historical exposure to Christian missionaries on individuals' bias toward in-group and out-group members and Le Rossignol

[1] These results are unlikely to be driven by the endogenous location of missions. First, we include *collectivité* fixed effects (small administrative units: $n > 700$) to remove any time-invariant heterogeneity at a fairly granular level. Second, we always include grid-cell level state-of-the-art controls to account for the potential endogeneity in the location of missions within *collectivités*.

et al. (2023) examines how exposure to the historical missionary presence influences the *quality* of education today. In contrast to the existing literature, we investigate the impact of colonial investments in education over several generations (mobilizing different sources of data) from 1930 to the present. The colonial data allow us to estimate the effect of exposure to Christian missions on the first generations of individuals directly exposed to them, in line with Wantchekon et al. (2015).[2] For this part of the analysis, by exploiting the *timing of the opening of posts* in the spirit of difference-in-difference estimation, we rely on less demanding assumptions than the existing literature.[3]

One of the main shortcomings in the above literature is the lack of microdata to examine the evolution of African societies as a result of missionary activities and document the mechanisms behind the long-run impact of missions (Okoye, 2022). In particular, determining whether the persistent effects work through the supply side or the demand side is particularly challenging (Cagé and Rueda, 2016). In this regard, several authors mention supply-side factors to explain the persistence of colonial investments (not only Christian missions) on educational outcomes. Huillery (2009) argues that initial investments in education lead to continued funding post-independence in French Africa (in contrast to Ben Salah et al. (2022) for the case of Tunisia). In line with our findings, Okoye and Pongou (2023) show that people living near historic missions in Nigeria are now more likely to live in districts with existing schools. Using administrative data on the universe of secondary schools in contemporary DRC, we explore this question at a more granular level and propose a mechanism to rationalize this finding: religious competition, operating through school construction shapes the geography of schooling supply.

We also contribute to the literature on school and religious competition. While there has been considerable research on school competition, none has focused on its effects on school location (to the best of our knowledge).[4] Moreover, most studies focus on developed countries. Exceptions include Bau (2022), who examined the negative effects of competition on low-income students in Pakistan. Close to our context, Gallego and Woodberry (2010) focus on the impact of religious competition at play *during* the colonial period on the quality of education today in Africa. In particular, they argue that the large differences in educational attainment between Catholic and non-Catholic states in Africa today are largely explained by market forces during the colonial era (and these institutional differences have persisted to the present because of their high degree of inertia). Because Catholic states favored the Catholic Church and restricted the entry of Protestant missions, Catholic schools invested less in school quality than their counterparts in non-Catholic states, which feared competition from Protestants. In non-Catholic states, there was no regulation favoring a particular denomination, and both had to invest in school quality to attract converts. In this paper, we

[2] In the same line and also in the context of colonial Congo, Guirkinger and Villar (2022) study the impacts of pro-natalist policies on women fertility during the colonial period.

[3] By constructing an original and comprehensive dataset of missions, we also address Jedwab et al. (2022) criticism of altas-based sources that disproportionately report a selection of the best missions.

[4] Spatial location models have been used to study "product differentiation" among religious organizations (see Iyer, 2016 and Iannaccone, 1998 for detailed reviews).

take a different approach by focusing on the post-independence competitive dynamics triggered by the initial location of missions and provide quantitative evidence on how this post-independence competition induces a clustering of schools from different religious networks.

Finally, we contribute to the literature on intergenerational transmission, educational mobility and their determinants (for recent reviews see Black and Devereux (2011) or Solon (2018)). Little is known about these issues in developing country contexts. An important exception is Alesina et al. 2021 who show the existence of a strong "regional effect" in education mobility. To measure this effect they rely on migrants' children to compare siblings exposed to different "regions" while holding parental education constant. In a sense, we do the opposite and compare migrants' children living in the *same* city (and are therefore exposed to the same local environment), but whose parents have been differently exposed to colonial education. This enables us to isolate a demand effect from regional exposure effects.

The remainder of this paper is organized as follows. Section 2 provides historical background on educational policies in the DRC. Section 3 presents the data and measures. Section 4 provides evidence on the long-lasting impacts of colonial investments in the DRC. Section 5 presents a conceptual discussion on the potential transmission mechanisms. Section 6 tests the supply-side mechanisms at work in our empirical framework, while Section 7 tests those on the demand side. Section 8 concludes the paper.

2 Historical Background

2.1 Colonial Schooling

In the Congo, both Catholic and Protestant missions invested heavily in mass education and played a crucial role in the development of the educational system. By 1960, at independence, 97% of all students were attending missionary schools (Yates, 1976).[5] Although the primary intention of missionaries was to convert Africans to Christianity, they saw the provision of formal education as the most effective way to do so (Meier zu Selhausen, 2019).[6] The colonial state, as in most African colonies, encouraged mission investment in education, through the provision of direct subsidies or indirect benefits (for example, related to infrastructure or land concessions) to missions that ran schools. Yet in the Congo, Catholic missions benefited from preferential treatment by the colonial authorities. Unlike Protestant missions (mostly from Britain, the U.S. or Sweden), they were typically "national missions" and were perceived as more loyal to Belgium and easier to work with, or

[5] In fact, the Belgian Congo had the highest number of Western missionaries in Tropical Africa, reaching almost 4.000 in the eve of the World War II, as compared to about 3.500 in the entire region of East Africa during the interwar years (Frankema, 2013; Bergeron, 2020).

[6] The focus on education and the reach of missionaries were global, leading to what some authors have called a "first global mass education wave" (Valencia Caicedo, 2019a).

to control (Markowitz, 1970).[7] Beginning in 1925, the Belgian state subsidized Catholic missions to provide education, giving them an important advantage over Protestant schools (Protestant missions would not receive a subsidy until 1948). According to Boyle (1995), by the end of the 1950s, about 11% of the total number of students were enrolled in Protestant schools, while about 85% were enrolled in the Catholic network.

The type of education offered by the two types of missions was different, for girls in particular. Catholic missions followed an official program set by the government (to qualify for subsidies), while Protestant missions were free to design their own programs. In Catholic missions, the principle of non-mixed schooling was a moral issue: girls should have a separate curriculum from boys, and only nuns could be responsible for their education (Masandi, 2004). Thus, opening classes for girls was only possible if nuns were present.[8]. The program focused on domestic skills such as cooking, child care, farming, and dressmaking. Depaepe and Kikumbi (2018) and Yates (1982), argue that the education provided by the Protestants was better in terms of quality, especially for girls who were in the same classes as boys: the curriculum was thus less focused on teaching practical, traditionally "female" skills. Protestant missionaries thereby promoted a different ideal of a Christian woman than the Catholics. In Appendix A, we provide additional evidence on the differences between Catholic and Protestant education.

At independence, approximately 98% of students were enrolled in primary schools, while secondary schools accounted for less than 2% of the total enrollment, and only a few dozen university students had graduated. Yet at independence, the Congo did very well compared to other colonies in terms of overall primary school enrollment: as much as 71% of the appropriate age group was enrolled in primary school, the highest rate in Africa. However this overall figure masks significant gender disparities with girls far less likely to attend school than boys (Masandi, 2004).[9]

2.2 Post-independence Schooling

After independence, the newly elected government committed to expanding its education system and subsidized schools that met minimum standards. In addition, the differences in education between boys and girls were officially abolished in 1962 (André and Poncelet, 2013).

The 1960s saw a massive opening of new secondary schools, driven largely by the opening of new "official" (state) schools. However, most schools were still run by Christian denominations, and especially by Catholic congregations (Lembagusala Kikumbi, 2018): in the early 1970s, 62% of pri-

[7]Some Protestant missionaries reported the atrocities committed by the system of forced labor and concessionary companies during the years of the Congo Free State under the authority of King Leopold II, and the king soon viewed Protestants as a threat to his project (Anet, 1939). The suspicion remained after Belgium "took over" the colony in 1908.

[8]The late arrival of nuns in the territory (around the mid-1920s) could explain (in part) the delay in women's education in the colony (most Protestant posts had at least one female missionary at the opening of the post (Irvine, 1978))

[9]Gender disparities are also striking in higher education. Lauro (2020) notes that there was no woman at the university and only one among the 800 general high school graduates at independence.

mary school children were enrolled in Catholic schools, compared to 21% in Protestant and 14% in official public schools.[10]

In the mid-1980s, Mobutu nationalized schools but quickly a deep crisis hit the education sector. In response to this crisis, the government authorized private providers to open schools and agreements were signed in 1986 with representatives of the country's four main religions (Catholicism, Protestantism, Islam and Kimbanguism) to delegate part of the management of the system in return for grants and subsidies. In the face of significant financial challenges, both private and public schools have sought parental contributions to cover a substantial portion of the schooling expenses, particularly teachers' salaries. These private contributions represent about two-thirds of the country's basic education costs (Briand and Nicolai, 2021).

Since the beginning of the 2000s (and with the end of the civil wars and economic turmoil), the situation regarding education has clearly improved, and today, DRC outperforms other income-comparable countries (such as Niger, Mali and Burkina Faso). Yet, in their detailed report on education in the country, Gauthier et al. (2021) show that geographical inequality remains high and public planning and regulation by the State are lacking. In many places, only some religious networks, in particular the Catholic and Protestant churches, are present. These religious schools are said to rely on school openings as a tool of evangelization to draw in more converts. In addition, evidence in Briand and Nicolai (2021) suggests that faith-based organizations use a significant proportion of the households' school fees to finance their church activities.

3 Data and Variables

3.1 Data

Historical data.–We construct our main historical dataset by combining surveys containing information on individuals born during the colonial era with data on Christian missions.

Demographic Survey from the 1970s: These data provide original individual-level information on 250,000 individuals in 46,000 households surveyed between 1975 and 1977 in seven major cities in the DRC: Kinshasa, Matadi, Bandundu, Kikwit, Mbandaka, Kananga, and Bukavu (1/10 of the total number of households identified in each of these cities are surveyed). Demographic information was collected on age, sex, ethnicity, marital status, place of birth, and migration status, as well as socioeconomic characteristics such as years of education and occupation. Among respondents born before independence, 80% are migrants, and 85% of them migrated to the cities after independence (or shortly before) and were therefore educated in their place of birth. In fact, migration prior to the last years of the colonial era was highly controlled and restricted. Importantly, this survey includes

[10] In secondary education, the state played a more active role: one third of students attended an official school, while 42% (resp. 17%) attended a Catholic (resp. Protestant) school in 1973 (MacGaffey, 1982). It is worth noting that even in the official secondary schools, the teachers were mostly from (Belgian) Catholic orders (Sheline et al., 1984).

information on the position of individuals within the household, which allows us to link parents and children and to study educational mobility. We retrieved these data from digital archives at the University of Louvain-La-Neuve in Belgium. These data are considered high quality by demographers who rely on them to study demographic dynamics in the Congo in well-published academic papers (Tabutin, 1982; Shapiro, 1996).[11]

Household Budget Survey of the 1970s: Using the same methodology as the demographic survey of the 1970s, a household budget survey was conducted in parallel, in which 1/50 of the identified households were interviewed. This survey contains information on expenditures and economic transactions made by the household during the month of the interview, including information on education expenditures, which will allow us to explore additional questions related to the demand for education.

Demographic Survey from the 1950s: Since the 1970s demographic survey was conducted in only 7 major cities of the DRC, we complement this information with data from another demographic survey conducted in the 1950s. However, data from this survey have been published in the form of aggregates at the territory level and by age category (5-9, 10-14, 15-19, 20-24, 25-29, 30-34, 35-44, 45-54 and +55).[12] The survey covered about 11% of the total population and its sampling strategy was designed to be representative of both rural and urban areas. It includes information on the number of children enrolled in primary and secondary schools, the number of people who can read and write, and the number of people with no education. We digitized these data from the published booklets that we found in various libraries in Belgium. Since the information provided by the 1950s Demographic Survey is aggregated at the *Territory x Age-cohort* level, we mostly rely on the 1970s Demographic Survey in our main specifications, and use the 1950s data for descriptive purposes and robustness analyses.

Missionary activities: As detailed above, virtually all education took place in mission schools.To measure colonial investment in education at the local level, we construct a database with comprehensive information on Christian mission posts opened in the DRC between 1885 and 1948. The data on Catholic missions come from information digitized from comprehensive yearbooks and maps published in 1924, 1935, and 1949 (Corman, 1924, 1935; Van Wing, 1949). As for the location and date of opening of Protestant missions, we obtain them from maps published in 1905, 1921, 1930, 1944, 1953, and 1960, and from a 1978 handbook (Irvine, 1978). The recorded Protestant missions cover the period 1879-1960, while the recorded Catholic missions cover the period 1885-1948. To make the results more comparable, we focus on the period 1885-1948. The final sample of missions includes a total of 697 missions for the DRC, of which 300 are Protestant and 397 are Catholic. Figure

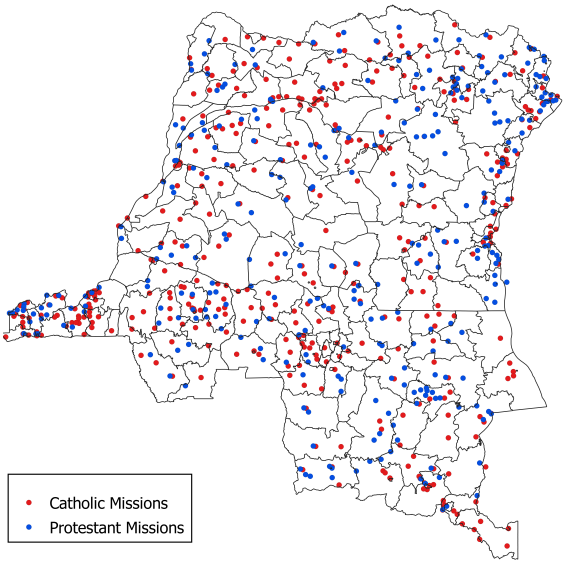
[11] These surveys were conducted during Mobutu's dictatorship, but both the design and implementation of the survey and data collection were managed jointly by a team of demographers based at the Congolese Institute for Research and Statistics and the Université Catholique de Louvain in Belgium. Data cleaning and statistical programming were carried out in Belgium.

[12] At the time of the survey, the territory was the smallest administrative unit in the Democratic Republic of the Congo, smaller than the district and than the province. There were 138 territories in 1955.

1 shows the geographic location of Catholic and Protestant missions in the DRC in 1948. Importantly, we know the date of arrival of Catholic nuns (if any).[13] On the other hand, Protestant missions almost always had female missionaries.[14] We will use this information when examining the gendered effects of exposure to missionary presence, since the presence of nuns within the Catholic school system was a necessary condition for the education of girls.[15]

For the DRC, these data on missions are far more complete than most of the existing data on missions used in the literature, enabling us to address one of the criticisms raised by Jedwab et al. (2022), namely that mission atlases exacerbate endogeneity in mission location by reflecting only the best missions (Appendix B shows a comparison of our dataset with the missions reported for Congo in Cagé and Rueda (2020) and Nunn (2010), who use information provided by Streit (1929) (Catholic missions), Beach (1903) (Protestant missions), and Roome (1924)).[16]

Figure 1: Location of Christian Missions in 1948



Note: The map shows the exact location of Catholic and Protestant missions in the DRC in 1948, along with territory level boundaries. The digitization has been done by the authors.

Contemporary data.–To study persistence in education and some of its underlying mechanisms, we rely on contemporary demographic information.

Demographic and Health Surveys (DHS): We use all available rounds of the DRC DHS (2007-2013), a

[13] Catholic nuns mostly arrived at pre-existing missions run by male missionaries. In fact, the date of arrival of Catholic nuns is the same as the date of establishment of the mission post only 6% of the time.

[14] According to Irvine (1978), about 90% of Protestant posts hosted at least one female missionary.

[15] This was true until 1960. After independence, girls were also educated in missions without Catholic nuns.

[16] The comparison shown in Appendix B refers to the final dataset used in both papers. Even if we restrict our data to missions opened before the year they use (1903 for Protestant missions and 1929 for Catholic in the case of Cagé and Rueda (2020), and 1924 in the case of Nunn (2010)), we have 62 Protestant missions and 199 Catholic, while Cagé and Rueda (2020) have 26 Protestant and 69 Catholic. If we compare the number of missions in the 1924 Roome map, we have 166 Protestant missions and 156 Catholic, compared to 120 Protestant and 93 Catholic in the Roome map.

nationally representative survey that provides detailed information on education, literacy, occupation, and religion. In total, we have information on about 40,000 individuals living in 785 clusters. Since we have information on the latitude and longitude of DHS clusters, we are able to combine this dataset with the historical colonial schools data detailed above.

Contemporaneous schools: We retrieved data on the universe of primary and secondary schools in the DRC in 2020. This dataset is provided by the Ministry of Education and includes school-level information such as exact GPS location, number of students and teachers, or school management regime. The education system in the DRC consists of two types of schools: publicly funded and private. Public schools are divided into official schools and schools under contract with the state. Official schools are run by the state and are secular, while schools under contract are run by the four religious organisations that have signed an agreement with the state (Catholics, Protestants, Kimbanguists, and Muslims). While they are managed most often by faith-based organisations, private schools do not receive any state subsidies (new evangelical churches typically operate private schools). In our data, there are approximately 60,000 primary schools, of which nearly 20% are Catholic (public), 37% are Protestant (public), 17% are official schools, 12% are managed by other religious groups (public), and 14% are private (unfortunately these data do not provide information on whether these private schools are denominational or not). As for secondary education, there are 35,000 secondary schools, of which 15% are Catholic (public), 35% are Protestant (public), 18% are official schools, 15% are administered by other religious groups (public), and 17% are private.

Determinants of missions' location: Finally, since missionaries were likely to locate in better areas, it is crucial to consider the geographic and historical characteristics that influence this decision when we examine the lasting influence of missionary presence. Building on Jedwab et al. (2022), our control variables include: altitude, slope, rainfall, length of growing season, distance to the coast, distance to a colonial road, distance to a colonial railroad, distance to a navigable river, population density in 1900, cropland area in 1900 as estimated in the HYDE 3.1 database (Klein Goldewijk et al., 2011), malaria index from Cagé and Rueda (2016), tsetse suitability index from Alsan (2015) and number of slaves exported in the Indian and Atlantic trades (normalized by ethnic homeland area) from Nunn and Wantchekon (2011). We construct these historical and geographical controls at DHS cluster level and the territory level.

3.2 Measure of exposure to missions

Since missionaries provided virtually all education during the colonial period, and since all missions operated schools during our study period, we use exposure to missionary presence as a measure of exposure to colonial investment in education. However, we distinguish between three types of missions - Catholic, Catholic with nuns, and Protestant - since the type of education they offered slightly differed. Our construction of exposure variables differs across datasets, as they provide dif-

ferent levels of precision regarding the location of the individual place of birth / location (in the DHS we know the GPS coordinates of the sampling cluster, while in the demographic survey we have information on the territories of birth). With DHS data, we measure exposure to former missionary presence as the logarithm of the distance from the DHS cluster to the nearest mission post, multiplied by (-1).[17] For the historical analysis we construct an average exposure to missionary presence for each territory and each year and assign this measure to each respondent according to their year of birth.[18] To do this, we follow Calvi and Mantovanelli (2018) and construct a continuous measure of proximity at the territory level that controls for mission density. Specifically, we generate 1000 random points within each territory and compute the distance from each random point to its closest mission before averaging over these distances. A major advantage of this method is that it takes into account missions in neighboring territories when calculating the exposure of a given territory. We repeat this process for each territory, each year between 1885 and 1948, and the three types of missions. Finally, based on these distances we construct a measure of proximity by multiplying the logarithm of the distance by (-1). Table C1 in Appendix C provides descriptive statistics for these exposure measures.

4 Long-lasting impacts of colonial investments in education

We start by exploring the long lasting impacts of colonial schools on educational outcomes today in the DRC using DHS data, focusing on two dimensions of heterogeneity : gender, and the religious affiliation of these schools at independence.

4.1 Educational outcomes today and missionary schools in the past

We follow the existing literature by estimating a linear regression model of contemporary outcomes on the proximity of individuals' cluster in the DHS survey to the nearest Christian mission, controlling for historical and geographic characteristics. In addition, we follow the strategy introduced by Cagé and Rueda (2016) and restrict the analysis to those individuals living in DHS clusters with at least one mission within a 50 km radius. The idea behind this restriction is that areas located far from mission posts most likely present substantial differences from those closer to posts, not only in terms of geographical attributes but also institutional or cultural factors. In order to enable comparisons between similar areas on these dimensions, we remove these remote areas from the

[17] We use distances in logarithms to remove the high skewness in the distribution of distances and because we expect the influence of mission to be fundamentally nonlinear, with individuals located close to missions being disproportionately affected by the presence of the mission. We provide robustness estimates with alternative measures of exposure.

[18] We choose exposure at birth primarily because it allows us to include individuals in our sample who were born up to 1948. For example, if we instead compute exposure at age 6, we can only include individuals born before 1942, since our last mission opening occurs in 1948.

sample.[19] Let i denote individuals, c denote DHS clusters, and p denote provinces. [20] Our regression equation is:

$$y_{icp} = \beta_0 + \beta_C M_c^C + \theta_C M_c^C F_i + \beta_P M_c^P + \theta_P M_c^P F_i + \lambda F_i + \gamma W_i + \mathbf{\Phi} X_c + \alpha_p + \sigma_r + \varepsilon_{icp} \quad (1)$$

where $y_{i,c,p}$ is the educational outcome of interest. M_c^C (M_c^P) measures the exposure of cluster c to Catholic (Protestant) missions and it is expressed as the negative (log) distance of cluster c to the nearest Catholic (Protestant) mission in 1948. α_p denotes province fixed effects, which are included in all regressions and capture time-invariant province-level characteristics, such as colonial policies or unobserved heterogeneity, that may be correlated with average education and missionary activity. Finally, σ_r represents the DHS survey round (2007 or 2013). The vector W_i' contains individual-level control variables such as age, age squared, and gender. Finally, we also include the vector X_c', which contains geographic and historical controls computed at the DHS cluster level. Their selection is based on the main determinants of mission location listed by Jedwab et al. (2022) (see Section 3.1 for details about these variables).[21] Since our main variables of interest are defined at the DHS cluster level, we cluster the standard errors at this level.

The results are reported in Table 1. We find that, today, *(i)* proximity to a Christian colonial school matters for women's education but not for men's and *(ii)* Catholic and Protestant colonial schools have similar effects (we cannot reject the null hypothesis that $\beta_C + \theta_C = \beta_P + \theta_P$). In terms of magnitude, for women, halving the distance to a former Catholic or Protestant school is associated with 0.2 additional years of schooling (a 4% increase relative to the female sample mean), a 4 pp increase in literacy (an 8% increase), and a 3 pp increase in the likelihood of attending postprimary school (an 8% increase).[22] These effects therefore contribute to reducing gender inequality in education. For example, halving the distance to a Catholic or Protestant mission reduces the gender gap in literacy by 15%. Interestingly, exposure to colonial schools has no effect on women's likelihood of completing secondary education. For men, on the other hand, it is only in this dimension (completion of secondary education) that we find an effect of proximity to Catholic schools: halving the distance to a Catholic school increases the probability of completing secondary education by 1 pp (or an increase of 9%).

Our results on contemporaneous education confirm the general findings in the literature regard-

[19] The main threshold chosen here to define proximity is 50 km. Cagé and Rueda (2016) use 100km as their threshold, but their respondents' cities are on average 140km away from the nearest mission, while in our case, due to the higher availability of data, it is 22km for Catholics and 32km for Protestants. The choice of this threshold does not affect our results. Virtually the same results are obtained by choosing different thresholds (i.e. 30km, 40km or no threshold).

[20] Today, the national territory of the DRC is divided into 26 provinces, the province into territories/cities, the territory/city into *collectivités*, the *collectivité* into groups/neighbourhoods, and the group/neighbourhood into villages/streets.

[21] One standard control used in the literature (which mainly includes multi-country analyses) is distance to the capital city. However, we do not include it here, since in the DRC context, distance to the coast is highly correlated with distance to the capital city, Kinshasa ($\rho = 0.95$).

[22] The final effect of halving distances is obtained by multiplying the coefficient reported in the table by $ln(2)$, since $[-ln(d)] - [-ln(\frac{d}{2})] = ln(2)$.

ing the persistent effects of missionary presence on education today: women living in places close to colonial schools are, on average, more educated than women living in more distant places. However, we also find a persistent effect of both historical Protestant and Catholic missions, which is consistent with the results in Baten et al. (2021) or Becker and Meier zu Selhausen (2023), where no differences in outcomes are found between these two religions.[23]

Robustness. In Appendix D, we provide further discussion and analysis in order to rule out a spurious correlation between mission location and current educational outcomes. Specifically, we first show the sensitivity of our main results to the inclusion of different combinations of relevant control variables (historical determinants of missionary location). Then, we show that our results hold when we control for contemporary urbanization, or when we restrict the analysis to rural DHS clusters only (the latter two analyses help control for the fact that missions may have located in more densely populated areas). Finally, we conduct a series of additional robustness checks. First, we show that missions left a lasting impact on the main dimension they targeted: religion. We show that proximity to historical Catholic missions increases the probability of being Catholic, while proximity to historical Protestant missions increases the probability of being Protestant.Second, we show that our results are robust to alternative definitions of exposure to missionary presence, sample restriction to never migrants, measures of spatial autocorrelation, or after imposing common support.

Table 1: Education in 2000 and exposure to former missionary presence

	(1) Years of education	(2) Literacy	(3) Post primary	(4) Secondary or more
Exposure to Catholics	0.0720	-0.0118	-0.00398	0.0197**
	(0.119)	(0.0108)	(0.0117)	(0.00928)
Exp to Catholics x Female	0.273***	0.0576***	0.0475***	-0.0127*
	(0.0712)	(0.0102)	(0.0103)	(0.00649)
Exposure to Protestants	-0.00320	-0.0143	-0.0107	-0.000604
	(0.121)	(0.0119)	(0.0136)	(0.00923)
Exp to Protestants x Female	0.348***	0.0564***	0.0525***	0.0110
	(0.0689)	(0.00946)	(0.0106)	(0.00722)
FEs	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes
Mean Y	6.933	0.637	0.566	0.165
Mean Y female	5.678	0.505	0.435	0.102
R-squared	0.304	0.202	0.232	0.165
N	34654	34654	34654	34654

NOTE. Data: Pooled 2007 and 2013 waves of the DHS. The sample is restricted to people living in DHS clusters located 50km or closer to a mission. The table reports OLS estimates. We use $-log(distance)$ to measure exposure. Outcome variables are defined as follows: single years of education in column (1), ability to read a whole sentence in column (2), probability of having post-primary education in column (3) (it includes incomplete secondary education) and probability of having secondary or higher education in column (4). Standard errors () are clustered at DHS cluster level. Geographical, historical and individual controls included (see Section 4 for details). *** for $p < 0.01$, ** for $p < 0.05$, * for $p < 0.1$.

[23] In contrast, Nunn (2014) finds a significant effect only for Protestant missions.

Does persistence fade over time? The DHS samples include generations of adults educated in the first decades after independence, as well as adults born in the early 1990s, so it is possible to examine whether the persistent effects highlighted above fade over time. Exploring fading is informative as different mechanisms lead to different predictions regarding the fading of persistence over time. If persistence is due to changes in cultural factors or beliefs, one would expect the importance of historical factors to diminish over time.[24] For example, if missions increased parental demand for education in the short run because people realized the high returns to colonial education, the strong initial effects of exposure to colonial schools on children's education would diminish once the massive opening of schools after independence gave children access to education throughout the country. Put differently, if we assume that schools opened randomly across space after independence, the intergenerational regression coefficients of areas close to colonial schools and areas far from colonial schools will converge.[25]

Interestingly, our analysis of the fading of persistence over time indicates that this kind of demand channels are unlikely to explain our long-term results. Indeed Table E1 in Appendix E reveals that the correlation between exposure to missions and education is remarkably stable over time. In fact, we find no heterogeneous effect of exposure to missionary presence by decade of birth.[26] These results are in line with Becker and Meier zu Selhausen (2023) who find no evidence of diminishing effects of exposure to Protestant and Catholic missions on women's education over time.

When examining mechanisms, our results suggest that something other than demand plays a role in the persistence of colonial investments in education, and the detectable persistence suggests the absence of the state in equalizing access to education across the Congolese population. In the Section 6.1, we turn to an examination of supply factors and explore the above questions in more detail.

4.2 The effect of early missionary schooling on education during colonial times

We now turn to the question of whether missionary investment in *education* led to higher average levels of education near mission posts (which may have persisted). This is an important first step in understanding the mechanisms of persistence. However, while this is often an (implicit) claim, it is rarely formally tested. A first descriptive look is provided by Figure 2, which compares average educational outcomes by territory in colonial and contemporary times. A darker territory in the left

[24] In this regard, Frankema and Waijenburg (2011), Bottero and Wallace (2013), or Cogneau and Dupraz (2015), highlight the difficulties encountered in Nunn (2008)'s analysis, where there is a strong correlation between GDPpc in the year 2000 and exposure to the slave trade, but this correlation disappears when GDP figures prior to 1970 are used. In these situations, when long-term effects are not detected at any point in time, and especially when they increase over time, Frankema and Waijenburg (2011) argue that we need to "think harder about how and why these effects might lie dormant and then reappear at a later point in time".

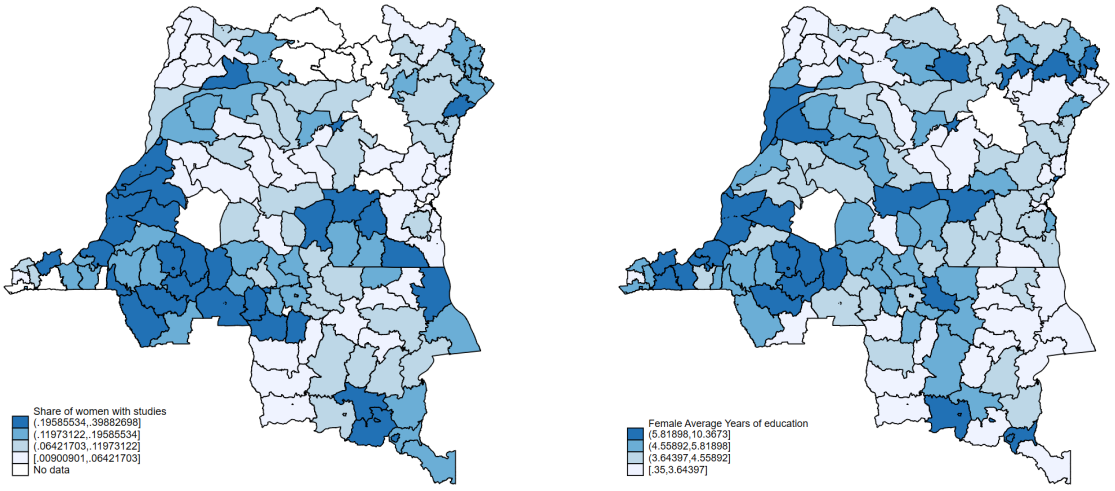
[25] For example, Ben Salah et al. (2022) find that, in Tunisa, the effect of exposure to colonial public education on literacy declines over time due to the strong expansion of public education and compulsory schooling.

[26] Using the DHS personal record files (PR), we even observe persistent effects for children aged 12 to 17. However, we do not find an effect on children aged 6 to 11, suggesting that persistence today is driven by access to secondary schooling.

panel indicates a higher average share of women with any education in the 1950s, while in the right panel it indicates a higher average years of education for women in the 2000s. The maps suggest that initial inequalities in educational attainment are highly persistent over time.

To systematically examine the relationship between the opening of mission schools and colonial education, we draw on microdata containing information on the education of individuals directly exposed to colonial schools (using individual-level data from the 1970s Urban Demographic Survey) and combine it with information on the timing of the opening of new mission posts during the colonial era.

Figure 2: Female education, 1950s vs 2000s



(a) Share of women 15-19 with studies in 1950s

(b) Women's average years of education in 2000s

Notes: Panel 2a shows the geographic distribution of female education using the Demographic Survey of the 1950s. We use those women aged 15 to 19 at the time of the survey, since variation in education is high and primary education has already been completed. The share of women with studies is defined as (1-share of women without studies). For some territories (28/131), the share of women without studies was not available, but there was information on the number of women able to read or write. In those cases, the share of women without studies is computed as the difference between the total number of women and the number of women able to read or write. Panel 2b shows the geographic distribution of female education using data from the 2007 and 2013 DHS rounds. All women included. It shows, for each territory, the average years of female education.

4.2.1 Empirical strategy and results

Our general strategy is to exploit the time variation in the exposure to missions in the spirit of a difference-in-differences specification, including cohort and territory of birth fixed effects. This identification strategy helps to overcome a major weakness of the existing literature on the impact of missions (or other colonial investments): any time-invariant characteristics (e.g., related to geography or the environment) correlated with mission placement are absorbed by the territory-fixed effects and cannot bias our estimates. As before, we distinguish between Catholic and Protestant missions and we add a variable to capture the effect of exposure to Catholic missions with nuns. This is because the opening of schools for girls within the Catholic system was conditional on the

presence of at least one nun.[27] [28]

Let i index individuals, t index territory of birth (since most of the sample consists of urban migrants), a index year of birth and m the type of mission ($m = 1$ denotes Catholic missions, $m = 2$ denotes Catholic missions with at least one nun and $m = 3$ refers to Protestant missions). Using these notations, Equation 2 describes our preferred empirical specification:

$$y_{i,t,l} = \beta_0 + \beta_C D^C_{t,l} + \beta_P D^P_{t,l} + \beta_N D^N_{t,l} + \alpha_C F_i D^C_{t,l} + \alpha_P F_i D^P_{t,l} + \alpha_N F_i D^N_{t,l} + X_i^{'}\Phi + \theta_l + \sigma_{coh} + \varepsilon_{i,t,l} \quad (2)$$

where $y_{i,t,l}$ is an educational outcome. $D^C_{t,l}$, $D^P_{t,l}$ and $D^N_{t,l}$ are our variables of interest and measure the average exposure of territory l in year t as described in Section 3.2. The coefficient associated to $D^N_{t,l}$ (exposure to Catholic missions with nuns) captures the effect of posts with at least one Catholic nun, conditional on the exposure to general Catholic missions and Protestant missions. The variable F_i is an indicator $= 1$ if individual i is female, and its interaction with our measures of missionary presence captures the differential impact of missions by gender. X_i denotes a vector of individual-level control variables, which includes the F_i gender indicator, year of installation in the current city and whether the respondent was born in a rural or urban area. Finally, θ_l and σ_{coh} denote territory of birth and age-cohort fixed effects respectively. Since our treatment variables are defined at the territory of birth level, we cluster the standard errors at this level.[29] The inclusion of territory fixed effects allows for a within-territory analysis. Therefore, the coefficients of interest are identified by time variations in the exposure to missions in a given territory.

Table 2 displays the results. Two main findings stand out. First, the effect of exposure to missionary presence is only detectable for Catholic missions. In terms of magnitude, Column (4) shows that halving the distance to a Catholic mission increases years of education by 0.5 (11% of the sample mean) or, in Column 6, the probability of completing primary education by 6 percentage points (13% of the sample mean). The effect of Protestant missions is not only statistically insignificant but also small in size. The contrast between Catholic and Protestant is in line with historical accounts: as mentioned in Section 2 the majority of pupils were in Catholic schools in the 1950s. Yet, given that proximity to former Protestant missions has today the same effect as proximity to Catholic ones, it suggests that the mechanisms behind persistence may differ across denominations.

Second, we confirm that the presence of nuns in Catholic missions was important for female ed-

[27] In the previous analysis, based on DHS data, we did not include exposure to Catholic missions with nuns. This is because here we only observe missions at one point in time (1948) and by that time a large proportion of Catholic posts counted with at least one nun, leading to potential multicollinearity ($\rho = 0.70$). In addition, many more Catholic posts began to include nuns after 1948, so that the distinction likely became less relevant after 1948. Nevertheless, when we distinguish between exposure to Catholic missions with nuns and Catholic missions without nuns, our results are left unchanged.

[28] When using the 1970s survey, we focus on individuals born between 1930 and 1948, since the data include few migrants born earlier (and heterogeneity in education is small for them).

[29] Note, however, that clustering at this level may be highly conservative for two reasons (Abadie et al., 2023). First, we observe all clusters in the population and second, treatment assignment is imperfectly correlated within clusters. Still, since conventional robust standard errors may be underestimated, we prefer being overly cautious and report clustered standard errors.

ucation: halving the distance to a Catholic mission with at least one nun in is associated with a 8 percentage points increase in the probability of having any schooling (column 5). This latter result represents a large impact when compared to the mean of the variable for the female sample (16%). These results are especially striking given that our exposure measurement is an average exposure within a given territory. As such, it tends to attenuate the true effect of mission exposure and provides lower bound estimates.[30] These results are consistent with the historical record on the functioning of the Catholic school system, where the presence of nuns was a necessary condition for opening schools for girls, and suggests that ignoring this distinction in similar contexts may be masking important heterogeneity.

Table 2: Education in colonial times and missionary presence

	(1) Years educ	(2) Any educ	(3) Primary or more	(4) Years educ	(5) Any educ	(6) Primary or more
Catholic missions	0.587***	0.0344	0.0546**	0.759***	0.0907*	0.0831***
	(0.209)	(0.0278)	(0.0251)	(0.248)	(0.0460)	(0.0318)
Catholic missions x female	0.0415	-0.0158	-0.00337	-0.416	-0.146	-0.0699
	(0.255)	(0.0379)	(0.0312)	(0.393)	(0.0909)	(0.0540)
Protestant missions	-0.0690	0.0364	0.0161	-0.0963	0.0302	0.0129
	(0.275)	(0.0299)	(0.0315)	(0.280)	(0.0301)	(0.0318)
Protestant missions x female	-0.159	0.0185	-0.0100	-0.115	0.0310	-0.00367
	(0.240)	(0.0285)	(0.0310)	(0.245)	(0.0287)	(0.0320)
Catholic with nuns				0.0405	-0.0290	-0.0139
				(0.228)	(0.0303)	(0.0278)
Catholic with nuns x female				0.423	0.121*	0.0615
				(0.320)	(0.0635)	(0.0399)
FEs	Yes	Yes	Yes	Yes	Yes	Yes
Territory FE	Yes	Yes	Yes	Yes	Yes	Yes
Cohort FE	Yes	Yes	Yes	Yes	Yes	Yes
Mean Y	4.995	0.734	0.435	4.995	0.734	0.435
R-squared	0.442	0.292	0.338	0.442	0.293	0.338
N	41655	41655	41655	41655	41655	41655

NOTE. Data: Demographic Survey of the 1970s. The sample is restricted to people born after 1930. The table reports OLS estimates. Exposure to missionary presence is measured as $-log(distance)$. Outcome variables are defined as follows: single years of education in columns (1) and (4), a binary variable that equals one if the respondent has at least one year of education in columns (2) and (5) and the probability of completing primary education (>5 years of education) in columns (3) and (6). Standard errors () are clustered at the territory of birth level. Fixed-effects include city of residence, territory of birth, 5yr age cohorts and whether the individual was born in an urban area. *** for $p < 0.01$, ** for $p < 0.05$, * for $p < 0.1$.

4.2.2 Threats to identification

Selective migration.- One potential concern may be related to the nature of the 1970s survey. Indeed, this survey includes information on people living in seven major cities, most of whom are migrants from rural areas. Therefore, selection into migration and its potential heterogeneity by Catholic/Protestant exposure may bias our estimates. First, the returns to education may differ between Protestant and Catholic schooling. Second, the presence of mission posts may have created economic opportunities even for people who did not attend Christian schools, affecting their likelihood of migrating. To examine this question, we use data from the demographic survey conducted

[30] This coefficient interpretation (in which we interpret only the interaction coefficient) is also conservative. It assumes that nuns missions were the furthest away from the simulated points, and remain the furthest away among Catholics posts, so the average distance to "general" missions remains unchanged. If we assume that nuns missions were the closest missions to the simulated points (and therefore remain the closest missions), then the distance to "general" Catholic missions is also halved. Summing up the coefficients, we obtain an increase of 13 pp.

in the 1950s, at a time when migratory flows were strictly controlled.[31] This survey covered about 11% of the total population of the country and its sampling strategy was designed to be representative of both rural and urban areas. Available data is aggregated at the territory and age-category level (more details in Appendix F). As a first step, we verify that patterns between the two databases are qualitatively comparable. If the effects of mission exposure are similar, then we can assume that the 1970s sample does not indicate any particular differential selection of migrants along the mission exposure dimension. Table F1 in Appendix F shows the results. Overall, the results using the 1950s data go in the same direction as our main results with the 1970s survey.

In order to rule out that selective migration is driving the results on the individual sample from the 1970s, we explicitly examine the extent of selection into migration that exists in the 1970s dataset. First, we quantify the degree of selection into migration by territory and age cohort by calculating the share of educated people (people with some education) in a given territory and age cohort in the representative 1950s sample and by comparing it with the share of educated people in the same age cohort and territory of birth in the 1970s urban sample.[32] Figure G1 in Appendix G shows that there is generalized positive selection into migration: the share of educated people in the 1970s sample is usually higher than the share of educated people in the 1950s sample (comparing the same territories and age cohorts).

Second, we examine whether the degree of selection into migration is differentially affected by exposure to missionary presence (i.e., whether educated people in highly exposed territories are more likely to migrate to cities than educated people in moderately exposed territories). To do this, we regress the degree of selection into migration (observed at the territory x age cohort level, shown in figure G1) on our measures of exposure to missionaries. Table G1 shows that the magnitude of selection into migration does not depend on the type of exposure. Putting together both analyses suggest that educated people are more likely to migrate, yet this increased propensity is *not* a function of their missionary exposure. This suggests that our estimated effects of missionary exposure on (migrants) education are not the results of a composition effect (whereby the effect of education on the propensity to migrate would be a function of exposure), and can thus be interpreted as a direct influence of mission on the local population's levels of education.

Endogenous opening of missions.–Our identifying assumption is that in the absence of new mission posts, education trends would have been similar across places where these posts opened and where they did not. Given that missionaries were the sole providers of education during colonial times, this assumption is quite plausible. Yet, a potential concern in our setting is related to the endogenous timing of new post openings: we might be worried that the intensity of educational investments varied with different (time varying) returns to education (and that these returns were

[31] In this respect, we're not overly concerned about the geographical sorting in colonial times, whereby individuals with higher demand for education would come to live in their vicinity.

[32] We focus on people over the age of 15, as they should have started school by this age. We assume that the territory of birth is the same as the territory of residence in the 1950s sample, as migration was very limited in the early colonial period.

heterogeneous along our key dimensions of analysis: gender and religious denominations). For instance, if, in contrast with Protestant schools, Catholic schools opened strategically in places where other colonial investments were made (e.g increased employment opportunities), our coefficients would not capture the causal effect of mission opening on education but rather the differential religious strategies deployed.

A first remark is that time-invariant factors that would affect these returns are absorbed by the territory fixed effects. We conduct two other analyses that suggest that an endogenous timing in school openings in unlikely to drive our results. First in Table H1 in Appendix H, we check decade by decade that the characteristics of territories where Catholic vs Protestant missions settled are not systematically different.[33] Second, we add time variant controls that capture differences in the economic dynamism of different places across time. To do so, we collected information at the district level from yearly reports on the administration of the colony presented to the Belgium parliament. Specifically, we include data on the size of the white Belgian and white non-Belgium population, the size of the indigenous population and the amount of per-capita tax levied from the indigenous population. This information covers the entire period of analysis (1930-1948).[34] We show in Appendix I that adding time-varying covariates to control for confounding factors barely changes our results.

5 Mechanisms of persistence: a conceptual discussion

Why does the initial location of colonial schools still influence education outcomes more than 80 years after their openings? Why do we observe today a positive effect only on women's years of education? Why do we observe a similar effect for Protestant and Catholic missions in the long run, while the effect for Catholics was significantly stronger during the colonial period? To answer these questions we now turn to transmission mechanisms, distinguishing between two broad categories: supply factors and demand factors.

5.1 Supply factors

Several mechanisms may explain why places where schools were first established continue to attract more investment in education over time. First, the placement of missions was not random: missions may have been located in more favorable environments (better connected to markets, better natural endowments, etc.) where returns to education were higher. If these places (in particular

[33] For readability purposes, we chose to show only three decades.

[34] First, it is important to note that missionary only represent a minority of the white population at the time. Second, the reports are not always complete: for some dimensions, we could not recover the information for some years (taxes in 1948 and white Belgian and non-Belgian population between 1939-1944 and between 1945-1948). When this is the case, we use the last available year.

urban areas) continue to enjoy higher returns, they may continue to attract more schools for the same reason. We show in Sections 4 and D that our results are robust to *(i)* the inclusion of the determinants of mission location, *(ii)* the inclusion of historical and current population density as controls, *(iii)* a restriction to rural places. Second, places that attracted colonial investment in education may continue to attract more public funding due to the permanent nature of school buildings. This mechanism is highlighted by Huillery (2009) in the context of French Africa. In the DRC, where public subsidies are dismal, we do not expect an important contribution from this channel.

Third, competition among schools may lead to the clustering of schools in places where they first appear, as suggested by Hotelling-style models of spatial competition. This is all the more likely in the context of developing countries, where entry into the school sector is easy, government subsidies are limited, and schools are often associated with a religion. In this context, if religions compete for converts through schools, or if schools act as profit maximizers, they may respond strategically to the opening of schools by other religious denominations by opening a school nearby to prevent their competitor from becoming too successful. To investigate clustering effects and competition among schools, we use information on the denomination of existing schools and the dynamics of school openings. We expect competition to be stronger between schools of different denominations than between schools of the same denomination. While the possibility that religious competition affects the supply of education has been often mentioned, it has rarely been formally tested. An important exception is Gallego and Woodberry (2010), mentioned in the introduction, who show that the quality of education provided by missionaries was higher when they faced stronger competitive pressures. While this competition can be positive for overall school quality, it can also lead to strong spatial inequalities.

Finally, higher supply in places where schools opened first may be the result of faster structural transformation in these places (Rocha et al., 2017 or Valencia Caicedo, 2019a). Structural transformation may then contribute to increasing the returns to education and both supply and demand, which in turn leads to clustering. To test for this channel, we examine whether the type of occupation differs closer to missions (using DHS data) and whether economic development, proxied by night light luminosity, differs.

5.2 Demand factors

Demand for education may be persistently higher near former missions if educated parents have a higher demand for their children's education than uneducated parents, but also if missions affect parental demand for education, *regardless of parental education*. The latter mechanism would lead to higher educational mobility in the vicinity of former missions, with uneducated parents more likely to invest in their children's education if they were exposed to missions (Alesina et al., 2021). Such effects have been highlighted by Wantchekon et al. (2015), who uses detailed data from Benin to

show that uneducated parents are more likely to invest in their children's education if they grew up in a village that hosted a colonial school. The former mechanism (whereby educated parents have a higher demand for education), termed the intergenerational *transmission* of education, has been the focus of a large literature in sociology and economics and may be driven by several factors.[35] First, there may be an intergenerational correlation in ability or other family characteristics (such as values, parenting skills or information). Second, parental education may affect the (perceived) returns to schooling. Finally, in the presence of liquidity constraints, uneducated parents may be poorer and therefore underinvest in their children's education.

An important confounding factor in trying to isolate these demand channels relates to supply: the educational levels of parents and children may be correlated simply because they are more likely to grow up in the same environment (with the same access to schools) than random individuals. This supply channel is central to Alesina et al. (2021)'s recent study of intergenerational mobility in sub-Saharan Africa, where they compare intergenerational transmission among siblings who grew up in different places. They find that "regional exposure" has a significant impact on the level of intergenerational correlation (or mobility).[36] Our historical data provide an ideal setting to isolate pure demand factors from this regional exposure effect. Indeed, it consists of a representative sample of second-generation urban migrants in the 1970s who share the same supply environment but whose parents, educated in missions, have different levels of education (and exposure to missions). This allows us, in the spirit of Alesina et al. (2011)'s earlier work on the persistence of gender roles, to compare the educational outcomes of children who share the same access to school but whose parents had different levels of exposure to missions in their childhood (and different levels of education).

6 Persistence in the supply of education: empirical investigation

6.1 Location of schools in the vicinity of historical missions

We first examine whether the supply of contemporary schools is correlated with the location of colonial mission posts. To do this, we use data on the universe of contemporary primary and secondary schools (as of 2020) and their characteristics provided by the Ministry of Education. First, we divide the DRC into small grid cells of 20 km x 20 km, as shown in Figure 3. We then calculate the total number of schools and missions per grid cell. Since very few grid cells have more than one mission, we rely on a binary indicator of the presence of a mission. Thus, the unit of observation for

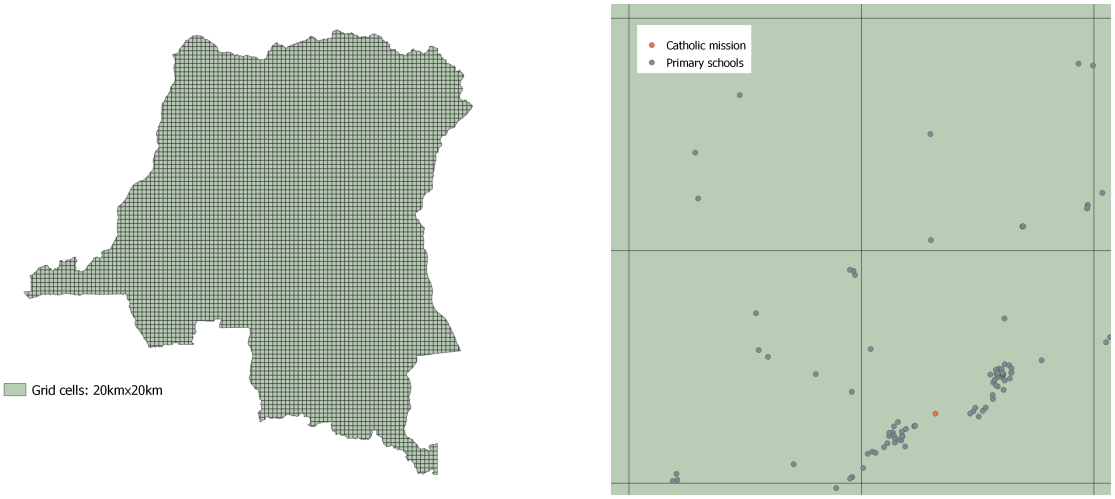
[35] Seminal papers include Becker (1964) and Coleman (1968). For a recent review, see Bjorklund and Salvanes (2011).

[36] The classification of this "regional exposure" effect as a supply-side effect is debatable in that it captures not only school supply but also local returns to education. However, it differs from a "pure" demand channel, where educated parents would have a higher demand for education, holding the environment (for example, school suply or the local returns to education) constant.

this analysis is a cell. In each specification, we include *collectivité* fixed effects, which are smaller administrative units than territories, to control for time-invariant location-specific confounders.[37] In addition, we control for factors that may have influenced the location of missions *within collectivités*, including: the presence of a navigable river, the presence of a colonial railroad, the presence of a pre-colonial exploration route, population density in 1900, cropland area in 1900, mean altitude, ruggedness and the distance from the centroid of each grid cell to Kinshasa.[38]

A strong correlation between historical missions and the number of schools may simply reflect that the grid-cells that hosted missions are (and likely were) more populated. To absorb this confounding factor we express our main dependent variable as the number of schools *per thousand inhabitants* and we systematically control for the population density in 1900 (our results also hold even when we control for contemporary population density at the cell level, and when we restrict the sample to rural schools, for more details see Appendix J).[39]

Figure 3: Historical missions and contemporary schools in the DRC



(a) 20x20km cells

(b) Example

The results are reported in Table J3. We find a strong and significant effect of past missionary presence on the number of primary and secondary schools a given cell has today.

When a historical Catholic (Protestant) mission was present in the grid cell, there is 0.8 (0.4) additional primary schools per 1000 inhabitants today (Column 1). The same holds true for secondary

[37] Today, the national territory of the DRC is divided into 26 provinces, the province into territories/cities, the territory/city into *collectivités*, the *collectivité* into groups/neighbourhoods, and the group/neighbourhood into villages/streets. The *collectivité* is the smallest administrative unit for which we have the shapefile.

[38] Some variables used in Section 4 to control for mission placements are not included here because they are absorbed by the *collectivité* fixed effects. Indeed malaria suitability, tse-tse suitability, or the number of slaves exported in the Indian and Atlantic trades, are defined at the level of ancestral ethnic territory and are therefore not (almost) invariant within a *collectivité* (while there are about 60 ethnic groups in the Ethnographic Atlas within the boundaries of the DRC, we count more than 700 *collectivités*).

[39] Furthermore, the results are robust to using the number of missions per 1000 inhabitants as an explanatory variable.

schools: a Catholic (Protestant) mission in the grid cell is associated with 0.5 (0.26) additional secondary schools per 1000 inhabitants. These effects are large. Having hosted a Catholic (Protestant) mission in the past is associated with a 109% (50%) increase in the mean number of primary schools per 1000 inhabitants. Similarly, having hosted a Catholic (Protestant) mission in the past is associated with a 126% (62%) increase in the mean number of secondary schools per 1000 inhabitants. Interestingly, the proportion of girls in these secondary schools is also higher near former missions (we return to this point below). In addition, the proportion of female teachers in secondary schools is higher near missions, which may increase female education per se, if female teachers act as role models (Burde and Linden, 2013; Adukia, 2017).

Table 3: Historical Missionary Presence and Contemporary Schools

	(1) Schools/1000	(2) % Girls	(3) % Female Teachers
Panel A: Primary Education			
Catholic mission	0.916***	0.0613***	0.0658***
	(0.170)	(0.0101)	(0.0107)
Protestant mission	0.430***	0.0401***	0.0414***
	(0.146)	(0.0129)	(0.0136)
Mean Y	0.776	0.288	0.310
Collectivite FE	Yes	Yes	Yes
R-squared	0.276	0.390	0.394
N	5787	6010	6010
Panel B: Secondary Education			
Catholic mission	0.560***	0.0691***	0.0334***
	(0.110)	(0.00986)	(0.00407)
Protestant mission	0.281***	0.0492***	0.0138***
	(0.0982)	(0.0112)	(0.00425)
Mean Y	0.411	0.189	0.0497
Collectivite FE	Yes	Yes	Yes
R-squared	0.248	0.433	0.485
N	5787	5984	6010

NOTE. Data: Universe of primary and secondary schools in the DRC in 2020, from Ministry of education. The table reports OLS estimates. The unit of observation is a 20kmx20km grid cell. Outcome variables are defined as follows: schools per 1000 population in 2015 in column (1), average share of girls in school by grid cell in column (2), and average share of female teachers in school by grid cell in column (3). Controls at the grid-cell level are always included: presence of navigable river, presence of colonial reialroad, presence of precolonial explorer route, population density in 1900, cropland area in 1900, mean altitude, ruggedness, and distance from the centroid of the grid-cell to Kinshasa. Sector fixed-effects (collectivités) included in all specifications. Robust standard errors in parenthesis. *** for $p < 0.01$, ** for $p < 0.05$, * for $p < 0.1$.

Why did post-independence schools open near former missions (and schools)? The discussion above (Section 5) suggests three mechanisms: 1) missions were located in areas where demand/returns to education would be higher; 2) missions triggered structural change leading to higher demand/returns to education; 3) schools compete and lead to clustering. Mission placement is unlikely to fully explain the results: carefully controlling for endogeneity in mission location (with geographic fixed effects or state of the art controls) does not affect the significance of the coefficients.[40] In what fol-

[40] This issue is more problematic when mission data are limited to the oldest missions or when mission data come from

lows, we first examine school competition and its role in the clustering of schools. We then turn to examining the structural transformation argument, looking at the correlation between the structure of occupations and proximity to historical missions.

6.2 Competition across religions

To investigate whether clustering is exacerbated by competitive forces, we examine whether the opening of a secondary school of a given denomination triggers - or deters - the opening of a school of the same or another denomination in the same place (grid-cell).[41]

More specifically, we estimate the following regression, where $S_{i,t,r}$ takes value 1 if a school of denomination r opened at time t in grid-cell i (with $r = c$ corresponding to Catholic and $r = p$ to Protestant school). Finally, λ_t and σ_i are year and grid-cell fixed effects, respectively. We show the results using different lags for the opening of a school in the past (during the previous three or five years). Note that a lag of our dependent variable is included in the construction of one of our explanatory variables. However, as T is large in our context (the median grid-cell has $T = 40$), dynamic panel bias becomes insignificant and the standard within-groups estimator is appropriate (Roodman, 2009; Blundell and Bond, 2023).[42].

$$S_{i,t,r} = \beta_0 + \sum_{j=1}^{3,5} \beta_c S_{i,t-j,c} + \sum_{j=1}^{3,5} \beta_p S_{i,t-j,p} + \lambda_t + \sigma_i + \varepsilon_{i,t,r} \tag{3}$$

If schools compete with each other, we would expect competition to be stronger across religious denominations than within. Under this assumption, we could detect competition by observing that the opening of a Catholic (Protestant) school is more likely after the recent opening of a Protestant (Catholic) school than of a Catholic (Protestant) school. If school openings are unrelated to religious competition, we would not expect any difference between β_c and β_p.

Table 4 shows the results. Both types of religious schools respond very differently to the opening of a school of the other denomination than to the opening of a school of the same denomination. Column 1 shows that the opening of a Catholic school in the same area in the last 3 years reduces the probability of a new Catholic school opening by about 2 percentage points. In contrast, the opening of a Protestant school in the last 3 years increases the probability of a new Catholic school opening by 1.4 percentage points, which is an increase of 28% from the mean. Protestant schools also respond

atlases, (Jedwab et al., 2017), which is not our case (we have information on the universe of missions operating in 1948 from several yearbooks and colonial maps).

[41]We focus on secondary schools, since we do not have information on the opening date of primary schools. An important assumption is that secondary school closure is not introducing problematic sample selection concerns: we know the date of opening of all schools operating in 2020, we thus have no information on schools that would have opened and closed before 2020.

[42]Moreover, the number of instruments would be far too large if we implemented the kind of estimators proposed by Arellano and Bond (1991). For example, if we include three yearly lags of our dependent variable, we would have about 3000 instruments. We would still reach 150 instruments if we limit ourselves to a single lag. In any case, our main conclusions remain valid if we implement the estimator proposed by Arellano and Bond (1991) (see Appendix K)

to the opening of a Catholic school: the opening of a Catholic school in the last three years increases the likelihood of a Protestant school opening by 2.6 percentage points (or 23% of the mean) (column 2).

These differential effects by denomination after the opening of a new school are difficult to explain in the absence of competitive forces, even if clustering is also driven by economic factors. Still, we show in Appendix M, Table M1, that these effects do not change when we control for education trends at the province level, which may capture aggregate demand for education (for the number of school openings by year and province). Moreover, we show that our results are not sensitive to the use of Conley standard errors, and therefore are not driven by the existence of spatial autocorrelation (see Table M2).[43] Furthermore, this competition is not a purely urban phenomenon, that is taking place in cities and accompanying processes of structural transformation : if we restrict attention to rural areas, results are similar (results are displayed in Appendix O, using two different definitions of rural grid-cells).

To further probe into the role of *religion* in this competition across schools, we extend the analysis and include secular public schools, as well as other types of faith-based schools.[44] To the extent that Catholic (Protestant) schools are in competition with other types of schools, e.g. because they wish to attract pupils from other schools for conversion or financial reasons, we would again expect different reactions to the opening of a Catholic (Protestant) school than to the opening of any other type of school. Table L in the appendix reports the results. It confirms the competition between the two main denominations (Catholic and Protestant) and shows that both denominations react strongly to the opening of any other faith-based schools. However, they react less strongly to the opening of a secular public school (suggesting that religious competition, over and above financial considerations, is likely to be an important driver of faith-based school openings).[45]

In short, religious competition appears to lead to a concentration of schools in areas close to historic missions. While this possibility has been raised in the literature, it has never been formally tested.[46] Historians insist on the importance of religious competition in colonial Africa and argue that it helps to understand the geography of mission settlements. In the case of the Congo, both Catholic and Protestant authorities carefully monitored each other's progress and tried to prevent

[43] A plausible interpretation of the negative coefficients for the opening of a school of the same denomination is that the capacity of the existing school is increased instead of building a new school very close to the existing one. However, this mechanism does not explain why Protestant schools are more likely to open where a new Catholic school has just opened (and vice versa) than elsewhere.

[44] We group private schools - most likely from new evangelical churches - and "other schools" which is a residual category of faith schools grouping Kimbanguistes, Muslims and Adventists among others (see Section 3.1 for a description of school types).

[45] Although the effect of opening a secular public school on the opening of a Catholic school is zero, we still find a positive coefficient when we look at the probability of opening a Protestant school. This effect is however smaller than the effect of opening a Catholic school (about half).

[46] Interestingly, in their investigation of the impacts of colonial public education on labour and marriage market outcomes in Cameroon, André and Dupraz (2023) note that Christian schools tend to locate where other Christian schools were already operating. While they do not distinguish between Protestant and Catholic schools, this finding could be the result of competition across schools.

the other religion from "conquering" large areas by opening posts relatively close to each other. Recent reports on education in the DRC indicate that today, as in colonial times, schools remain a vector of proselytization for the churches, so that church competition can lead to school competition (Gauthier et al., 2021). Although studying the impact of school clustering and competition on the quality of the education provided is beyond the scope of this paper, simple descriptive statistics show that Catholic schools are slightly larger (in number of students and classrooms) than Protestant ones, but have comparable proxy indicators of quality: same number of teachers per classroom, students per classroom and per teacher (Tables upon request).

Table 4: Competition between religious affiliations

	(1) P(Catholic)	(2) P(Protestant)	(3) P(Catholic)	(4) P(Protestant)
Catholic between t and t-3	-0.0171***	0.0262***		
	(0.00368)	(0.00497)		
Protestant between t and t-3	0.0132***	0.00329		
	(0.00287)	(0.00428)		
Catholic between t and t-5			-0.0198***	0.0220***
			(0.00343)	(0.00464)
Protestant between t and t-5			0.00924***	-0.00758*
			(0.00283)	(0.00399)
Time FEs	Yes	Yes	Yes	Yes
Grid-cell FEs	Yes	Yes	Yes	Yes
Mean Y	0.0521	0.119	0.0543	0.125
R-squared	0.107	0.191	0.110	0.193
N	61849	61849	57079	57079

NOTE. The dependent variable is a dummy that equals one if a new school of type x opens in cell c at year t. The independent variables are dummies that equal one if a new school of the opposite type opened in cell c in year t-1, t-2 or t-3, or in cell c in year t-1, t-2, t-3, t-4 or t-5, respectively. Standard errors () clustered at the 20x20km grid cell level are reported in parenthesis. *** for $p < 0.01$, ** for $p < 0.05$, * for $p < 0.1$.

Robustness checks: One of the main drawbacks of our dataset is that it includes the universe of secondary schools opened in 2022 (and thus ignores schools that have closed before that date). Since an important determinant of school closure in the DRC is conflict, we conduct a robustness test where we restrict attention to grid cells with low exposure to conflict. To do this, we use data on the total number of conflicts that occurred between 1997 and 2022 from the Armed Conflict Location and Event Data Project (ACLED).[47] Appendix N confirms that the results presented in sections 6.1 and 6.2 are robust to this sample restriction (Tables N1 and N2, respectively).

6.3 Structural transformation and returns to education

Another (yet related) explanation for the concentration of schools closer to historic missions relates to structural change and returns to education. If the initial educational advantage allowed mission-exposed areas to take advantage of economic opportunities (development of manufactur-

[47]Conflicts include events such as fighting, explosions or remote violence, protests, riots, strategic developments, and violence against civilians.

ing or service sectors), then these areas may have enjoyed higher levels of returns to education and economic development, leading to a more dynamic supply of education and generating educational persistence.[48] Although we have previously shown that our results on competition are unlikely explained by structural transformation, we further explore this channel and provide suggestive evidence based on contemporaneous occupational patterns in the DHS data. While the DHS survey provides simple information about labour market participation and the broad sector of occupation, it is however not well suited for an in-depth analysis of educational returns as it does not include details about occupation or information about income. Following Jedwab et al. (2022), we also explore the influence of exposure to missionary presence on the intensity of nightlights in the area around each DHS cluster, which is usually considered a proxy for economic development, both in terms of levels and changes.[49]

In practice, we re-estimate equation 1 (long-term effects on education) using these outcomes as dependent variables. Table 5 reveals that halving the distance to former Catholic or Protestant missions reduces the propensity to work in the formal sector by a modest 1-2 percentage points (even when considering only individuals over 20 in column 2). These results provide already suggestive evidence of limited structural transformation, since higher-productivity activities tend to concentrate in the formal sector (McMillan et al., 2014). Conditional on working, the sector of employment is slightly different in the vicinity of Catholic missions: halving the distance reduces the probability of working in agriculture by four percentage points in favor of services (+2 pp) and manufacturing (+1.2 pp). In contrast, we see no clear pattern of occupation closer to historic Protestant missions. Moreover, we find no effect of nighttime luminosity, which is surprising if we expect places closer to historic missions to be more economically dynamic, but is consistent with the results for Ghana of Jedwab et al. (2022). In short, we do not find clear evidence of structural transformation near historical missions. At most, the occupational structure shows some modest signs of structural transformation near historical Catholic posts (but not Protestant), suggesting that these differences in occupational specialization (and associated structural transformation) are quite unlikely to explain the patterns of persistence, at least for Protestant missions.

[48] Occupational specialization is the main factor of transmission generating economic and educational persistence in Rocha et al. (2017); Valencia Caicedo (2019a)

[49] This variable is provided by the DHS. Is is constructed as the average nighttime luminosity of the area within the 2 km (urban) or 10 km (rural) buffer surrounding the DHS survey cluster location. It removes outliers such as flares from petroleum extraction and other short-duration lights. The background data was also shifted to 0 to account for moonlight.

Table 5: Exposure to missions and occupational specialization

	(1) Work	(2) Work	(3) Agriculture	(4) Services	(5) Manufacture	(6) Log(nightlights)
Exp to Cath	-0.0181**	-0.0150**	-0.0563***	0.0193***	0.0121***	0.0260
	(0.00850)	(0.00761)	(0.0137)	(0.00660)	(0.00357)	(0.0257)
Exp to Prot	-0.0243***	-0.0196**	-0.00832	-0.00314	-0.00779**	0.0299
	(0.00817)	(0.00774)	(0.0139)	(0.00776)	(0.00340)	(0.0261)
FEs	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Mean Y	0.719	0.821	0.393	0.178	0.0781	0.652
R-squared	0.220	0.101	0.290	0.100	0.102	0.823
N	34208	25221	34208	34208	34208	675

NOTE. Data: Pooled 2007 and 2013 waves of the DHS. The sample is restricted to people living in DHS clusters located 50km or closer to a mission. The sample in column 2 is restricted to people over 20. The unit of observation in column 7 is the DHS cluster. The table reports OLS estimates. We use $-log(distance)$ to measure exposure. Outcome variables are defined as follows: "Employed" is a dummy variable equal to one if the respondent works (column 1) or if the respondent works and is older than 20 years old (column 2). Dummy equal to one if the respondents works in agriculture (column 3), services (column 4), or manufactures (column 5). The outcome in column 6 is a dummy variable that equals one if the respondent belongs to the top 40% of the wealth distribution. Column 7 reports the log(1+nightlights), where nighslights are defined as the average nighttime luminosity of the area within the 2 km (urban) or 10 km (rural) buffer surrounding the DHS survey cluster location (removing outliers such as flares from petroleum extraction and other short-duration lights. The background data was also shifted to 0 to account for moonlight). Standard errors () are clustered at DHS cluster level. Geographical, historical and individual controls included. *** for $p < 0.01$, ** for $p < 0.05$, * for $p < 0.1$.

6.4 Distance to school and education

The analysis of school location reveals strong spatial inequalities that are correlated with the location of missions in the past. In other words, closer to former missions, children grow up closer to both primary and secondary schools. Inequality in distance to school typically translates into inequality in education in poor country contexts. It is well documented that distance to school is a strong determinant of enrollment, especially for girls (King and Hill, 1993; Burde and Linden, 2013; World Bank, 2021), so persistence in school location may be a critical element in understanding spatial inequality in female educational outcomes.

Table J3 shows that the proportion of girls in secondary schools is strongly associated with the presence of historical missions. Such an association is not found for primary schools, where girls make up 48% of students. Data from the 2013 National Survey on the Situation of Out-of-School Children and Adolescents in the DRC (OOSC) confirm the strong correlation between distance to schools and attendance rates. This survey is representative of children aged 6-17.[50] It includes detailed information on education and on the distance between the respondent's residence and the nearest primary and secondary school for approximately 20,000 children.

Table 6 shows that the probability that a child attends school is negatively associated to the distance to school. For primary schools, the effect of distance is strong and similar for boys and girls: if the school is 5-10 km away, children are 14 percentage points less likely to have ever attended school than if it is less than 1 km away (40pp for distances above 10 km). For secondary school attendance, the results are very different by gender: the probability of never attending secondary school is al-

[50] The survey was managed by the Ministry of Primary, Secondary and Vocational Education of the DRC and implemented by the Higher Institute of Population Sciences of the University of Ouagadougou.

ready 7 percentage points higher for girls living 3-5 km from a secondary school than for those living less than 1 km, an effect of almost 30% of the mean.[51] It may appear surprising that the differences in effects across gender are marked only for secondary schooling, recalling that the persistent effects of missions was particularly marked for primary schooling outcomes among adult women in the 2007 and 2013 waves of the DHS. Yet the progress in primary school attendance have been very substantial over the last decades, so that heterogeneity in schooling outcomes among adolescents in 2013 concerns mostly secondary schooling.

Table 6: Distance to School and Enrollment rates

	Dependent variable: Out-of-school Child					
	Primary			Secondary		
	All	Boys	Girls	All	Boys	Girls
	(1)	(2)	(3)	(4)	(5)	(6)
Primary school 1-2km	0.0400***	0.0424**	0.0369*			
	(0.0152)	(0.0170)	(0.0203)			
Primary school 3-5km	0.0901***	0.0822***	0.0944***			
	(0.0220)	(0.0245)	(0.0298)			
Primary school 5-10km	0.185***	0.242***	0.125***			
	(0.0348)	(0.0468)	(0.0402)			
Primary school >10km	0.477***	0.461***	0.490***			
	(0.0905)	(0.113)	(0.0699)			
Secondary school 1-2km				0.00731	-0.00210	0.0145
				(0.0128)	(0.0154)	(0.0178)
Secondary school 3-5km				0.0307	-0.0116	0.0740**
				(0.0211)	(0.0233)	(0.0296)
Secondary school 5-10km				0.0610***	0.0357	0.0842***
				(0.0226)	(0.0220)	(0.0301)
Secondary school >10km				0.290***	0.239***	0.345***
				(0.0440)	(0.0553)	(0.0470)
Mean Y	0.267	0.258	0.276	0.185	0.140	0.232
R-squared	0.145	0.147	0.145	0.0923	0.0588	0.119
N	12086	6170	5916	9030	4577	4453

NOTE. Data: Out-of-School Children and Adolescents Survey. The sample in Columns (1)-(3) is restricted to children in primary school age (6-11) while it is restricted to children in secondary school age (12-17) in Columns (4)-(6). The dependent variable is a dummy indicating whether the child attends school at the time of the survey. Standard errors () are clustered at the "grappe" level. Province fixed-effects are always included. Controls include age, whether the respondent lives in a rural/urban area and sex.

All in all, the combination of the clustering of schools in specific places (in part driven by competition across religious denominations) and the influence of distance to school in schooling outcomes are important drivers of geographical and gender inequalities in educational outcomes in the DRC and of the persistence of the effects of colonial missions.

[51] Note that the mean of the dependent variable is significantly higher in columns 1-3 than in columns 4-6. This is because columns 1-3 focus on the age range 6-11 and 25% of the children in our sample start primary school later, when they are older than six years old.

7 Persistence in the demand for education: empirical investigation

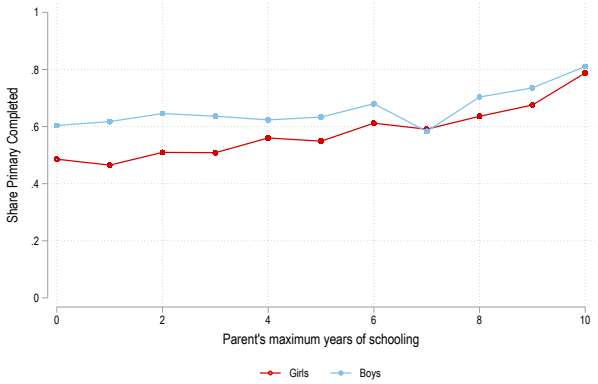
The demographic survey from the 1970s enables us to isolate demand channels and assess whether educated parents (or those who grew up near missions) make different decisions about their children's education, holding supply constant (and absorbing the "regional exposure effect"), in an urban context. To this end, we leverage the heterogeneity of migrant parents' exposure to missions in their childhood: sampled children face the same schooling supply in the cities (we can even include neighborhood fixed effects), but their parents grew up in different environments and (therefore) have different levels of education (exposure to missions). Specifically, we estimate the extent to which parents' education during the colonial period matters for children's education (in the newly independent country), and whether exposure to Christian missionaries had an effect on the education of the children of exposed individuals.[52]

7.1 Intergenerational transmission of education

We begin by estimating the raw correlation between parents' and children's education. Figure 4 plots the share of children with completed primary education as a function of the maximum year of education of their parents. There is a positive relationship, and the slope is steeper for girls than for boys: while 60% (50%) of boys (girls) whose parents have no education manage to complete primary education, this percentage rises to 80% when the maximum year of parental education is 10. This suggests that there is positive intergenerational correlation, yet the graph also reveals a remarkable degree of upward educational mobility immediately after independence: a majority of urban children (boys and girls) of uneducated parents finish primary school.

[52] We follow Card et al. (2022) or Alesina et al. (2021) and focus on children aged 14-19 because they should have already completed primary school and cohabitation rates are very high (0.6% of people aged 14-19 in our sample are heads of household, while about 6% are spouses of the head of household).

Figure 4: Correlation between parents' and children education



Note: Data: Demographic Survey of the 1970s. The figure shows the share of children aged 14-19 with primary school completed (6 years of education) given the maximum year of education of their parents.

Table 7: Intergenerational correlation in education in the 1970s

	(1)	(2)	(3)	(4)	(5)	(6)
	Years educ	Primary or more	Post-primary	Years educ	Primary or more	Post-primary
Father's y.o.e	0.0998***	0.0175***	0.0165***	0.0778***	0.0155***	0.0157***
	(0.0110)	(0.00161)	(0.00131)	(0.00590)	(0.00131)	(0.00165)
Mother's y.o.e	0.0452***	0.00928***	0.00917***	0.0327***	0.00654***	0.00677***
	(0.0103)	(0.00214)	(0.00188)	(0.0115)	(0.00185)	(0.00242)
Father's y.o.e x F				0.0457**	0.00422	0.00179
				(0.0210)	(0.00300)	(0.00285)
Mother's y.o.e x F				0.0268***	0.00580***	0.00506**
				(0.00738)	(0.00181)	(0.00206)
FEs	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Mean Y	6.080	0.636	0.439	6.080	0.636	0.439
R-squared	0.354	0.261	0.298	0.356	0.262	0.298
N	22458	22458	22458	22458	22458	22458

NOTE. Data: Demographic Survey conducted during the 1970s. The sample is restricted to children aged 14-19 during the time of the survey. In the explanatory variables, "*y.o.e*" account for "Years of education" to shorten their names. The table reports OLS estimates. Outcome variables are defined as follows: single years of education in columns (1) and (2), a binary variable that equals one if the respondent has at least one year of education in columns (2) and (5) and the probability of completing primary education (>5 years of education) in columns (3) and (6). Standard errors () are clustered at the territory of birth level. Fixed-effects include city of residence, territory of birth, age and the zone of residence of the individual within the city. Controls also include age of parents. *** for $p < 0.01$, ** for $p < 0.05$, * for $p < 0.1$.

The positive, but very modest, correlation between children and parents education is confirmed in a regression framework.[53] Table 7 presents the results of regressing children's education on their parents' education, controlling for an extensive set of demographic and geographic characteristics. Overall, the relationship between parents' and children's education is strongly significant but small in size: an additional year of father's (mother's) education is associated with 0.1 (0.05) years of education for a child (column 1). These coefficients are small compared to estimates in the literature, even accounting for the fact that we absorb the "regional exposure effect" of parents. For instance,

[53]We obtain consistent results if we replace parents' years of education with a dummy indicating whether parents have any education. Table upon request.

Hertz et al. (2008) report coefficients from simple regressions of children number of years of education on parents years of education for 42 countries and find coefficients of 0.80 for their African sample.[54]

Our estimates suggest that the relationship between parents and children education is slightly stronger for girls, suggesting that parental education is a stronger determinant of girls' education than of boys'.[55] Why this larger intergenerational correlation for girls? Above we highlighted three factors repeatedly mentioned in the literature to explain intergenerational correlation: liquidity constraints, transmission in ability or other family characteristics and different returns to education for children of educated parents. Are uneducated parents liquidity constrained and giving priority to boys who experience higher returns to education? As we have information on parental occupation we can (imperfectly) control for liquidity constraints. These results are shown in Appendix P. It is striking that our coefficient on parental education barely move when we include this control, pointing to a limited role of liquidity constraints.[56]

Could family backgrounds (values) and returns to education be different when parents are educated, and different across gender? Several elements suggest that the answer is positive. Colonial education conveyed specific gender values that may have directly influenced parents' demand for education. Furthermore, labour market returns were higher for men (educated women had very few skilled labour opportunities until the very end of the colonial period), while women likely experienced marriage market returns to education. If marriage market returns depend more on parental background than labour market returns (for example because family network is more important in marriage market than labour market), intergenerational correlation in education may be stronger for daughters than for sons.[57]

7.2 Missions and education mobility

The high degree of educational mobility shown above may itself be influenced by exposure to missions (maybe missions changes the demand for education of both educated and uneducated individuals). As detailed above, Alesina et al. (2021) show that upward mobility in Africa is higher in areas exposed to missions. With our urban migrant sample, we can formally test for this positive effect of missions on educational mobility, again absorbing the "regional exposure effect" of parents.

[54] Other regional averages are: 0.79 for Latin America, 0.47 for Eastern European countries and 0.54 for West-European countries and North America.

[55] This is consistent with recent findings for other developing countries, both in Africa or in Asia (Emran and Sun, 2015; Emran and Shilpi, 2015; Azomahou and Yitbarek, 2016; Torche, 2019).

[56] Parental occupation qualifies as a "bad control" because it is itself influenced by parental education. Yet the fact that the coefficient on education is unaffected by the inclusion of this variable suggests that it is not "mediating" the direct impact of parents' education on children education.

[57] Regarding the intergenerational correlation in family characteristics, Wantchekon et al. (2015) argues that ability is likely to have only a very modest influence on individuals differences in colonial education, as selection into missionary schools could hardly be based on ability.

We exploit the same source of variation as in Table 7, replacing parental education by parental exposure to mission. Thus, our coefficients are again identified by time variations in parental exposure to missions in a given territory, holding constant the supply of education in the city. In addition, with the same estimation strategy, we explore the role of exposure to mission on education *expenditure*, taking advantage of an expenditure survey including 1/50 of the total number of households identified in the same seven cities of the 1970s Demographic Survey.

Table 8: Parents' exposure to missions and children's education

	(1) Years educ	(2) $\geq$ Primary	(3) Post-primary	(4) Years educ	(5) $\geq$ Primary	(6) Post-primary
Father's exposure to Cath	-0.0264	-0.0143	0.00179	0.0167	-0.0135	0.00228
	(0.116)	(0.0228)	(0.0196)	(0.158)	(0.0270)	(0.0225)
Father's exposure to Nuns	-0.118*	-0.0201	-0.0115	-0.133*	-0.00924	-0.00795
	(0.0643)	(0.0142)	(0.0119)	(0.0753)	(0.0164)	(0.0133)
Father's exposure to Prot	0.277***	0.0433**	0.0397**	0.193*	0.0281	0.0336*
	(0.102)	(0.0207)	(0.0185)	(0.116)	(0.0223)	(0.0198)
Exposure to Cath x Female				-0.0910	-0.00246	-0.00133
				(0.152)	(0.0196)	(0.0180)
Exposure to Nuns x Female				0.0232	-0.0229	-0.00764
				(0.0797)	(0.0154)	(0.0145)
Exposure to Prot x Female				0.179	0.0324**	0.0130
				(0.111)	(0.0136)	(0.0131)
FEs	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Mean Y	6.066	0.632	0.437	6.066	0.632	0.437
R-squared	0.284	0.201	0.253	0.285	0.202	0.253
N	20443	20443	20443	20443	20443	20443

NOTE. Data: Demographic Survey of the 1970s. The sample is restricted to children aged 14-19 at the time of the survey. The table reports OLS estimates. Father's exposure to missions is described Section 3.2. Outcome variables are defined as follows: single years of education in columns (1) and (4), the probability of completing primary education (>5 years of education) in columns (2) and (5), and the probability of having post-primary education (>6 years of education) in columns (3) and (6). Standard errors () are clustered at father's territory of birth level. Fixed-effects include city of residence and father's territory of birth. Controls include sex, year of installation in the current city, age and age of parents. *** for $p < 0.01$, ** for $p < 0.05$, * for $p < 0.1$.

Table 8 shows the results and reveals that parental exposure to Protestant missions directly increases their demand for education, especially for their daughters. In contrast, exposure to Catholic missions has no significant effect. In terms of magnitude, these effects are modest. Halving the distance (at birth) of the father to a Protestant mission increases children's years of education by 3% or the probability of completing primary education by 3 pp (5%). The same conclusion is drawn from the analysis of educational expenditures (Table 9): exposure to Protestant, but not Catholic missions, increases educational expenditures.

Table 9: Exposure to missions and education expenditures

	(1) Education exp.	(2) Ln(1+Educ Exp.)	(3) Exp. per capita	(4) Clothes exp.
Exposure to Catholic	-0.0382	-0.211	-54.95	0.00542
	(0.0399)	(0.162)	(98.16)	(0.0403)
Exposure to Nuns	-0.0140	-0.0508	75.52	0.00148
	(0.0205)	(0.104)	(75.75)	(0.0213)
Exposure to Protestant	0.0665**	0.278*	60.68	0.00627
	(0.0307)	(0.146)	(87.33)	(0.0265)
FEs	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes
Mean Y	0.348	1.511	1311.9	0.264
R-squared	0.162	0.179	0.183	0.160
N	4731	4731	4731	4731

NOTE. Data: Budgetary Survey of the 1970s. The table reports OLS estimates. (Log) Exposure to missions is described in Section 3.2. Outcome variables are defined as follows: dummy variable that equals one if the household spends in education in column (1), 1 + the logarithm of total expenditure in education in column (2) , total expenditure per capita in column (3), and whether the household spends in clothes for children in column (4). Standard errors () are clustered at the territory of birth level. Fixed-effects include city of residence, territory of birth, and 5-year age cohorts. Controls include total number of household members, sex of household head, whether respondents were born in urban/rural area, and total expenditure. *** for $p < 0.01$, ** for $p < 0.05$, * for $p < 0.1$.

These results come somewhat as a surprise, since we showed above that *Catholic but not Protestant* missions had a sizeable effect on the *education of the first generation*. Taken together, these findings suggest that parental exposure to Catholic missions has an effect on children education *only to the extent that parents themselves are educated* (so that the results is far less strong in reduced form when we directly estimate the effects of missions on the education of the next generation). In contrast, exposure to Protestant missions appears to directly increase parents' demand for education, suggesting that exposure to Protestant missions is associated with more investment in education, even for uneducated parents (exposure to Protestant missions has a stronger impact on mobility). In Appendix Q we explore this conjecture and confirm that Protestant missions have a stronger effect on mobility than Catholic missions.

Why is there a greater impact of Protestant missions (than Catholic) on the education of the next generation? Why is the effect stronger for girls? A large literature in the social sciences establishes that Protestantism, at least historically, conveys a strong attachment to education. The idea is that every individual, male or female, should be able to read the Bible (*sola scriptura*). Becker and Woessmann (2008, 2009, 2010) show that Protestantism in Prussia in the early 19th century (before the Industrial Revolution) caused a strong increase in the demand for literacy. It is difficult to determine whether Protestant missionaries in the Congo were more insistent on literacy than Catholic missionaries. However, it is clear that Protestants were more educated than Catholic missionaries, especially female missionaries (Irvine, 1978). Furthermore, as discussed above, Protestant missions had a more gender-equal approach to schooling (Yates, 1982).

Overall, our examination of demand channels suggests that the influence of parental education and mission exposure on educational outcomes in urban post-independence Congo is modest. Parents, whether educated or not, invested heavily in the education of their children, the majority of

whom completed primary school. However, interesting gender and religious contrasts emerge, with a positive correlation between children's education and parental exposure to Protestantism, and greater intergenerational persistence for daughters.

8 Conclusion

Our paper proposes a new mechanism to explain the long-term effects of historical missions on female education in the DRC. Contemporaneous schools - overwhelmingly associated with either a Catholic or Protestant church - appear to compete, with the opening of a school of one religion seeming to trigger the subsequent opening of a school of the other (but not the same) religion. This competition seems to be the most likely channel for the clustering of schools around historical missions. This clustering has gendered consequences, as girls' education is more sensitive to the distance to school and thus more likely to be influenced by the distance to historical missions.

An interesting avenue for further research would be to examine the gendered returns to education from the colonial period to the present. Historians have argued for the lack of economic opportunities for women during the colonial period and the low labor market returns to education (Lauro, 2020; Lembagusala Kikumbi, 2018). However, we find that the demand for girls' education was very high immediately after independence. This raises the question of the nature of the returns to female education: are there labor market returns for some? What about marriage market returns? Do these returns change over time? What is the legacy of the colonial labor market structure? The latter question is even more relevant since our analysis of the DHS data suggests that women's participation in the labor market is *lower* closer to historical missions, even though their levels of education are higher.

On the supply side, the Congolese government has recently stepped up its efforts to provide free education and has launched an important program to build non-denominational public schools. In this context, our paper raises the question of the impact of these public investments on schools run by religious organizations, particularly in terms of complementarity and substitutability: Will these schools reduce inequalities in access to education by opening in areas where private actors are not active? Should we expect new competition between new public schools and religious schools? More generally, private actors play a very important (and growing) role in the provision of education in many countries. While a large literature has examined the consequences of this competition for the cost and quality of education, to the best of our knowledge there is no analysis of the spatial consequences and the possible clustering of schools in certain areas. This is a promising area for future research. Another gap in the literature concerns the possibility that religions compete for new converts through schools. This is likely to be relevant in other contexts and may have important consequences for the type of education provided by these actors.

References

Abadie, A., Athey, S., Imbens, G. W., and Wooldridge, J. M. (2023). When should you adjust standard errors for clustering? *The Quarterly Journal of Economics*, 138(1):1–35. 16

Administration coloniale (1950). Rapport sur l'administration du congo belge: Présentation aux chambres législatives. 1

Adukia, A. (2017). Sanitation and education. *American Economic Journal: Applied Economics*, 9(2):23–59. 23

Alesina, A., Giuliano, P., and Nunn, N. (2011). Fertility and the plough. *American Economic Review*, 101(3):499–503. 21

Alesina, A., Hohmann, S., Michalopoulos, S., and Papaioannou, E. (2021). Intergenerational Mobility in Africa. *Econometrica*, 89:1–35. 2, 5, 20, 21, 30, 32

Alsan, M. (2015). The Effect of the TseTse Fly on African Development. *American Economic Review*, 105:382–410. 10

André, G. and Poncelet, M. (2013). Héritage colonial et appropriation du « pouvoir d'éduquer. *Cahiers de la recherche sur l'éducation et les savoirs*. 6

André, P. and Dupraz, Y. (2023). Education and polygamy: Evidence from cameroon. *Journal of Development Economics*, 162:103068. 25

Anet, H. (1939). Protestant Missions in Belgian Congo. *International Review of Mission*, 28:415–425. 6

Angrist, J. D. and Pischke, J.-S. (2009). *Mostly Harmless Econometrics: An Empiricist's Companion*. Princeton: Princeton University Press. 5

Arellano, M. and Bond, S. (1991). Some Tests of Specification for Panel Data: Monte Carlo Evidence and an Application to Employment Equations. *The Review of Economic Studies*, 58(2):277–297. 24, 22

Azomahou, T. and Yitbarek, E. (2016). ntergenerational Education Mobility in Africa: Has Progress Been Inclusive?'. *Policy Research Working Paper 7865. Washington, DC: World Bank*. 32

Baten, J., De Haas, M., Kempter, E., and Meier Zu Selhausen, F. (2021). Educational Gender Inequality in Sub-Saharan Africa: A Long-Term Perspective. *Population and Development Review*, 47:813–849. 13

Bau, N. (2022). Estimating an equilibrium model of horizontal competition in education. *Journal of Political Economy*, 130(7):1717–1764. 4

Beach, H. (1903). *A Geography and Atlas of Protestant Missions: Their Environment, Forces, Distribution, Methods, Problems, Results and Prospects at the Opening of the Twentieth Century*. New York: Student Volunteer Movement for Foreign Missions. 9

Becker, B. (2022). The empire within: Longitudinal evidence on the expansion of christian missions in colonial africa. *Journal of Historical Political Economy*, 2:333–362. 3

Becker, B. and Meier zu Selhausen, F. (2023). *Women on a Mission: Protestant Legacies of Gender Equality in Africa?* AEHN, African Economic History Network. 13, 14

Becker, G. S. (1964). Human capital: A theoretical and empirical analysis, with special reference to education. *University of Illinois at Urbana-Champaign's Academy for Entrepreneurial Leadership Historical Research Reference in Entrepreneurship*. 21

Becker, S. O. and Woessmann, L. (2008). Luther and the girls: Religious denomination and the female education gap in nineteenth-century prussia. *The Scandinavian Journal of Economics*, 110(4):777–805. 3, 34

Becker, S. O. and Woessmann, L. (2009). Was Weber Wrong? A Human Capital Theory of Protestant Economic History. *The Quarterly Journal of Economics*, 124:531–596. 34

Becker, S. O. and Woessmann, L. (2010). The effect of protestantism on education before the industrialization: Evidence from 1816 prussia. *Economics Letters*, 107(2):224–228. 34

Ben Salah, M., Chambru, C., and Fourati, M. (2022). The colonial legacy of education: Evidence from of tunisia. *Working Paper, No. 411. University of Zurich, Department of Economics*. 4, 14

Bergeron, A. (2020). Religion and the Scope of Morality: Evidence From Exposure to Missions in the DRC. *Working Paper*. 3, 5

Bjorklund, A. and Salvanes, K. G. (2011). Education and family background: Mechanisms and policies. In Hanushek, E., Machin, S., and Woessmann, L., editors, *Handbook of the Economics of Education*, volume 3, chapter 03, pages 201–247. Elsevier, 1 edition. 21

Black, S. E. and Devereux, P. J. (2011). Recent developments in intergenerational mobility. *Handbook of labor economics*, 4:1487–1541. 5

Blundell, R. and Bond, S. (2023). Initial conditions and blundell–bond estimators. *Journal of Econometrics*, 234:101–110. 24

Bottero, M. and Wallace, B. (2013). Is there a long-term effect of africa's slave trades? *Quaderni di Storia Economica. Banca d'Italia*, 30. 14

Boyle, P. (1995). School Wars: Church, State, and the Death of the Congo. *The Journal of Modern African Studies*, pages 451–468. 6

Briand, V. and Nicolai, M. (2021). Religious networks in the drc: help or hindrance to education? *World Bank report*, (161509). 7

Burde, D. and Linden, L. L. (2013). Bringing education to afghan girls: A randomized controlled trial of village-based schools. *American Economic Journal: Applied Economics*, 5(3):27–40. 23, 28

Cagé, J. and Rueda, V. (2016). The Long-Term Effects of the Printing Press in Sub-Saharan Africa. *American Economic Journal: Applied Economics*, 8:69–99. 2, 3, 4, 10, 11, 12

Cagé, J. and Rueda, V. (2020). Sex and the mission: The conflicting effects of early Christian missions on HIV in Sub-Saharan Africa. *Journal of Demographic Economics*, 86:213–257. 3, 9

Calvi, R., Hoehn-Velasco, L., and Mantovanelli, F. G. (2022). The protestant legacy: missions, gender, and human capital in india. *Journal of Human Resources*, 57(6):1946–1980. 2, 3

Calvi, R. and Mantovanelli, F. G. (2018). Long-term effects of access to health care: Medical missions in colonial India. *Journal of Development Economics*, 135:285–303. 11

Card, D., Domnisoru, C., and Taylor, L. (2022). The intergenerational transmission of human capital: Evidence from the golden age of upward mobility. *Journal of Labor Economics*, 40(S1):S39–S95. 30

Cogneau, D. and Dupraz, Y. (2015). institutions historiques et développement économique en afrique: Une revue sélective et critique de travaux récents. *Histoire mesure*, pages 103–134. 14

Coleman, J. S. (1968). Equality of educational opportunity. *Equity & Excellence in Education*, 6(5):19–28. 21

Collier, P. (2024). *Left Behind. A New Economics for Neglected Places*. Penguin UK. 2

Congo Missionary Conference (1911). A report to the sixth general conference of missionaries of the protestant missionary societies working in congoland. 4

Congo Missionary Conference (1924). Organisation de l'enseignement libre subsidié pour indigènes avec le concours des sociétés de missions chrétiennes. 1

Conley, T. (1999). GMM estimation with cross sectional dependence. *Journal of Econometrics*, 92:1–45. 9

Corman, A. (1924). Annuaire des Missions Catholiques au Congo Belge. *L'édition universelle, Bruxelles*. 8

Corman, A. (1935). Annuaire des Missions Catholiques au Congo Belge. *L'édition universelle, Bruxelles*. 8

Depaepe, M. and Kikumbi, A. L. (2018). Educating girls in Congo: An unsolved pedagogical paradox since colonial times? *Policy Futures in Education*, 16:936–952. 6

Emran, M. and Shilpi, F. (2015). Gender, Geography, and Generations: Intergenerational Educational Mobility in Post-Reform India. *World Development*, 72:362–80. 32

Emran, S. and Sun, Y. (2015). Magical Transition? Intergenerational Educational and Occupational Mobility in Rural China: 1988–2002. *Policy Research Working Paper 7316. Washington, DC: World Bank*. 32

Frankema, E. (2013). Colonial Education and Postcolonial Governance in the Congo and Indonesia. *in: E. Frankema and F. Buelens (eds.), Colonial Exploitation and Economic Development. The Belgian Congo and the Netherlands Indies Compared, London and New York: Routledge*, pages 153–177. 5

Frankema, E. and Waijenburg, M. V. (2011). Structural impediments to african growth? new evidence from real wages in british africa, 1880–1965. *CGEH Working Paper No. 24*, (4). 14

Gallego, F. A. and Woodberry, R. (2010). Christian Missionaries and Education in Former African Colonies: How Competition Mattered. *Journal of African Economies*, 19:294–329. 3, 4, 20

Gauthier, B. P., Abouly, Y., Yi Chang, A., and Adelman, M. A. (2021). Service delivery indicators report: Drc. *UNESCO report*, (ED/GEMR/MRT/2021/P1/14). 7, 26

Guinnane, T. W. (2023). We do not know the population of every country in the world for the past two thousand years. *The Journal of Economic History*, 83(3):912–938. 5

Guirkinger, C. and Villar, P. (2022). Pro-birth policies, missions and fertility : historical evidence from Congo. *DeFiPP Working Paper 04*. 4

Hertz, T., Jayasundera, T., Piraino, P., Selcuk, S., Smith, N., and Verashchagina, A. (2008). The inheritance of educational inequality: International comparisons and fifty-year trends. *The BE Journal of Economic Analysis & Policy*, 7(2). 32

Huillery, E. (2009). History Matters: The Long-Term Impact of Colonial Public Investments in French West Africa. *American Economic Journal: Applied Economics*, 1:176–215. 2, 4, 20

Iannaccone, L. R. (1998). Introduction to the economics of religion. *Journal of economic literature*, 36(3):1465–1495. 4

Irvine, C. (1978). The Church of Christ in Zaire : a handbook of Protestant churches, missions and communities, 1878-1978. *Indianapolis : Dept. of Africa, Division of Overseas Ministries, Christian Church*. 6, 8, 9, 34

Iyer, S. (2016). The new economics of religion. *Journal of Economic Literature*, 54(2):395–441. 4

Jedwab, R., Kerby, E., and Moradi, A. (2017). History, Path Dependence and Development: Evidence from Colonial Railways, Settlers and Cities In Kenya. *The Economic Journal*, 127(603):1467–1494. 24

Jedwab, R., Meier zu Selhausen, F., and Moradi, A. (2022). The Economics of Missionary Expansion: Evidence from Africa and Implications for Development. *Journal of Economic Growth*, 27:149–192. 2, 4, 9, 10, 12, 27, 5, 14

Kelly, M. (2019). *The Standard Error of Persistence*. UCD Working Paper. 9

King, E. M. and Hill, M. A. (1993). *Women's education in developing countries*. The World Bank. 28

Klein Goldewijk, K., Beusen, A., van Drecht, G., and de Vos, M. (2011). The hyde 3.1 spatially explicit database of human induced land use change over the past 12,000 years. *Global Ecology and Biogeography*, 20:73–86. 10

Lauro, A. (2020). Women in the Democratic Republic of Congo. In Spear, T., editor, *The Oxford Research Encyclopedia of African History*. Oxford: Oxford University Press.(Oxford Research Encyclopedias). 6, 35

Le Rossignol, E., Donat-Bouillud, P., and Hirschi, C. (2023). Christian missions and education quality: Evidence from the democratic republic of the congo. *Working paper*. 3

Lembagusala Kikumbi, A. (2018). L'education des filles dand les écoles secondaires du diocèse de Kikwit en R.D.Congo (1960-1997). *PhD Dissertation*. 6, 35

MacGaffey, W. (1982). Education, religion, and social structure in zaire. *Anthropology & Education Quarterly*, 13(3):238–250. 7

Markowitz, D. V. (1970). The Missions and Political Development in the Congo. *Africa: Journal of the International African Institute*, 40:234–247. 6

Masandi, P. K. (2004). L'Éducation féminine au congo belge. *Paedagogica Historica*, 40(4):479–508. 6

McMillan, M., Rodrik, D., and Íñigo Verduzco-Gallo (2014). Globalization, structural change, and productivity growth, with an update on africa. *World Development*, 63:11–32. Economic Transformation in Africa. 27

Meier zu Selhausen, F. (2019). Missions, Education and Conversion in Colonial Africa. In Mitch, D. and Cappelli, G., editors, *Globalization and the Rise of Mass Education*, pages 25–59. Palgrave, Macmillan. 5

Montgomery, M. (2017). Colonial Legacy of Gender Inequality: Christian Missionaries in German East Africa. *Politics Society*, 45:225–268. 2, 3

Nickell, S. (1981). Biases in dynamic models with fixed effects. *Econometrica*, 49(6):1417–1426. 22

Nunn, N. (2008). The long term effects of africa's slave trade. *The Quarterly Journal of Economics*, 123:139–176. 14

Nunn, N. (2010). Religious Conversion in Colonial Africa. *American Economic Review Papers and Proceedings*, 100:147–152. 9

Nunn, N. (2014). Gender and Missionary Influence in Colonial Africa. *Africa's Development in Historical Perspective. New York: Cambridge University Press*, pages 489–512. 2, 3, 13

Nunn, N. and Wantchekon, L. (2011). The slave trade and the origins of mistrust in Africa. *American Economic Review*, 101:3221–52. 10

Okoye, D. (2022). Historical christian missions and african societies today: Perspectives from economic history. *Economic History of Developing Regions*, 37(3):315–332. 2, 3, 4

Okoye, D. and Pongou, R. (2023). Missions, fertility transition, and the reversal of fortunes: evidence from border discontinuities in the emirates of Nigeria. *J Econ Growth*. 4

Rocha, R., Ferraz, C., and Soares, R. R. (2017). Human capital persistence and development. *American Economic Journal: Applied Economics*, 9(4):105–36. 20, 27

Roodman, D. (2009). How to do xtabond2: An introduction to difference and system gmm in stata. *The Stata Journal*, 9(1):86–136. 24

Roome, W. (1924). *Ethnographic Survey of Africa: Showing the Tribes and Languages; Also the Stations of Missionary Societies [map]*. 9

Service de l'Enseignement (1952). Organisation de l'enseignement libre subsidié pour indigènes avec le concours des sociétés de missions chrétiennes. 1

Shapiro, D. (1996). Fertility decline in Kinshasa. *Population Studies*, 50:89–103. 8

Sheline, Y. E., Papagiannis, G. J., and Grant, S. R. (1984). The effect of school sponsorship on academic achievement: a comparison of catholic, protestant and government secondary schools in zaire. *Comparative Education*, 20(2):223–236. 7

Solon, G. (2018). What do we know so far about multigenerational mobility? *The Economic Journal*, 128(612):F340–F352. 5

Streit, K. (1929). *Atlas Hierarchicus: Descriptio geographica et statistica Sanctae Romanae Ecclesiae tum occidentis tum orientis juxta statum praesentum accedunt nonnullae notae historicae necnon ethnographicae*. Paderbornae : sumptibus typographiae Bonifacianae. 9

Tabutin, D. (1982). Evolution régionale de la fécondité dansl'ouest du Zaïre. *Population (french edition)*, page 29–50. 8

Torche, F. (2019). Educational mobility in developing countries. WIDER Working Paper Series wp-2019-88, World Institute for Development Economic Research (UNU-WIDER). 32

Valencia Caicedo, F. (2019a). Missionaries in Latin America and Asia: A First Global Mass Education Wave. In Mitch, D. and Cappelli, G., editors, *Globalization and the Rise of Mass Education*, pages 61–98. Palgrave, Macmillan. 5, 20, 27

Valencia Caicedo, F. (2019b). The Mission: Human Capital Transmission, Economic Persistence, and Culture in South America. *The Quarterly Journal of Economics*, 134:507–556. 3

Van Wing, J. (1949). Annuaire des Missions Catholiques au Congo Belge et au Ruanda. *L'édition universelle, Bruxelles*. 8

Vinck, H., Briffaerts, J., Herman, F., and Depaepe, M. (2006). Expériences scolaires au congo belge: Etude exploratoire. In *Annales Aequatoria*, pages 5–101. JSTOR. 1

Voth, H.-J. (2020). Persistence - Myth and Mystery. *CEPR Discussion Papers, Centre for Economic Policy Research*, 15417. 9

Wantchekon, L., Klašnja, M., and Novta, N. (2015). Education and Human Capital Externalities: Evidence from Colonial Benin. *The Quarterly Journal of Economics*, 30:703–757. 4, 20, 32

World Bank (2021). Empowering girls and enhancing learning in drc. note 2: Supply and demand side determinants of the gender gap. 28

Yates, B. A. (1976). The Triumph and Failure of Mission Vocational Education in Zaïre 1879-1908. *Comparative Education Review*, pages 193–208. 5

Yates, B. A. (1982). Colonialism, education and work: Sex differentiation in Colonial Zaïre. *in Edna G. Bay, ed., Women and Work in Africa, Westview Press, Boulder*, pages 127–52. 6, 34

Appendix A Catholic and Protestant Educational Programs in colonial times

Different views on girls' education in Catholic and Protestant schools

The strong conservative view existing in the Catholic system regarding girls' education is well summarized in the following paragraph, which is an excerpt of the official (governmental) program of 1952 to be followed by subsidized schools in Congo.

> "The ideal would be to be able to pursue the moral and intellectual uplift of boys and girls at the same pace. Unfortunately, this ideal cannot be realized due to a variety of unfavorable circumstances: [...] lower intellectual receptivity of girls compared to boys [...] It is necessary to design a girls' education program that trains good wives and good mothers and that does not neglect practical branches such as gardening, cooking, washing, ironing, sewing, child care, hygiene, and housekeeping.(Service de l'Enseignement (1952), p.18)".

The difference with the Protestant viewpoint is striking as illustrated by the following excerpt of the minutes of the Congo Missionary Conference of 1924 (this conference gathered annually Protestant missions active in the Congo):

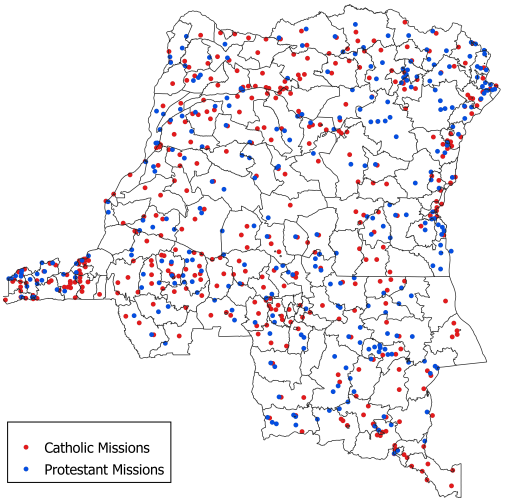
> "In this land, where the woman's social position is so much lower than that of the man's we believe that a mixed school is a powerful factor in lifting the woman to be man's equal. The girls being in the same class as boys have in the daily competition an opportunity of showing an equal aptitude for learning as the boys. Thus we expect the old idea of woman's inferiority to man will be done away with.(Congo Missionary Conference (1924), p.33)".

Differences across Protestant and Catholic schools

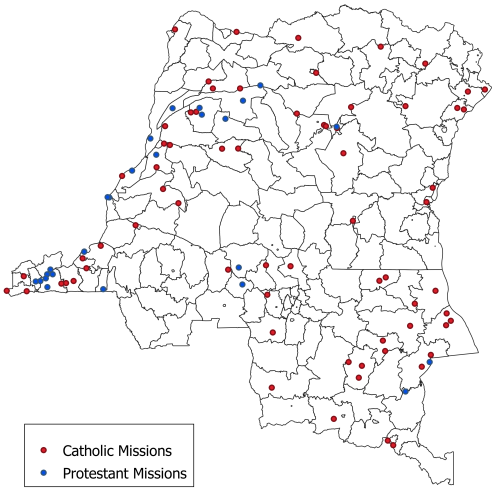
The analysis of the 1950 Report to the Houses of Parliament shows that, in addition to a greater number of schools and pupils, the number of pupils per school (gross average using the report's figures) was also higher among Catholics than Protestants (41 vs. 30)(Administration coloniale, 1950). While these figures should be treated with caution (and may mask considerable heterogeneity), they do suggest that Catholic schools were larger than Protestant ones. Unfortunately it is difficult to draw conclusion regarding school quality from these reports (there is no consistent information on the number of teachers per school for example). While the education promoted by Protestants may have been more content- and quality- driven than that of Catholics (see Section 2), the latter were much better connected to colonial administration and large companies. Vinck et al. (2006) indicates that Catholic education (especially at secondary level) provided access to a better occupational opportunities, especially for boys.

Appendix B Comparison of mission posts databases

Figure B1: Data comparison with Cagé and Rueda (2020)

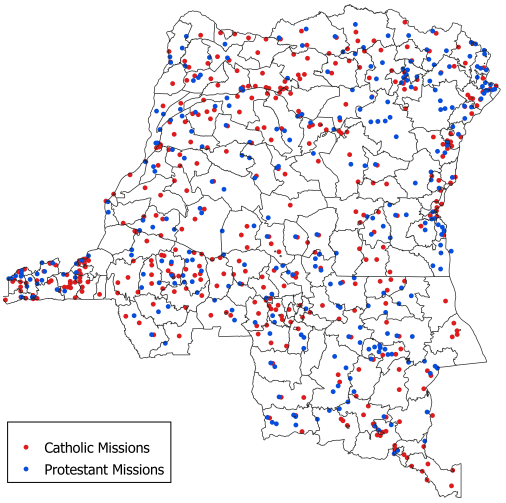


(a) Our data

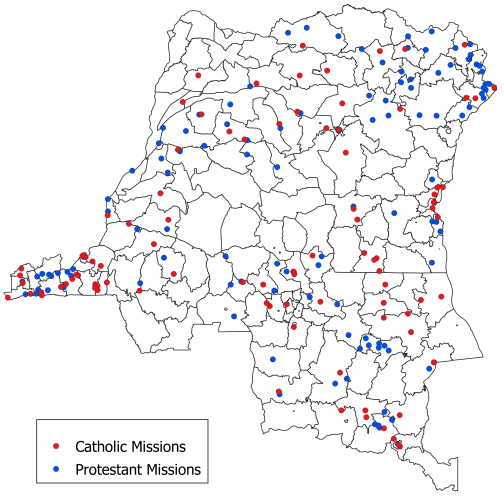


(b) Cagé and Rueda (2020)

Figure B2: Data comparison with Nunn (2010)



(a) Our data



(b) Nunn (2010)

Appendix C Measures of exposure to missions

Table C1: Exposure to missionary presence in 1900,1948 and DHS

	N	Mean	St. deviation	Max	Min
Exposure to Catholics in 1900	148	-230.14	145.61	-592.28	-4.52
Exposure to Catholics in 1948	148	-37.81	19.76	-114.50	-2.98
Exposure to Catholics in DHS	785	-21.64	20.83	-126.20	-0.37
Exposure to Nuns in 1900	148	-306.26	187.33	-790.68	-4.52
Exposure to Nuns in 1948	148	-54.43	31.47	-158.61	-2.98
Exposure to Nuns in DHS	785	-35.40	35.88	-189.21	-0.37
Exposure to Protestants in 1900	148	-142.64	87.24	-362.27	-6.43
Exposure to Protestants in 1948	148	-45.61	23.83	-161.64	-6.43
Exposure to Protestants in DHS	785	-32.16	28.33	-191.05	-0.33

Notes: Exposure to mission of type X in 1900 and in 1948 is our measure of average exposure computed at the territory level. It is computed as the average (negative) distance in kilometres between 1000 random points generated within the territory in the corresponding year and the nearest mission of type X. With the DHS data, exposure is measured as the (negative) distance in kilometres from each DHS cluster to the closest mission in 1948. N corresponds to the number of clusters in the DHS, while it corresponds to the number of territories for our historical distances.

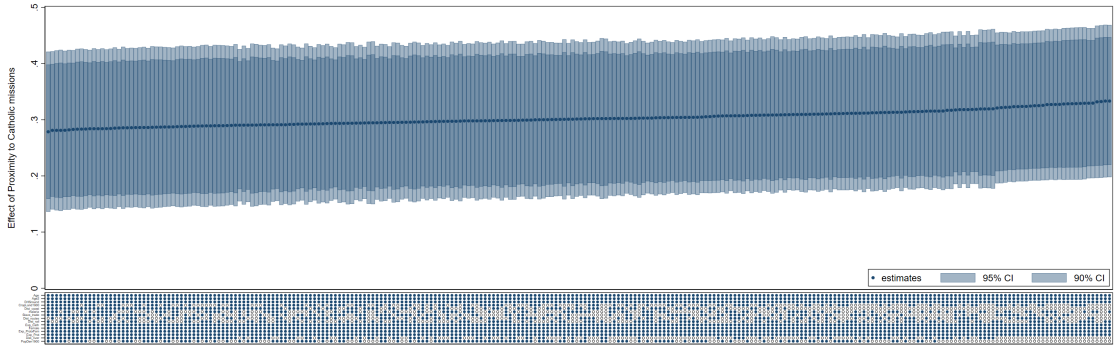
Appendix D Long-term Effects: Threats to identification and Robustness Checks

In this Appendix we provide further discussion and analyses in order to rule out a spurious correlation between mission location and education outcomes today. First, we show that our results are not sensitive to the inclusion of any particular variable related to the determinants of mission location. Second, we discuss the potential endogeneity of historical post location. Third, we investigate whether missions left lasting impact on the main dimension they targeted: religion. Finally, we perform a series of robustness checks.

Specification curves.– Figures D1 and D2 show the coefficient stability of our main results to different combinations of relevant control variables. Under random assignment, point estimates should not dramatically change after the inclusion of control variables. We examine whether the coefficients associated to missionary presence are sensitive to some of the variables usually identified as determining the initial position of missions. As we observe below, the coefficients are barely sensitive to the inclusion of different combinations of control variables, reducing the concerns about the endogeneity bias potentially introduced by missionary location. This effects are consistent with the accounts of Wantchekon et al. (2015), who argue that colonial schools' location was made with very little information, and therefore were quasi-random in practice. In the context of the DRC, early reports from missionary provide qualitative evidence in this direction:

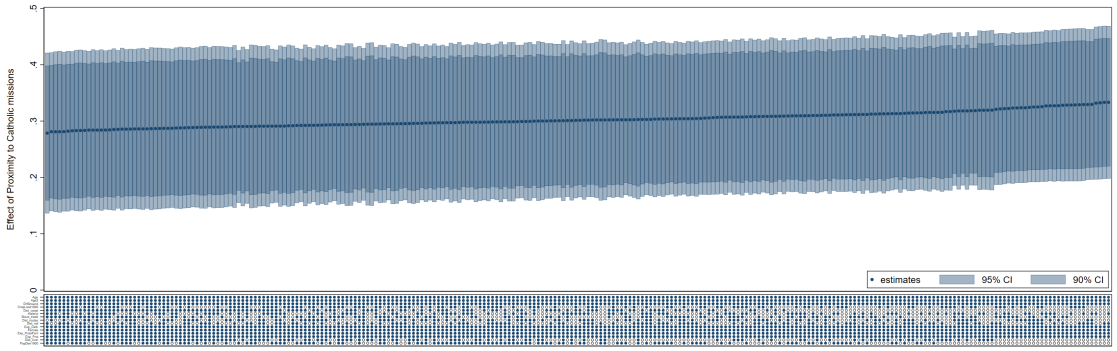
> "Sometimes the question is asked, why was a station established at such and such place, or why was a house built on such and such a site, because today, to a newcomer, it appears that the place or site is not the best that could have been chosen. But if one could realize the circumstances that existed at the time of selection, one would probably find that there was no other course open to our brethren who had to act. The people were not always so willing to welcome white men as now, and there was much jealousy on the part of neighboring villages, which often operated against the most desirable site being occupied (Congo Missionary Conference (1911), p.23)".

Figure D1: Specification curve: Exposure to Catholics x Female



Note: The figure shows the specification curve for the effect of exposure to Catholic missions interacted with the female dummy. Each dot is a coefficient from Eq. 1 with a different combination of control variables. The vertical bars, from darkest to lightest, denote the 95% and 90% confidence intervals. All specifications include province fixed effects.

Figure D2: Specification curve: Exposure to Protestants x Female



Note: The figure shows the specification curve for the effect of exposure to Protestant missions interacted with the female dummy. Each dot is a coefficient from Eq. 1 with a different combination of control variables. The vertical bars, from darkest to lightest, denote the 95% and 90% confidence intervals. All specifications include province fixed effects.

Endogenous location of historical posts.–Our main specification includes an extensive state-of-art set of historical and geographic controls, which the literature have identified as important determinants of mission location (Jedwab et al., 2022). Nevertheless, we cannot rule out the presence of unobserved confounding factors. In particular, an important concern is that our treatment (exposure to missions) mainly captures differential degrees of urbanization. Indeed, most colonial posts in the DRC (but not all), became cities or towns after independence. In that case, our treatment would be a proxy for distance to the city, and our empirical strategy would consist in a comparison between more and less urbanized areas. To account for this, we have always included population density in 1900 as a proxy for current urbanization (the correlation between our measure of population density in 1900 and an index of urbanization in 2000 is 0.81).[58] We do not directly control for current urbanization in our main specifications as it can be understood as a *bad control* in the sense of Angrist and Pischke (2009). Table D1 shows the re-estimation of Equation 1 including urbanization in 2000 as a control and shows that our results barely move. Even if this variable can be considered as a *bad control*, the fact that our results change little when we control for current urbanization suggests that it is not the main driver of the correlation (Table D1). Similarly, Table D2 estimates Eq. 1 using the sample of rural DHS cluster only. Although this sample restriction may introduce bias due to the bad control problem, we obtain similar results.[59]

[58] We acknowledge that these historical measures of population density have strong limitations (Guinnane, 2023). However, in our case, historical population density strongly correlates with current population density, which is derived from remote sensing image collections (e.g. Landsat imagery). Moreover, our results are not sensitive to the inclusion of historical population density.

[59] Now, the long-term effects of Protestant missions seem to be somewhat stronger, driven by their influence on post-primary education. This is not very surprising. As we briefly discuss in Section 3.1, 35% of the 35.000 secondary schools that operate in the DRC in 2020 are Protestant, as compared with 15% of Catholic secondary schools.

Table D1: Exposure to missions, education and urbanization

	(1) Years of education	(2) Literacy	(3) Post primary	(4) Secondary or more
Exposure to Catholic	0.00298	-0.0184*	-0.0110	0.0157**
	(0.103)	(0.0104)	(0.0118)	(0.00787)
Exp to Cath x Female	0.262***	0.0566***	0.0463***	-0.0134**
	(0.0730)	(0.0104)	(0.0106)	(0.00642)
Exposure to Protestant	-0.0341	-0.0172	-0.0139	-0.00240
	(0.110)	(0.0112)	(0.0131)	(0.00839)
Exp to Prot x Female	0.348***	0.0563***	0.0524***	0.0110
	(0.0699)	(0.00967)	(0.0108)	(0.00713)
Urbanization	4.828***	0.459***	0.491***	0.280***
	(0.471)	(0.0402)	(0.0437)	(0.0362)
FEs	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes
Mean Y	6.933	0.637	0.566	0.165
R-squared	0.334	0.223	0.255	0.179
N	34654	34654	34654	34654

NOTE. Data: Pooled 2007 and 2013 waves of the DHS. The sample is restricted to people living in DHS clusters located 50km or closer to a mission. The table reports OLS estimates. We use $-log(distance)$ to measure exposure. "Urbanization" is an index ranging from 0.00 (extremely rural) to 1.00 (extremely urban) for the area within the 2 km (urban) or 10 km (rural) buffer surrounding the DHS survey cluster location. Outcome variables are defined as follows: single years of education in column (1), ability to read a whole sentence in column (2), probability of having post-primary education in column (3) (it includes incomplete secondary education) and probability of having secondary or higher education in column (4). Standard errors () are clustered at DHS cluster level. Geographical, historical and individual controls included. *** for $p < 0.01$, ** for $p < 0.05$, * for $p < 0.1$.

Table D2: Exposure to missions, education and urbanization

	(1) Years of education	(2) Literacy	(3) Post primary	(4) Secondary or more
Exposure to Catholics	-0.133	-0.0143	-0.00826	-0.00428
	(0.117)	(0.0129)	(0.0152)	(0.00761)
Exp to Catholics x Female	0.215**	0.0293**	0.0187	0.00734
	(0.0959)	(0.0120)	(0.0128)	(0.00741)
Exposure to Protestants	0.122	0.0155	0.0180	-0.0117
	(0.138)	(0.0142)	(0.0183)	(0.0103)
Exp to Protestants x Female	0.336***	0.0382***	0.0322**	0.0250**
	(0.112)	(0.0145)	(0.0164)	(0.0106)
FEs	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes
Mean Y	5.209	0.480	0.392	0.0716
R-squared	0.231	0.170	0.189	0.0877
N	20031	20031	20031	20031

NOTE. Data: Pooled 2007 and 2013 waves of the DHS. The sample is restricted to people living in rural DHS clusters. The table reports OLS estimates. We use $-log(distance)$ to measure exposure. Outcome variables are defined as follows: single years of education in column (1), ability to read a whole sentence in column (2), probability of having post-primary education in column (3) (it includes incomplete secondary education) and probability of having secondary or higher education in column (4). Standard errors () are clustered at DHS cluster level. Geographical, historical and individual controls included (see Section 4 for details). *** for $p < 0.01$, ** for $p < 0.05$, * for $p < 0.1$.

Mission location and religion. – Conversion was the primary goal of missionary and historians accounts suggest that providing education was often seen as a strategy to attract new converts. If missionary activities are to have left long-lasting traces, we expect them first on the religious dimension. To investigate whether this is the case, we replace education with religion in the esti-

mated model (Equation 1). Results presented in Table D3 confirm that missions triggered changes that have persisted until today: proximity to historical Catholic missions increases the probability of being Catholic, while proximity to historical Protestant missions increases the probability of being Protestant.

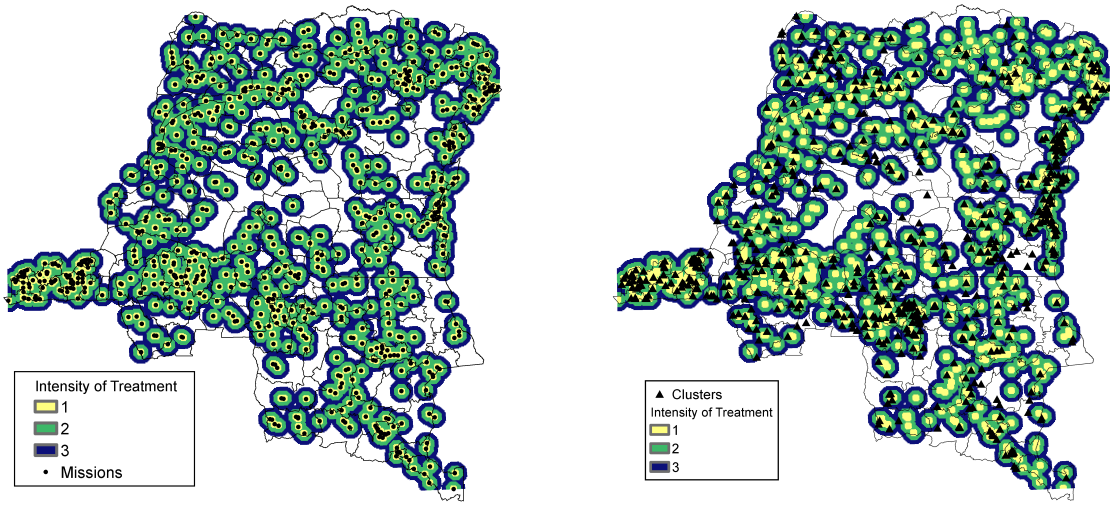
Table D3: Historical missionary presence and religion today

	(1) Religion today: Catholic	(2) Religion today: Protestant
Exposure to Catholic	0.0395***	-0.0172
	(0.0108)	(0.0107)
Exposure to Protestant	0.00913	0.0270**
	(0.0134)	(0.0134)
FEs	Yes	Yes
Controls	Yes	Yes
Mean Y	0.293	0.267
R-squared	0.0877	0.0957
N	34654	34654

NOTE. Data: Pooled 2007 and 2013 waves of the DHS. The sample is restricted to people living in DHS clusters located 50km or closer to a mission. We use $-log(distance)$ to measure exposure. The table reports OLS estimates. Outcome variables are dummies that equal one if the respondent reports that he/she is Catholic or Protestant, respectively. Standard errors () are clustered at DHS cluster level. Geographical, historical and individual controls included. *** for $p < 0.01$, ** for $p < 0.05$, * for $p < 0.1$.

Alternative measure of exposure to Christian missions – First, we consider an alternative measure of exposure to past missionary presence. Instead of measuring exposure as the negative (logarithmic) distance from each DHS cluster to the nearest mission, which in the context of the DHS data introduces classical measurement error due to random cluster displacements, we measure exposure using different sets of Euclidean distance buffers. Therefore, we classify each DHS cluster into three categories: highly exposed (0-16 km away from a mission), moderately exposed (16-33 km away), and weakly exposed (33-50 km away) (Figure D3). As in our main specification, we find in Table D4 that women in highly exposed clusters are more educated today. Second, if missions are located in better areas and educated people sort themselves into more favorable areas, migration would be a concern.

Figure D3: Intensity of Treatment



(a) Missions and area of influence

(b) DHS clusters and missions' intensity

Notes: Figure D3a shows the different intensity buffers. Number "1" corresponds to the area within a 16km radius from a mission, while "2" represents the area between 16km-33km and "3" represents the area between 33km-50km away from a mission. On the other hand, Figure D3b shows the correspondence between DHS clusters and the intensity measures. If a DHS cluster is 20km away from its closest mission, then it is treated with "medium" intensity. Only the closest mission is considered when assigning exposure.

Table D4: Degree of exposure to missions and education

	(1) Years of education	(2) Literacy	(3) Post primary	(4) Secondary or more
HIT	0.128	-0.0206	-0.0125	0.0112
	(0.288)	(0.0273)	(0.0321)	(0.0206)
HIT x Female	0.502**	0.106***	0.0987***	-0.00624
	(0.206)	(0.0280)	(0.0249)	(0.0184)
LIT	0.355	0.0555	0.0456	-0.0319
	(0.311)	(0.0364)	(0.0382)	(0.0223)
LIT x Female	-0.561*	-0.0930**	-0.0654*	0.0201
	(0.294)	(0.0383)	(0.0335)	(0.0239)
FEs	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes
Mean Y	6.933	0.637	0.566	0.165
R-squared	0.301	0.197	0.229	0.165
N	34654	34654	34654	34654

NOTE. Data: Pooled 2007 and 2013 waves of the DHS. The sample is restricted to people living in DHS clusters located 50km or closer to a mission. The table reports OLS estimates. Exposure measures at described in Section D. Outcome variables are defined as follows: single years of education in column (1), ability to read a whole sentence in column (2), probability of having post-primary education in column (3) (it includes incomplete secondary education) and probability of having secondary or higher education in column (4). Standard errors () are clustered at DHS cluster level. Geographical, historical and individual controls included. *** for $p < 0.01$, ** for $p < 0.05$, * for $p < 0.1$.

Migration.–Migration could also be considered as a potential confounder. In fact, people could be sorting themselves into missionary locations nowadays, since these areas could present better geographical, economic or cultural characteristics. Table D5 shows that our results are not driven by migration by focusing only on people who never migrated from their place of residence. Although

point estimates are not always significant here, this is likely due to low power due to smaller sample size. Indeed, by focusing on non-migrants, we have to restrict the sample to those people surveyed in the 2007 DHS round since the 2013 round does not have information on the number of years that respondents spent in their place of residence. Therefore, our sample size is reduced from 34.000 to 7.000. Still, the size and direction of coefficients are very similar.

Table D5: Exposure to missions and education of non-migrants

	(1) Years of education	(2) Literacy	(3) Post primary	(4) Secondary or more
Exposure to Catholic	0.143	-0.0168	0.00753	0.0227**
	(0.180)	(0.0169)	(0.0193)	(0.0108)
Exp to Cath x Female	0.237	0.0721***	0.0405*	-0.0204**
	(0.145)	(0.0220)	(0.0233)	(0.00996)
Exposure to Protestant	0.0747	-0.0125	-0.00896	0.00302
	(0.177)	(0.0167)	(0.0186)	(0.0126)
Exp to Prot x Female	0.232*	0.0475**	0.0459**	-0.00769
	(0.134)	(0.0194)	(0.0208)	(0.0102)
FEs	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes
Mean Y	6.324	0.603	0.521	0.123
R-squared	0.390	0.281	0.317	0.167
N	7567	7567	7567	7567

NOTE. Data: 2007 wave of the DHS. The sample is restricted to people surveyed in the 2007 DHS round who has never migrated, and lived in a DHS cluster located 50km or closer to a mission at the time of the survey. The table reports OLS estimates. We use $-log(distance)$ to measure exposure. Outcome variables are defined as follows: single years of education in column (1), ability to read a whole sentence in column (2), probability of having post-primary education in column (3) (it includes incomplete secondary education) and probability of having secondary or higher education in column (4). Standard errors () are clustered at DHS cluster level. Geographical, historical and individual controls included. *** for $p < 0.01$, ** for $p < 0.05$, * for $p < 0.1$.

Spatial autocorrelation. – A final concern is related to the existence of spatial autocorrelation, which could reduce our estimated standard errors. Following recent suggestions (i.e., Kelly (2019) or Voth (2020)), we always include province fixed effects, latitude, longitude and malaria as controls, and several variables measuring distances. Moreover, we always restrict our sample to DHS clusters located less than 50km away from the closest mission, reducing the concern that DHS clusters are similar to distant places, and omitting regions with extreme values of the explanatory variable. Finally, we show in Table D6 that the statistical significance of our results is unaffected when adjusting for spatial autocorrelation using Conley standard errors(Conley, 1999).[60]

[60] These results are consistent to the election of different thresholds such as 25km or 50km (not shown).

Table D6: Education in 2000 and missions, 100km Conley standard errors

	(1) Years of education	(2) Literacy	(3) Post primary	(4) Secondary or more
Exposure to Catholic	0.0720	-0.0118	-0.00398	0.0197**
	(0.119)	(0.0108)	(0.0117)	(0.00928)
	[0.137]	[0.010]	[0.013]	[0.009]
Exp to Cath x Female	0.273***	0.0576***	0.0475***	-0.0127*
	(0.0712)	(0.0102)	(0.0103)	(0.00649)
	[0.077]	[0.008]	[0.010]	[0.007]
Exposure to Protestant	-0.00320	-0.0143	-0.0107	-0.000604
	(0.121)	(0.0119)	(0.0136)	(0.00923)
	[0.127]	[0.013]	[0.015]	[0.006]
Exp to Prot x Female	0.348***	0.0564***	0.0525***	0.0110
	(0.0689)	(0.00946)	(0.0106)	(0.00722)
	[0.055]	[0.011]	[0.012]	[0.008]
FEs	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes
Mean Y	6.933	0.637	0.566	0.165
R-squared	0.304	0.202	0.232	0.165
N	34654	34654	34654	34654

NOTE. Data: Pooled 2007 and 2013 waves of the DHS. The sample is restricted to people living in DHS clusters located 50km or closer to a mission. The table reports OLS estimates. We use $-log(distance)$ to measure exposure. Outcome variables are defined as follows: single years of education in column (1), ability to read a whole sentence in column (2), probability of having post-primary education in column (3) (it includes incomplete secondary education) and probability of having secondary or higher education in column (4). Standard errors are either clustered at DHS cluster level () or account for spatial autocorrelation (100km Conley standard errors) []. Geographical, historical and individual controls included (see Section 4 for details). *** for $p < 0.01$, ** for $p < 0.05$, * for $p < 0.1$.

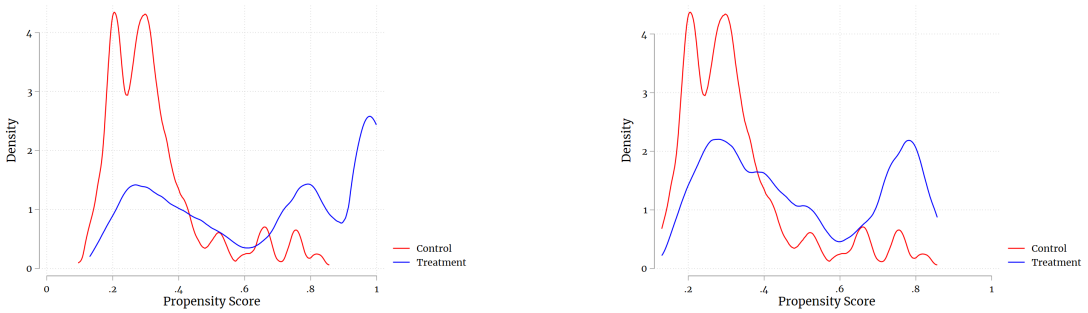
Common support – Linear regression is biased if the true relationship is non-linear. However, this bias is small if there is sufficient overlap in the supports of X ($P(d_i = 1 \mid X_i) < 1$ and $0 < P(d_i = 1 \mid X_i)$). Since we include an extensive set of continuous covariates, it may be useful to check whether there is a problem of common support.[61] In this section, we first verify that our results hold after imposing common support, and second we estimate an interacted regression model.

To identify common support, we first transform our continuous covariates and treatment variable (distance to the closest Christian mission) into dummy variables and then remove observations that are off support for the estimation of the average treatment effect, i.e., treated observations for which the propensity score was higher (smaller) than the maximum (minimum) propensity score of the control observations or control observations for which the propensity score was smaller (larger) than the minimum (maximum) propensity score of the treatment observations.[62] Figure D4 shows the distribution of the propensity score before (Figure D4a) and after (Figure D4b) removing observations off support. Similarly, Table D7 shows the results of our main specification (without distinguishing between Catholic and Protestant missions), before imposing common support (columns 1-4) and after imposing common support (columns 5-8). Coefficients are somewhat smaller, but remain positive and statistically significant.

[61] A detailed description of the list of control variables included in the regressions can be found in Section 3.

[62] We consider an individual as treated if he/she lives 10km or closer to a Christian mission.

Figure D4: Overlapping support



(a) Before imposing common support

(b) After imposing common support

Notes: Panel D4a shows the distribution of the propensity score for both the treatment (individuals living 10km or closer to a mission) and the control (individuals living more than 10km away from a mission) groups. Panel D4b shows the distribution of the propensity score for both the treatment and the control groups after removing observations off support – treated observations for which the propensity score was higher (smaller) than the maximum (minimum) propensity score of the control observations or control observations for which the propensity score was smaller (larger) than the minimum (maximum) propensity score of the treatment observations.

Table D7: Exposure to missions and common support

	No common support				Common support			
	(1) Years educ	(2) Literacy	(3) >primary	(4) ≥Secondary	(5) Years educ	(6) Literacy	(7) >primary	(8) ≥Secondary
≤ 10km	-0.00735	-0.0437**	-0.0283	0.0278	0.168	-0.00880	0.00626	0.0262
	(0.237)	(0.0212)	(0.0245)	(0.0173)	(0.241)	(0.0213)	(0.0249)	(0.0176)
≤ 10km x F	0.732***	0.141***	0.126***	-0.0170	0.441**	0.0822***	0.0693***	-0.00888
	(0.151)	(0.0202)	(0.0194)	(0.0135)	(0.173)	(0.0223)	(0.0225)	(0.0145)
FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mean Y	6.933	0.637	0.566	0.165	6.216	0.577	0.497	0.116
R-squared	0.288	0.192	0.221	0.136	0.208	0.151	0.170	0.0743
N	34654	34654	34654	34654	28631	28631	28631	28631

NOTE. Data: Pooled 2007 and 2013 waves of the DHS. In columns 1-4, the sample is restricted to people living in DHS clusters located 50km or closer to a mission, while in columns 5-8 we also exclude all observations off support. The table reports OLS estimates. Outcome variables are defined as follows: single years of education in columns (1) and (5), ability to read a whole sentence in columns (2) and (6), probability of having post-primary education in columns (3) and (7) (it includes incomplete secondary education) and probability of having secondary or higher education in columns (4) and (8). Standard errors () are clustered at DHS cluster level. Geographical, historical and individual controls included. *** for $p < 0.01$, ** for $p < 0.05$, * for $p < 0.1$.

Finally, we estimate the following equation on the full sample after imposing common support:

$$y_i = \beta_0 + \delta_1 d_i + \left(X_i - \bar{X}_i\right)\pi + \left(X_i - \bar{X}_i\right) d_i \gamma + \varepsilon_i$$

where $\left(X_i - \bar{X}_i\right)$ are our control variables in deviation from their mean and $\hat{\delta} = \widehat{ATE}$. Table D8, columns 1-4, shows that our results barely change.

Table D8: Interacted Linear Regression after Common Support

	Female sample				Male sample			
	(1) Years educ	(2) Literacy	(3) >primary	(4) ≥Secondary	(5) Years educ	(6) Literacy	(7) >primary	(8) ≥Secondary
≤ 10km	0.686***	0.0765***	0.0787***	0.0197**	0.255	0.00105	0.0191	0.0271*
	(0.214)	(0.0238)	(0.0237)	(0.00992)	(0.224)	(0.0197)	(0.0229)	(0.0164)
FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Mean Y	5.406	0.488	0.410	0.0771	7.913	0.763	0.680	0.198
R-squared	0.188	0.133	0.151	0.0542	0.127	0.0573	0.102	0.0720
N	19438	19438	19438	19438	9193	9193	9193	9193

NOTE. Data: Pooled 2007 and 2013 waves of the DHS. The sample is restricted to people living in DHS clusters located 50km or closer to a mission, and all observations off support are removed. Columns 1-4 focus on female individuals, while columns 5-8 focus on male individuals. The table reports OLS estimates. Outcome variables are defined as follows: single years of education in columns (1) and (5), ability to read a whole sentence in columns (2) and (6), probability of having post-primary education in columns (3) and (7) (it includes incomplete secondary education) and probability of having secondary or higher education in columns (4) and (8). Standard errors () are clustered at DHS cluster level. Geographical, historical and individual controls included. *** for $p < 0.01$, ** for $p < 0.05$, * for $p < 0.1$.

All these analyses confirm that our results are very robust and point to a causal effect of mission on education outcomes today.

Appendix E Long term effects by birth decade

Table E1: Education in 2000 and missions, by birth decade

	Years of education			
	(1)	(2)	(3)	(4)
Exposure to Missions	0.315**	0.468***		
	(0.142)	(0.159)		
Exp to Mission x (1980-1989)	0.102	-0.00476		
	(0.115)	(0.141)		
Exp to Mission x (1970-1979)	0.0186	-0.108		
	(0.130)	(0.151)		
Exp to Mission x (1950-1970))	0.120	0.0270		
	(0.160)	(0.173)		
Exposure to Catholic			0.271*	0.320**
			(0.139)	(0.157)
Exp to Cath x (1980-1989)			0.00921	-0.0124
			(0.113)	(0.132)
Exp to Cath x (1970-1979)			-0.0464	-0.0756
			(0.138)	(0.154)
Exp to Cath x (1950-1970)			-0.000437	0.0693
			(0.148)	(0.171)
Exposure to Protestant			0.144	0.259*
			(0.141)	(0.147)
Exp to Prot x (1980-1989)			0.155	0.136
			(0.107)	(0.120)
Exp to Prot x (1970-1979)			0.166	0.0873
			(0.130)	(0.141)
Exp to Prot x (1950-1970)			0.194	0.0212
			(0.135)	(0.159)
FEs	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes
Mean Y	7.005	6.101	7.005	6.101
R-squared	0.337	0.317	0.338	0.319
N	25561	17266	25561	17266

NOTE. Data: Pooled 2007 and 2013 waves of the DHS. Columns 2 and 4 restrict the sample to women. The sample is restricted to people living in DHS clusters located 50km or closer to a mission. The sample is restricted to respondents over the age of 20. The table reports OLS estimates. We use $-log(distance)$ to measure exposure. The outcome variable is single years of education. Standard errors are either clustered at DHS cluster level (). Geographical, historical and individual controls included (see Section 4 for details). *** for $p < 0.01$, ** for $p < 0.05$, * for $p < 0.1$.

Appendix F Short-term Effects in the 1950s

In this section, we rely on the demographic survey that was carried out in the 1950s (see Section 3 for details).

When using the 1950s demographic survey to estimate equation 2, we need to modify our specification slightly. First, instead of using the territory of birth, as in the 1970s survey, to match individuals to our measures of exposure to missionary presence, we use the territory of residence, since the data are aggregated by territory of residence. In addition, since the data are also aggregated by age cohort, we compute the average of age-specific exposure measures (i.e., for the age group 5-9, we first compute the exposure at birth of those aged 5, 6, 7, 8, and 9, and then take the average).

Let t index territory of residence, a index age-group and d index districts.[63] Then, we run the following regression equation for men, women and both sex separately:

$$y_{t,a} = \alpha + D_{t,a}^{'}\beta + X_{t}^{'}\Phi + \theta_d + \sigma_a + \varepsilon_{t,a} \tag{4}$$

Where $y_{t,a}$ is the educational outcome of age group a in territory t. Instead of looking at individual years of education or whether individual i has at least one year of education, the survey provides information on the share of people with (completed) primary and secondary education, the share of people who can read and write, or the share of people who have not studied. Since the variation is higher now, we also include people born before 1930. The vector $D_{t,a}$ contains the (negative) logarithm of our distance measures (averages of age-specific distances) described in section 3.2, but only for Catholics and Protestants due to the high correlation between distance to Catholic missions and distance to Catholic missions with nuns in this dataset ($\rho = 0.94$).[64] Finally, θ_d and σ_a are district and age group fixed effects.

Since we use district fixed effects (θ_d), we need to account for potential endogeneity in the location of missions within the territories of a given district.[65] To do so, we introduce the vector X_t, which contains geographic and historical controls computed at the territory level. Their choice is based on the main determinants of mission location listed by Jedwab et al. (2022) and include: distance to Catholic and Protestant missions in 1885, area, altitude, ruggedness, latitude, longitude and their product, distance to the nearest colonial route, population density and arable land in 1900, a malaria index, a tsetse susceptibility index, number of slaves exported in the Indian and Atlantic trade, distance to the nearest navigable river, and distance to the coast.[66] Standard errors are clustered at the territory of residence level.

[63] Districts are one level higher administrative units than territories.

[64] This high correlation may introduce a problem of (almost) perfect multicollinearity due to the fact that our exposure measure is now an average of age-specific exposures, which reduces the variation in our explanatory variables.

[65] Including territory fixed effects leaves us with very little variation. When using data from the 1950s, we move our geographic fixed effects up one level.

[66] We do not include distance to the capital because it is highly correlated with distance to the coast (($\rho = 0.95$).

Table F1: Education in 1950s and exposure to missionary presence

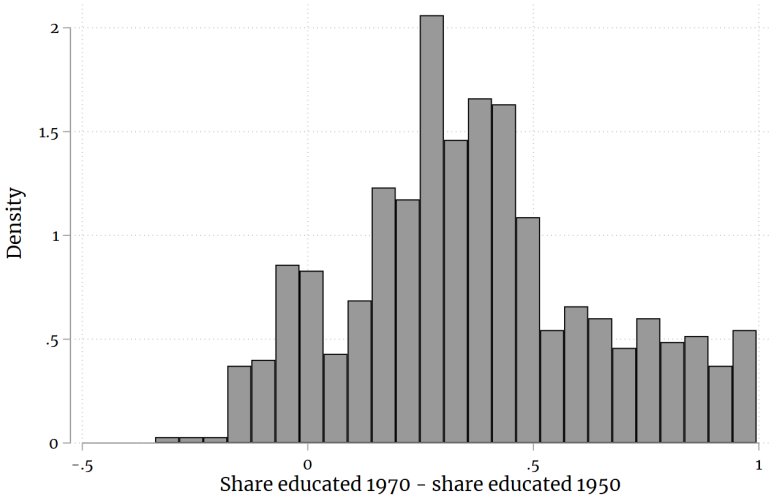
	(1) Share Primary	(2) Share Secondary	(3) Share read/write	(4) Share Studies
Panel A: Both sex				
Exposure to Catholic	0.0213***	0.00445**	0.0335***	0.0268***
	(0.00729)	(0.00171)	(0.00860)	(0.00810)
Exposure to Protestant	-0.00481	-0.00249	-0.00878	-0.00529
	(0.00996)	(0.00189)	(0.0103)	(0.0108)
Panel B: Men				
Exposure to Catholic	0.0195**	0.00743**	0.0336**	0.0334***
	(0.00919)	(0.00302)	(0.0132)	(0.0103)
Exposure to Protestant	0.0120	-0.00446	0.00932	0.00137
	(0.0120)	(0.00323)	(0.0141)	(0.0136)
Panel C: Women				
Exposure to Catholic	0.0159**	0.0000411	0.0159*	0.0237***
	(0.00738)	(0.000561)	(0.00880)	(0.00736)
Exposure to Protestant	-0.00783	-0.00138**	-0.00805	-0.00711
	(0.00945)	(0.000666)	(0.00915)	(0.00997)
FEs	Yes	Yes	Yes	Yes
Mean Y both	0.215	0.0107	0.160	0.221
Mean Y men	0.368	0.0222	0.300	0.376
Mean Y women	0.0834	0.00228	0.0517	0.0808
Controls	Yes	Yes	Yes	Yes
R-squared (both)	0.844	0.582	0.775	0.841
N (both)	1082	836	825	1064

NOTE. Data: Demographic Survey of the 1950s. The unit of observation is a "*Territory x Age-Cohort*". In column (2), the sample is restricted to cohorts older than 15 years old. The table reports OLS estimates. Exposure to missionary presence is measured as $-log(distance)$. Outcome variables are defined as follows: share of people in a given cohort and territory who attended primary (column 1) or secondary (column 2) school, share of people in a given cohort and territory able to read or write (column 3), and share of people with studies in a given cohort and territory (column 4). Standard errors () are clustered at the territory level. Total population, geographical and historical controls included. Cohort and district fixed-effects included in all specifications. *** for $p < 0.01$, ** for $p < 0.05$, * for $p < 0.1$.

Table F1 presents the results. Proximity to Catholic mission increases education for both men and women, while Protestant missions has no detectable effect. Unfortunately, here we are not able to identify the differential effect by gender of Catholic missions with nuns, so we only report the average effect of exposure to general Catholic missions. In terms of magnitude, halving the distance to a Catholic mission increases the share of people with primary school completed by almost 7%, or the share of people able to read and write by about 15%.

Appendix G Short-term Effects: Selection into migration

Figure G1: Degree of Selection into Migration



NOTE.: Data: Demographic Survey of 1950s and Demographic Survey of 1970s. The graph displays the distribution of the difference between the share of educated people in age-cohort a and territory t in the 1970s sample and the share of educated people in age-cohort a and territory t in the 1950s sample. For example, if this difference is 0.2, it means that the share of educated people in age-cohort a and territory t in the 1970s sample is 20 percentage points larger than the share of educated people in the 1950s sample from that same territory and age-cohort.

Table G1: Selection into migration and exposure to missionary presence

	Degree of Selection into Migration		
	(1)	(2)	(3)
Exposure to Catholic	0.00499	0.00621	-0.00215
	(0.0426)	(0.0422)	(0.0447)
Exposure to Protestant	0.0523**	0.0213	0.0399
	(0.0260)	(0.0268)	(0.0305)
Exposure to Catholic Nuns	0.0197	0.0220	0.0176
	(0.0308)	(0.0351)	(0.0355)
Cohort FE	No	Yes	Yes
District FE	No	No	Yes
Territory-level Controls	Yes	Yes	Yes
Mean Y	0.373	0.373	0.373
R-squared	0.147	0.215	0.249
N	645	645	645
p-value Cath=Prot	0.4083	0.7848	0.4968
p-value Cath=Nuns	0.8337	0.8271	0.7882
p-value Nuns=Prot	0.4159	0.9869	0.6169

NOTE. Data: Demographic Survey of the 1950s and Demographic Survey of the 1970s. The unit of observation is a "*Territory x Age-Cohort*". The table reports OLS estimates. Exposure to missionary presence is measured as the $-log(distance)$. It is measured as the average of age-specific exposure measures (at birth) of people from age-cohort a born in territory t. The outcome variable is the difference between the share of educated people in cohort a and territory t in the 1970s sample and the share of educated people in cohort a and territory t in the 1950s sample. Territory-level controls are described in Section F. Standard errors () are clustered at the territory level. *** for $p < 0.01$, ** for $p < 0.05$, * for $p < 0.1$.

Appendix H Short-term Effects: Determinants of Missions

Table H1: Differences between Catholic and Protestant posts, by opening decade

	1900-1910			1920-1930			1940-1948		
	Catholic	Protestant	p-value(1-2)	Catholic	Protestant	p-value(1-2)	Catholic	Protestant	p-value(1-2)
	(1)	(2)		(1)	(2)		(1)	(2)	
Longitude	21.963	23.228	0.396	23.132	24.449	0.123	22.561	23.498	0.284
Latitude	-2.599	-1.689	0.482	-3.923	-3.622	0.743	-2.810	-2.776	0.963
Elevation	568.664	664.965	0.393	726.201	735.825	0.899	685.208	719.918	0.659
Ruggedness Index	5.227	4.719	0.754	4.694	5.450	0.422	6.056	5.333	0.515
Malaria Suitability Index	14.588	12.528	0.240	11.790	12.239	0.719	14.236	12.739	0.147
Distance to navigable river (km)	58.271	90.860	0.210	140.256	98.444	0.077	82.527	112.076	0.128
Distance to coast (km)	1194.633	1275.922	0.650	1331.350	1264.488	0.489	1243.386	1509.821	0.010
Distance to Kinshasa (km)	868.453	926.350	0.716	1011.975	941.810	0.438	918.114	1166.291	0.005
Disantance to colonial routes (km-	79.256	108.589	0.189	99.683	107.704	0.581	101.217	91.132	0.524
Distance to colonial railroad (km)	655.757	511.468	0.213	560.390	644.113	0.163	574.660	694.486	0.022
Population density in 1900	18.146	74.364	0.088	10.300	13.945	0.499	14.790	8.341	0.186
Area suitable for agriculture in 1900	5.352	5.578	0.886	4.125	2.739	0.044	3.975	3.024	0.107
TseTse Fly Suitability Index	0.735	0.515	0.340	0.339	0.535	0.217	0.586	0.663	0.554
Exposure to the Atlantic Slave Trade	344,711.844	6,007.636	0.317	149,143.385	86,064.467	0.624	80,851.923	2,497.541	0.207
N	45	11		78	45		52	74	

Note: This table shows the differences in means between Catholic and Protestant posts along selected variables, depending on the decade in which the posts were opened. A description of the variables and their sources can be found in Section 3.1

Appendix I Short-term Effects: Time-varying controls

Table I1: Education in 1970s and exposure to missionary presence

	(1) Years educ	(2) Any educ	(3) Primary of more	(4) Years educ	(5) Any educ	(6) Primary of more
Catholic missions	0.520***	0.0296	0.0500**	0.700***	0.0862*	0.0804***
	(0.197)	(0.0277)	(0.0228)	(0.241)	(0.0467)	(0.0301)
Catholic missions x female	0.0361	-0.0162	-0.00384	-0.419	-0.147	-0.0698
	(0.255)	(0.0379)	(0.0312)	(0.391)	(0.0908)	(0.0537)
Protestant missions	-0.124	0.0310	0.00935	-0.147	0.0250	0.00658
	(0.294)	(0.0294)	(0.0329)	(0.297)	(0.0296)	(0.0332)
Protestant missions x female	-0.154	0.0188	-0.00959	-0.110	0.0313	-0.00333
	(0.240)	(0.0286)	(0.0310)	(0.245)	(0.0288)	(0.0321)
Catholic with nuns				-0.0176	-0.0314	-0.0259
				(0.232)	(0.0321)	(0.0285)
Catholic with nuns x female				0.420	0.121*	0.0609
				(0.319)	(0.0634)	(0.0396)
FEs	Yes	Yes	Yes	Yes	Yes	Yes
Territory FE	Yes	Yes	Yes	Yes	Yes	Yes
Cohort FE	Yes	Yes	Yes	Yes	Yes	Yes
Time-Varying Controls	Yes	Yes	Yes	Yes	Yes	Yes
Mean Y	4.995	0.734	0.435	4.995	0.734	0.435
R-squared	0.443	0.293	0.339	0.444	0.294	0.339
N	41655	41655	41655	41655	41655	41655

NOTE. Data: Demographic Survey of the 1970s. The sample is restricted to people born after 1930. The table reports OLS estimates. Exposure to missionary presence is measured as $-log(distance)$. Outcome variables are defined as follows: single years of education in columns (1) and (2), a binary variable that equals one if the respondent has at least one year of education in columns (2) and (5) and the probability of completing primary education (>5 years of education) in columns (3) and (6). Standard errors () are clustered at the territory of birth level. All regressions include time-varying district-level information on the size of the white Belgian and white non-Belgium population, the size of the indigenous population and the amount of per capita tax levied from the indigenous population. Fixed-effects include city of residence, territory of birth, 5yr age cohorts and whether the individual was born in an urban area. *** for $p < 0.01$, ** for $p < 0.05$, * for $p < 0.1$.

Appendix J Missions and contemporary schools: robustness

The strong positive correlation between historical mission schools and contemporary schools is not surprising if the missions were located in urban areas. While this may be true, it is less likely that urbanization explains all of our results. First, we have looked at *schools per 1000 inhabitants* instead of at the absolute number of schools in a grid-cell. Second, we always control for factors that are highly correlated with urbanization in the context of the DRC, such as historical population density, or the presence of a navigable river in the grid-cell. Here we show that the strong positive correlation between historical and contemporary schools hold seven when we control for contemporary population density, and when we restrict the sample to rural schools only.[67] Population density in 2000 comes from The Gridded Population of the World (GPW) collection (fourth version), which has an output resolution of about $1km^2$ at the equator. Tables J1 and J2 show the results after adding contemporary population density as an additional control.

Table J1: Former missionary presence and supply of primary education

	(1) Schools/1000	(2) % Girls	(3) % Fem Teac.	(4) Schools/1000	(5) % Girls	(6) % Fem Teach.
Catholic mission	0.916***	0.0613***	0.0658***	0.930***	0.0627***	0.0670***
	(0.170)	(0.0101)	(0.0107)	(0.169)	(0.0104)	(0.0110)
Protestant mission	0.430***	0.0401***	0.0414***	0.382***	0.0376***	0.0384***
	(0.146)	(0.0129)	(0.0136)	(0.144)	(0.0130)	(0.0138)
Mean Y	0.776	0.288	0.310	0.776	0.286	0.308
Collect FE	Yes	Yes	Yes	Yes	Yes	Yes
Pop den 2000	No	No	No	Yes	Yes	Yes
R-squared	0.276	0.390	0.394	0.282	0.400	0.405
N	5787	6010	6010	5787	5814	5814

NOTE. Data: Universe of primary schools in the DRC in 2020, from Ministry of education. The table reports OLS estimates. The unit of observation is a 20kmx20km grid cell. Contemporary population density is described in Appendix J. Outcome variables are defined as follows: number of schools per 1000 inhabitants in columns (1) and (4), average share of girls in school by grid cell in columns (2) and (5), and average share of female teachers in school by grid cell in columns (3) and (6). Controls at the grid-cell level are always included: presence of navigable river, presence of colonial reialroad, presence of precolonial explorer route, population density in 1900, cropland area in 1900, mean altitude, ruggedness, and distance from the centroid of the grid-cell to Kinshasa. Sector fixed-effects (collectivités) included in all specifications. Robust standard errors in parenthesis. *** for $p < 0.01$, ** for $p < 0.05$, * for $p < 0.1$.

[67] Note that the introduction of contemporary population density and the sample restrictions are bad controls.

Table J2: Former missionary presence and supply of primary education

	(1) Schools/1000	(2) % Girls	(3) % Fem Teac.	(4) Schools/1000	(5) % Girls	(6) % Fem Teach.
Catholic mission	0.560***	0.0691***	0.0334***	0.569***	0.0701***	0.0327***
	(0.110)	(0.00986)	(0.00407)	(0.109)	(0.0101)	(0.00407)
Protestant mission	0.281***	0.0492***	0.0138***	0.254***	0.0463***	0.0132***
	(0.0982)	(0.0112)	(0.00425)	(0.0975)	(0.0112)	(0.00425)
Mean Y	0.411	0.189	0.0497	0.411	0.186	0.0484
Collect FE	Yes	Yes	Yes	Yes	Yes	Yes
Pop den 2000	No	No	No	Yes	Yes	Yes
R-squared	0.248	0.433	0.485	0.253	0.443	0.490
N	5787	5984	6010	5787	5788	5814

NOTE. Data: Universe of secondary schools in the DRC in 2020, from Ministry of education. The table reports OLS estimates. The unit of observation is a 20kmx20km grid cell. Contemporary population density is described in Appendix J. Outcome variables are defined as follows: number of schools per 1000 inhabitants in columns (1) and (4), average share of girls in school by grid cell in columns (2) and (5), and average share of female teachers in school by grid cell in columns (3) and (6). Controls at the grid-cell level are always included: presence of navigable river, presence of colonial reialroad, presence of precolonial explorer route, population density in 1900, cropland area in 1900, mean altitude, ruggedness, and distance from the centroid of the grid-cell to Kinshasa. Sector fixed-effects (collectivités) included in all specifications. Robust standard errors in parenthesis. *** for $p < 0.01$, ** for $p < 0.05$, * for $p < 0.1$.

Table J3: Historical Missionary Presence and Contemporary Schools

	(1) Schools/1000	(2) % Girls	(3) % Female Teachers
Panel A: Primary Education			
Catholic mission	0.488***	0.0571***	0.0618***
	(0.104)	(0.0106)	(0.0111)
Protestant mission	0.197**	0.0336**	0.0346**
	(0.0974)	(0.0132)	(0.0140)
Mean Y	0.657	0.283	0.305
Collectivite FE	Yes	Yes	Yes
R-squared	0.270	0.388	0.394
N	5787	6009	6009
Panel B: Secondary Education			
Catholic mission	0.242***	0.0653***	0.0267***
	(0.0574)	(0.00990)	(0.00406)
Protestant mission	0.135**	0.0437***	0.0103**
	(0.0644)	(0.0110)	(0.00424)
Mean Y	0.333	0.184	0.0479
Collectivite FE	Yes	Yes	Yes
R-squared	0.238	0.424	0.465
N	5787	5985	6010

NOTE. Data: Universe of primary and secondary schools in the DRC in 2020, from Ministry of education. The sample is restricted to rural schools as defined by the Ministry of Education. The table reports OLS estimates. The unit of observation is a 20kmx20km grid cell. Outcome variables are defined as follows: schools per 1000 population in 2015 in column (1), average share of girls in school by grid cell in column (2), and average share of female teachers in school by grid cell in column (3). Controls at the grid-cell level are always included: presence of navigable river, presence of colonial reialroad, presence of precolonial explorer route, population density in 1900, cropland area in 1900, mean altitude, ruggedness, and distance from the centroid of the grid-cell to Kinshasa. Sector fixed-effects (collectivités) included in all specifications. Robust standard errors in parenthesis. *** for $p < 0.01$, ** for $p < 0.05$, * for $p < 0.1$.

Appendix K Competition between schools and religious affiliations

When the lagged dependent variable is included as a regressor, OLS estimates are inconsistent since they are correlated with the error term. Moreover, when T is small, the introduction of individual fixed effects does not solve the problem (Nickell, 1981). Here, we show that our results (two-way fixed effects model with large T) do not change when we implement the estimator developed by Arellano and Bond (1991), which is designed to avoid the problem raised by the inclusion of lagged dependent variables. To this end, we estimate the following first difference model:

$$\Delta y_{it} = \gamma_1 \Delta y_{i,t-1} + \gamma_2 \Delta y_{i,t-2} + \gamma_3 \Delta y_{i,t-3} + \beta_0 \Delta x_{i,t} + \beta_1 \Delta x_{i,t-1} + \beta_2 \Delta x_{i,t-2} + \beta_3 \Delta x_{i,t-3} + \Delta u_{i,t}$$

Where y_{it} is the opening of a school of type x in year t, and x_{it} is the opening of a school of the opposite type in year t. Because of practical reasons, we now separate the different lags in the right hand side of the equation. Table K1 shows evidence of strong substitution effects between schools of the same religion, but strong clustering dynamics between schools of different religion, suggesting competition between religious affiliations.

Table K1: Competition between religious affiliations

	(1) P(Catholic)	(2) P(Protestant)	(3) P(Catholic)	(4) P(Protestant)
Catholic		0.0909***		0.136***
		(0.0317)		(0.0447)
Lag 1 Catholic	-0.149***	0.0133*	-0.222***	0.0213**
	(0.0237)	(0.00728)	(0.0320)	(0.00934)
Lag 2 Catholic	-0.00587	-0.00210	-0.00688	0.00194
	(0.00498)	(0.00679)	(0.00538)	(0.00804)
Lag 3 Catholic	-0.0162***	0.00137	-0.0190***	0.00396
	(0.00419)	(0.00574)	(0.00446)	(0.00659)
Protestant	0.0720***		0.0619**	
	(0.0184)		(0.0242)	
Lag 1 Protestant	0.00733	-0.173***	0.0153**	-0.248***
	(0.00458)	(0.0260)	(0.00600)	(0.0343)
Lag 2 Protestant	0.00201	-0.000606	0.00694	0.00362
	(0.00419)	(0.00570)	(0.00509)	(0.00693)
Lag 3 Protestant	0.00250	-0.0138***	0.00572	-0.0108**
	(0.00354)	(0.00477)	(0.00406)	(0.00540)
Time FEs	Yes	Yes	Yes	Yes
Mean Y	0.0532	0.122	0.0532	0.122
N	59482	59482	59482	59482

NOTE. The dependent variable is a dummy that equals one if a new school of type x opens in cell c at year t. The independent variables are dummies that equal one if a new school opens in year t (Catholic or Protestant), in year $t-1$ (lag 1), $t-2$ (lag 2), or $t-3$ (lag 3). Standard errors () clustered at the 20x20km grid cell level are reported in parenthesis. *** for $p < 0.01$, ** for $p < 0.05$, * for $p < 0.1$.

Appendix L Competition across different school types

Table L1: Competition between school types

	(1) P(Catholic)	(2) P(Protestant)	(3) P(Catholic)	(4) P(Protestant)
Public Catholic between t and t-3	-0.0185***	0.0232***		
	(0.00363)	(0.00491)		
Public Protestant between t and t-3	0.0120***	0.000199		
	(0.00286)	(0.00422)		
Private between t and t-3	0.0231***	0.0244**		
	(0.00832)	(0.0109)		
Secular Public between t and t-3	0.00562	0.0164***		
	(0.00349)	(0.00495)		
Other between t and t-3	0.0106***	0.0317***		
	(0.00378)	(0.00584)		
Public Catholic between t and t-5			-0.0207***	0.0198***
			(0.00338)	(0.00461)
Public Protestant between t and t-5			0.00852***	-0.0100**
			(0.00283)	(0.00397)
Private between t and t-5			0.0188**	0.0188*
			(0.00775)	(0.0103)
Secular Public between t and t-5			0.00123	0.0103**
			(0.00317)	(0.00459)
Other between t and t-5			0.00918**	0.0291***
			(0.00375)	(0.00540)
Time FEs	Yes	Yes	Yes	Yes
Grid-cell FEs	Yes	Yes	Yes	Yes
Mean Y	0.0521	0.119	0.0543	0.125
R-squared	0.107	0.191	0.110	0.193
N	61849	61849	57079	57079

NOTE. The dependent variable is a dummy that equals one if a new school of type x opens in cell c at yea tr. The independent variables are dummies that equal one if a new school of the same or different type opened in cell c in year t-1, t-2 or t-3, or in cell c in year t-1, t-2, t-3, t-4 or t-5, respectively. The category "Other" includes: "Église de réveil du Congo", "École conventionnée Islamique", "École conventionnée Kimbanguiste", "École conventionnée Salutiste", "École conventionnée Adventiste", and "École conventionnée de la Fraternité". Standard errors () clustered at the 20x20km grid cell level are reported in parenthesis. *** for $p < 0.01$, ** for $p < 0.05$, * for $p < 0.1$.

Appendix M Competition across religious denominations: robustness

Table M1: Competition between religious affiliations, controlling for education trends

	(1) P(Catholic)	(2) P(Protestant)	(3) P(Catholic)	(4) P(Protestant)
Catholic between t and t-3	-0.0196***	0.0199***		
	(0.00355)	(0.00445)		
Protestant between t and t-3	0.0109***	-0.00256		
	(0.00271)	(0.00373)		
Catholic between t and t-5			-0.0210***	0.0190***
			(0.00329)	(0.00412)
Protestant between t and t-5			0.00866***	-0.00907***
			(0.00272)	(0.00351)
Time FEs	Yes	Yes	Yes	Yes
Grid-cell FEs	Yes	Yes	Yes	Yes
Mean Y	0.0521	0.119	0.0543	0.125
R-squared	0.158	0.350	0.162	0.351
N	61849	61849	57079	57079

NOTE. The dependent variable is a dummy that equals one if a new school of type x opens in cell c at year t. The independent variables are dummies that equal one if a new school of the opposite type opened in cell c in year t-1, t-2 or t-3, or in cell c in year t-1, t-2, t-3, t-4 or t-5, respectively. All specifications include the number of school openings in the province of cell c at year t. Standard errors () clustered at the 20x20km grid cell level and are reported in parenthesis. *** for $p < 0.01$, ** for $p < 0.05$, * for $p < 0.1$.

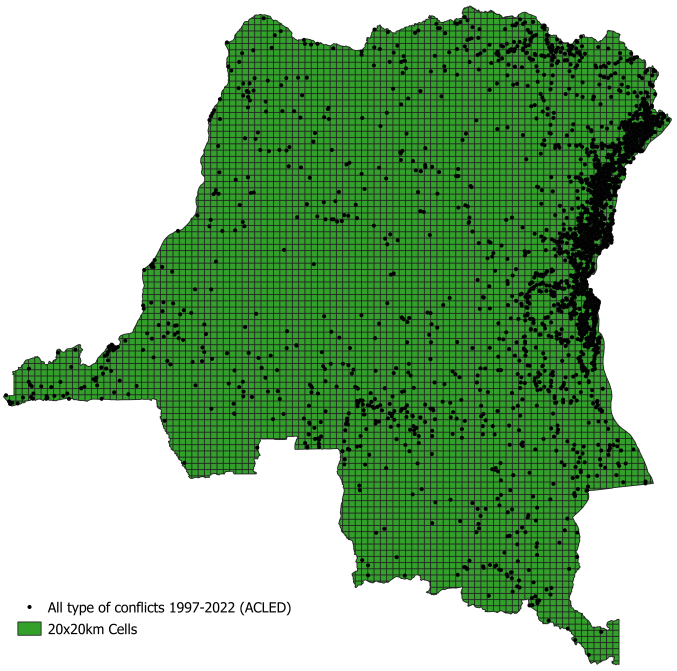
Table M2: Competition between religious affiliations, Conley standard errors

	(1) P(Catholic)	(2) P(Protestant)	(3) P(Catholic)	(4) P(Protestant)
Catholic between t and t-3	-0.0171***	0.0262***		
	(0.00458)	(0.00570)		
Protestant between t and t-3	0.0132***	0.00329		
	(0.00391)	(0.00590)		
Catholic between t and t-5			-0.0198***	0.0220***
			(0.00449)	(0.00623)
Protestant between t and t-5			0.00924**	-0.00758
			(0.00381)	(0.00591)
Time FEs	Yes	Yes	Yes	Yes
Grid-cell FEs	Yes	Yes	Yes	Yes
Mean Y	0.0597	0.126	0.0597	0.126
R-squared	0.00105	0.000780	0.00118	0.000692
N	61891	61891	57115	57115

NOTE. The dependent variable is a dummy that equals one if a new school of type x opens in cell c at year t. The independent variables are dummies that equal one if a new school of the opposite type opened in cell c in year t-1, t-2 or t-3, or in cell c in year t-1, t-2, t-3, t-4 or t-5, respectively. Standard errors () clustered at the 20x20km grid cell level. Standard errors to account for spatial autocorrelation (100km Conley standard errors) in parenthesis. *** for $p < 0.01$, ** for $p < 0.05$, * for $p < 0.1$.

Appendix N Post-colonial schools and conflict

Figure N1: Distribution of conflict events in the DRC, 1997-2022



NOTE.: Data comes from The Armed Conflict Location Event Data Project (ACLED). The figure shows the distribution of all type of conflicts in the DRC between 1997-2022. Events include battles, explosions/remote violence, protests, riots, strategic developments, and violence against civilians.

Table N1: Historical Missionary Presence and Contemporary Schools

	(1) Schools/1000	(2) % Girls	(3) % Female Teachers
Panel A: Primary Education			
Catholic mission	0.464***	0.0362***	0.0387***
	(0.139)	(0.0115)	(0.0121)
Protestant mission	0.320**	0.0418***	0.0424***
	(0.125)	(0.0132)	(0.0139)
Mean Y	0.699	0.281	0.302
Collectivite FE	Yes	Yes	Yes
R-squared	0.300	0.429	0.435
N	5466	5689	5689
Panel B: Secondary Education			
Catholic mission	0.251***	0.0434***	0.0236***
	(0.0878)	(0.0108)	(0.00436)
Protestant mission	0.237**	0.0452***	0.0119***
	(0.0921)	(0.0110)	(0.00420)
Mean Y	0.359	0.180	0.0473
Collectivite FE	Yes	Yes	Yes
R-squared	0.253	0.467	0.496
N	5466	5663	5689

NOTE. Data: Universe of primary and secondary schools in the DRC in 2020, from Ministry of education. The sample is restricted to grid-cells with less than 10 conflicts. The table reports OLS estimates. The unit of observation is a 20kmx20km grid cell. Outcome variables are defined as follows: schools per 1000 population in 2015 in column (1), average share of girls in school by grid cell in column (2), and average share of female teachers in school by grid cell in column (3). Controls at the grid-cell level are always included: presence of navigable river, presence of colonial reialroad, presence of precolonial explorer route, population density in 1900, cropland area in 1900, mean altitude, ruggedness, and distance from the centroid of the grid-cell to Kinshasa. Sector fixed-effects (collectivités) included in all specifications. Robust standard errors in parenthesis. *** for $p < 0.01$, ** for $p < 0.05$, * for $p < 0.1$.

Table N2: Competition between religious affiliations

	(1) P(Catholic)	(2) P(Protestant)	(3) P(Catholic)	(4) P(Protestant)
Catholic between t and t-3	-0.0217***	0.0234***		
	(0.00359)	(0.00508)		
Protestant between t and t-3	0.0110***	0.00156		
	(0.00283)	(0.00435)		
Catholic between t and t-5			-0.0233***	0.0196***
			(0.00338)	(0.00476)
Protestant between t and t-5			0.00841***	-0.00864**
			(0.00285)	(0.00409)
Time FEs	Yes	Yes	Yes	Yes
Grid-cell FEs	Yes	Yes	Yes	Yes
Mean Y	0.0480	0.114	0.0500	0.120
R-squared	0.0888	0.182	0.0914	0.184
N	59508	59508	54846	54846

NOTE. The dependent variable is a dummy that equals one if a new school of type x opens in cell c at year. The sample is restricted to grid-cells with less than 100 conflicts between 1997 and 2022. The independent variables are dummies that equal one if a new school of the opposite type opened in cell c in year t-1, t-2 or t-3, or in cell c in year t-1, t-2, t-3, t-4 or t-5, respectively. Standard errors () clustered at the 20x20km grid cell level. Robust standard errors in parenthesis. *** for $p < 0.01$, ** for $p < 0.05$, * for $p < 0.1$.

Appendix O Competition between religious schools: rural

To reduce further the concerns associated with confounding factors associated with urbanization dynamics (and therefore related to changes in the returns to education and structural transformation), we show here that our results do not change when we exclusively focus on rural areas. First, Table Q1 restricts the sample to rural schools as defined by the Congolese Ministry of Education. Second, Table Q2 restricts the sample to grid-cells with a population density in 2010 lower than 100. In both cases, our results barely change, suggesting that economic factors alone are unlikely to explain the the positive coefficient of opening a school of a different denomination.

Table Q1: Competition between religious affiliations: rural sample

	(1) P(Catholic)	(2) P(Protestant)	(3) P(Catholic)	(4) P(Protestant)
Catholic between t and t-3	-0.0229***	0.0143***		
	(0.00359)	(0.00525)		
Protestant between t and t-3	0.00813***	-0.00654		
	(0.00288)	(0.00436)		
Catholic between t and t-5			-0.0247***	0.0127***
			(0.00333)	(0.00491)
Protestant between t and t-5			0.00823***	-0.0174***
			(0.00282)	(0.00411)
Time FEs	Yes	Yes	Yes	Yes
Grid-cell FEs	Yes	Yes	Yes	Yes
Mean Y	0.0429	0.108	0.0446	0.113
R-squared	0.0807	0.171	0.0836	0.174
N	55875	55875	51297	51297

NOTE. The sample is restricted to rural schools. The dependent variable is a dummy that equals one if a new school of type x opens in cell c at year t. The independent variables are dummies that equal one if a new school of the opposite type opened in cell c in year t-1, t-2 or t-3, or in cell c in year t-1, t-2, t-3, t-4 or t-5, respectively. Standard errors () clustered at the 20x20km grid cell level and are reported in parenthesis. *** for $p < 0.01$, ** for $p < 0.05$, * for $p < 0.1$.

Table Q2: Competition between religious affiliations: rural sample

	(1) P(Catholic)	(2) P(Protestant)	(3) P(Catholic)	(4) P(Protestant)
Catholic between t and t-3	-0.0235***	0.0173***		
	(0.00365)	(0.00513)		
Protestant between t and t-3	0.00855***	-0.000612		
	(0.00288)	(0.00453)		
Catholic between t and t-5			-0.0248***	0.0179***
			(0.00346)	(0.00485)
Protestant between t and t-5			0.00738**	-0.00964**
			(0.00294)	(0.00426)
Time FEs	Yes	Yes	Yes	Yes
Grid-cell FEs	Yes	Yes	Yes	Yes
Mean Y	0.0459	0.112	0.0478	0.118
R-squared	0.0821	0.175	0.0845	0.177
N	53887	53887	49637	49637

NOTE. The sample is restricted to grid-cells with a population density lower than 100. The dependent variable is a dummy that equals one if a new school of type x opens in cell c at year t. The independent variables are dummies that equal one if a new school of the opposite type opened in cell c in year t-1, t-2 or t-3, or in cell c in year t-1, t-2, t-3, t-4 or t-5, respectively. Standard errors () clustered at the 20x20km grid cell level and are reported in parenthesis. *** for $p < 0.01$, ** for $p < 0.05$, * for $p < 0.1$.

Appendix P Intergenerational correlation and father's occupation

Table O1: Intergenerational correlation in education in the 1970s

	(1)	(2)	(3)	(4)	(5)	(6)
	Years educ	Primary or more	Post-primary	Years educ	Primary or more	Post-primary
Father's y.o.e	0.0976***	0.0169***	0.0163***	0.0754***	0.0149***	0.0154***
	(0.0105)	(0.00149)	(0.00120)	(0.00553)	(0.00128)	(0.00167)
Mother's y.o.e	0.0452***	0.00924***	0.00911***	0.0325***	0.00646***	0.00662***
	(0.0103)	(0.00215)	(0.00188)	(0.0115)	(0.00189)	(0.00244)
Father's y.o.e x F				0.0459**	0.00425	0.00177
				(0.0210)	(0.00304)	(0.00286)
Mother's y.o.e x F				0.0271***	0.00589***	0.00523**
				(0.00746)	(0.00179)	(0.00207)
FEs	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Mean Y	6.080	0.636	0.439	6.080	0.636	0.439
R-squared	0.355	0.262	0.299	0.357	0.263	0.299
N	22458	22458	22458	22458	22458	22458

NOTE. Data: Demographic Survey conducted during the 1970s. The sample is restricted to children aged 14-19 during the time of the survey. In the explanatory variables, "*y.o.e*" account for "Years of education" to shorten their names. The table reports OLS estimates. Outcome variables are defined as follows: single years of education in columns (1) and (2), a binary variable that equals one if the respondent has at least one year of education in columns (2) and (5) and the probability of completing primary education (>5 years of education) in columns (3) and (6). Standard errors () are clustered at the territory of birth level. Fixed-effects include city of residence, territory of birth, age, zone of residence of the individual within the city, and father's sector of activity. These sectors are 10: 1) Agriculture, silviculture, hunting and fishing; 2) Extractive industries; 3) Agricultural processing industries; 4) Other processing industries and rubber; 5) Building and civil engineering; 6) Electricity, gaz, water and health services; 7) Financial institutions, insurance, real state; 8) Transport, warehouses and communications; 9) Services; 10) Trade. Controls also include age of parents. *** for $p < 0.01$, ** for $p < 0.05$, * for $p < 0.1$.

Appendix Q Missions and the demand for education of uneducated parents.

We examine whether the demand for education of uneducated parents is different when they grew up closer to a Protestant mission. Formally we estimate the following equation, for both sons and daughters separately:

$$y_{iatz} = \alpha + ParEduc_i^{'}\beta + ParExp_i^{'}\gamma + ParExp_i * ParEduc_i^{'}\pi + X_i^{'}\Phi + \theta_t + \sigma_a + \tau_z + \varepsilon_{iatz} \quad (5)$$

Where y_{iatz} is the educational outcome of child i of age a born in territory t and living in the zone z within her city of residence. $ParEduc$ is a vector containing two binary variables indicating whether the mother and the father have at least one year of education. Finally, $ParExp$ captures whether the father was born in a territory highly exposed to Catholic or to Protestant missions.[68] In our main specification, high exposure to Catholic (Protestant) mission is defined as a binary variable that equals one if the father was born in a territory where the distance to Catholic (Protestant) mission is above the median.[69] X_i is a vector of individual level controls (gender, year of installation in the current city of residence and the age of parents). θ_t, σ_a and τ_z are territory of birth, age and neighborhood (within the city) fixed effects, respectively.

The main coefficient of interest is that on exposure, γ indicating whether uneducated parents who were (highly) exposed to missions take different education decisions (for them $ParEduc = 0$ and thus $ParEduc * ParExp = 0$). Table P1 reports the results and confirms that uneducated parents' exposure to Protestant missions is associated with higher investment in the education of their children, even if, again sizes are modest. Children of uneducated parents have 0.55 more years of education (9.5% of the sample mean) when parents' exposure to Protestant missions is above the median.[70] Exposure to Catholic missions has no significant effect. Furthermore the effect of exposure to Protestant missions is stronger for daughters than for sons.

[68] Results are similar (although of smaller size) if we use the exposure of the mother instead of the father. We prefer using father's exposure to missions because most mothers are uneducated.

[69] Below, we show that these results are robust to alternative thresholds (i.e., top 40% or top 30% of the distribution) or to a continuous measure of exposure.

[70] Interestingly the coefficient on the interaction is of a similar magnitude and an opposite sign, suggesting that educated and uneducated parents had similar demand for education, when highly exposed to Protestant missions.

Table P1: Exposure to mission and children's education: heterogeneity between educated and uneducated fathers
Using father's exposure

	Daughters			Sons		
	Years educ	$\geq$ Primary	Post-primary	Years educ	$\geq$ Primary	Post-primary
	(1)	(2)	(3)	(4)	(5)	(6)
Father educated	0.833***	0.110***	0.0703***	0.479***	0.0843***	0.0678***
	(0.125)	(0.0272)	(0.0195)	(0.0938)	(0.0188)	(0.0182)
Mother educated	0.420***	0.0797***	0.0674***	0.208***	0.0437***	0.0403***
	(0.0466)	(0.0102)	(0.0100)	(0.0362)	(0.00881)	(0.00937)
High Exposure to Cath	0.0135	-0.0153	-0.0210	-0.229	-0.0537	-0.0250
	(0.203)	(0.0293)	(0.0237)	(0.159)	(0.0330)	(0.0245)
High Exposure to Prot	0.547***	0.0701**	0.0654***	0.369**	0.0788***	0.0441*
	(0.179)	(0.0301)	(0.0195)	(0.150)	(0.0302)	(0.0259)
HEC x Father Educ	0.0866	0.0152	0.0542**	0.219	0.0593*	0.0220
	(0.223)	(0.0338)	(0.0233)	(0.159)	(0.0328)	(0.0249)
HEP x Father Educ	-0.455**	-0.0465	-0.0517**	-0.288*	-0.0784**	-0.0294
	(0.190)	(0.0309)	(0.0200)	(0.150)	(0.0342)	(0.0276)
FEs	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Mean Y	5.769	0.590	0.391	6.347	0.673	0.480
R-squared	0.350	0.263	0.282	0.371	0.267	0.311
N	9853	9853	9853	10562	10562	10562

NOTE. Data: Demographic Survey of the 1970s. The sample is restricted to daughters aged 14-19 at the time of the survey in columns (1)-(3) and to sons aged 14-19 in columns (4)-(6). The table reports OLS estimates. High exposure to mission of type X is a dummy variable that equals one if father's exposure to mission of type x is in the top 50% of the distribution. Outcome variables are defined as follows: single years of education in column (1), the probability of completing primary education (>5 years of education) in column (2), and the probability of having post-primary education (>6 years of education) in column (3). Standard errors () are clustered at the father's territory of birth level. Fixed-effects include territory of birth, age and zone of residence. Controls include sex, year of installation in the current city and age of parents. *** for $p < 0.01$, ** for $p < 0.05$, * for $p < 0.1$.

These results are robust to alternative specifications. First, Table P2 shows the same specification but uses instead mother's exposure to missionary presence. Second, Tables P3 and P4 measure high exposure to missions by using alternative thresholds: high exposure is a dummy variable that takes value one if the father was born in a territory belonging to the top 40% or to the top 30% of the distribution of exposure to missionary presence, respectively. Finally, Table P5 measures exposure to missionary presence by using the logarithmic distance, as reported in Section 4.2.

Table P2: Exposure to mission and children's education: heterogeneity between educated and uneducated mothers
Using mother's exposure

	Daughters			Sons		
	Years educ	$\geq$ Primary	Post-primary	Years educ	$\geq$ Primary	Post-primary
	(1)	(2)	(3)	(4)	(5)	(6)
Father educated	0.651***	0.0925***	0.0696***	0.454***	0.0771***	0.0652***
	(0.103)	(0.0161)	(0.0137)	(0.0621)	(0.0142)	(0.0132)
Mother educated	0.522***	0.0935***	0.0929***	0.271***	0.0511***	0.0455***
	(0.0637)	(0.0132)	(0.0166)	(0.0502)	(0.0132)	(0.0125)
High Exposure to Cath	0.103	-0.00292	0.0274*	0.0251	0.00170	0.00425
	(0.0830)	(0.0156)	(0.0155)	(0.0656)	(0.0132)	(0.0159)
High Exposure to Prot	0.190***	0.0318**	0.0158	0.182**	0.0202	0.0286*
	(0.0685)	(0.0142)	(0.0147)	(0.0740)	(0.0167)	(0.0173)
HEC x Father Educ	-0.140	-0.0324*	-0.0484**	-0.0353	-0.00762	0.00377
	(0.101)	(0.0182)	(0.0231)	(0.0840)	(0.0229)	(0.0221)
HEP x Father Educ	-0.0541	0.0151	0.0152	-0.102	-0.00665	-0.0158
	(0.0895)	(0.0198)	(0.0189)	(0.102)	(0.0266)	(0.0251)
FEs	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Mean Y	5.770	0.590	0.393	6.358	0.676	0.481
R-squared	0.348	0.262	0.284	0.368	0.265	0.311
N	9561	9561	9561	10138	10138	10138

NOTE. Data: Demographic Survey of the 1970s. The sample is restricted to daughters aged 14-19 at the time of the survey in columns (1)-(3) and to sons aged 14-19 in columns (4)-(6). The table reports OLS estimates. High exposure to mission of type X is a dummy variable that equals one if mother's exposure to mission of type x is in the top 50% of the distribution. Outcome variables are defined as follows: single years of education in column (1), the probability of completing primary education (>5 years of education) in column (2), and the probability of having post-primary education (>6 years of education) in column (3). Standard errors () are clustered at the mother's territory of birth level. Fixed-effects include territory of birth, age and zone of residence. Controls include sex, year of installation in the current city and age of parents. *** for $p < 0.01$, ** for $p < 0.05$, * for $p < 0.1$.

Table P3: Exposure to mission and children's education: heterogeneity between educated and uneducated fathers
Using an alternative measure of father's exposure : threshold at 40 %

	Daughters			Sons		
	Years educ	$\geq$ Primary	Post-primary	Years educ	$\geq$ Primary	Post-primary
	(1)	(2)	(3)	(4)	(5)	(6)
Father educated	0.801***	0.108***	0.0680***	0.468***	0.0783***	0.0622***
	(0.116)	(0.0251)	(0.0187)	(0.0921)	(0.0191)	(0.0182)
Mother educated	0.419***	0.0794***	0.0672***	0.208***	0.0441***	0.0405***
	(0.0467)	(0.0102)	(0.00997)	(0.0360)	(0.00878)	(0.00933)
High Exposure to Cath	0.0142	-0.0157	-0.0199	-0.228	-0.0506	-0.0250
	(0.204)	(0.0307)	(0.0247)	(0.145)	(0.0308)	(0.0227)
High Exposure to Prot	0.551***	0.0737**	0.0613***	0.360**	0.0843***	0.0354
	(0.140)	(0.0290)	(0.0209)	(0.146)	(0.0288)	(0.0294)
HEC x Father Educ	0.0854	0.0197	0.0485**	0.238	0.0650**	0.0273
	(0.221)	(0.0336)	(0.0239)	(0.147)	(0.0316)	(0.0244)
HEP x Father Educ	-0.461***	-0.0568*	-0.0458**	-0.318**	-0.0812**	-0.0238
	(0.154)	(0.0295)	(0.0222)	(0.137)	(0.0330)	(0.0290)
FEs	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Mean Y	5.769	0.590	0.391	6.347	0.673	0.480
R-squared	0.350	0.263	0.282	0.371	0.267	0.311
N	9853	9853	9853	10562	10562	10562

NOTE. Data: Demographic Survey of the 1970s. The sample is restricted to daughters aged 14-19 at the time of the survey in columns (1)-(3) and to sons aged 14-19 in columns (4)-(6). The table reports OLS estimates. High exposure to mission of type X is a dummy variable that equals one if father's exposure to mission of type x is in the top 40% of the distribution. Outcome variables are defined as follows: single years of education in column (1), the probability of completing primary education (>5 years of education) in column (2), and the probability of having post-primary education (>6 years of education) in column (3). Standard errors () are clustered at the father's territory of birth level. Fixed-effects include territory of birth, age and zone of residence. Controls include sex, year of installation in the current city and age of parents. *** for $p < 0.01$, ** for $p < 0.05$, * for $p < 0.1$.

Table P4: Exposure to mission and children's education: heterogeneity between educated and uneducated fathers
Using an alternative measure of father's exposure : threshold at 30 %

	Daughters			Sons		
	Years educ	$\geq$ Primary	Post-primary	Years educ	$\geq$ Primary	Post-primary
	(1)	(2)	(3)	(4)	(5)	(6)
Father educated	0.784***	0.110***	0.0737***	0.482***	0.0834***	0.0653***
	(0.105)	(0.0217)	(0.0180)	(0.0818)	(0.0180)	(0.0162)
Mother educated	0.415***	0.0791***	0.0666***	0.206***	0.0436***	0.0401***
	(0.0468)	(0.0102)	(0.00986)	(0.0361)	(0.00869)	(0.00930)
High Exposure to Cath	-0.293	-0.0315	-0.0246	-0.166	-0.0241	-0.0214
	(0.321)	(0.0459)	(0.0356)	(0.128)	(0.0271)	(0.0287)
High Exposure to Prot	0.838***	0.0982***	0.0642**	0.270**	0.0580**	0.0326
	(0.189)	(0.0279)	(0.0250)	(0.116)	(0.0239)	(0.0276)
HEC x Father Educ	0.402	0.0393	0.0506	0.180	0.0431	0.0308
	(0.339)	(0.0481)	(0.0353)	(0.141)	(0.0306)	(0.0323)
HEP x Father Educ	-0.768***	-0.0860***	-0.0528**	-0.251**	-0.0613**	-0.0276
	(0.203)	(0.0286)	(0.0253)	(0.111)	(0.0267)	(0.0305)
FEs	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Mean Y	5.769	0.590	0.391	6.347	0.673	0.480
R-squared	0.351	0.263	0.282	0.371	0.267	0.311
N	9853	9853	9853	10562	10562	10562

NOTE. Data: Demographic Survey of the 1970s. The sample is restricted to daughters aged 14-19 at the time of the survey in columns (1)-(3) and to sons aged 14-19 in columns (4)-(6). The table reports OLS estimates. High exposure to mission of type X is a dummy variable that equals one if father's exposure to mission of type x is in the top 30% of the distribution. Outcome variables are defined as follows: single years of education in column (1), the probability of completing primary education (>5 years of education) in column (2), and the probability of having post-primary education (>6 years of education) in column (3). Standard errors () are clustered at the father's territory of birth level. Fixed-effects include territory of birth, age and zone of residence. Controls include sex, year of installation in the current city and age of parents. *** for $p < 0.01$, ** for $p < 0.05$, * for $p < 0.1$.

Table P5: Exposure to mission and children's education: heterogeneity between educated and uneducated fathers
Using an alternative measure of father's exposure : logarithmic distance

	Daughters			Sons		
	Years educ	$\geq$ Primary	Post-primary	Years educ	$\geq$ Primary	Post-primary
	(1)	(2)	(3)	(4)	(5)	(6)
Father educated	-0.0483	-0.00134	0.102*	0.253	0.0378	0.0377
	(0.494)	(0.0749)	(0.0608)	(0.369)	(0.0823)	(0.0929)
Mother educated	0.416***	0.0793***	0.0667***	0.208***	0.0437***	0.0402***
	(0.0463)	(0.0101)	(0.00992)	(0.0359)	(0.00874)	(0.00929)
Father's Exposure to Cath	-0.196	-0.0343*	-0.0194	-0.0983	-0.0237	-0.00740
	(0.159)	(0.0190)	(0.0176)	(0.103)	(0.0171)	(0.0182)
Father's Exposure to Prot	0.507***	0.0734***	0.0505***	0.200*	0.0436***	0.0236
	(0.129)	(0.0193)	(0.0164)	(0.107)	(0.0165)	(0.0225)
Exp to Cath x Educ	0.295	0.0364	0.0488***	0.112	0.0352*	0.0116
	(0.191)	(0.0224)	(0.0181)	(0.0956)	(0.0182)	(0.0190)
Exp to Prot x Educ	-0.456***	-0.0584***	-0.0365**	-0.154	-0.0423**	-0.0176
	(0.145)	(0.0198)	(0.0163)	(0.102)	(0.0178)	(0.0228)
FEs	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Mean Y	5.769	0.590	0.391	6.347	0.673	0.480
R-squared	0.351	0.263	0.283	0.371	0.267	0.311
N	9853	9853	9853	10562	10562	10562

NOTE. Data: Demographic Survey of the 1970s. The sample is restricted to daughters aged 14-19 at the time of the survey in columns (1)-(3) and to sons aged 14-19 in columns (4)-(6). The table reports OLS estimates. Exposure to missionary presence is measured as $-log(distance)$. Outcome variables are defined as follows: single years of education in column (1), the probability of completing primary education (>5 years of education) in column (2), and the probability of having post-primary education (>6 years of education) in column (3). Standard errors () are clustered at the father's territory of birth level. Fixed-effects include territory of birth, age and zone of residence. Controls include sex, year of installation in the current city and age of parents. *** for $p < 0.01$, ** for $p < 0.05$, * for $p < 0.1$.